



MODERN TEACHING STRATEGIES AND MATHEMATICS ACADEMIC ACHIEVEMENT AMONG JUNIOR SECONDARY SCHOOL STUDENTS IN POST– COVID–19 ERA IN CALABAR EDUCATION ZONE, CROSS RIVER STATE, NIGERIA.

ANNE MEREMIKWU, CECILIA OLUNWA EKWUEME AND DAVID ABUA OPOH

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ABSTRACT

This study assess modern teaching strategies and mathematics academic achievement among junior secondary school students in post– covid–19 era in Calabar education zone, Cross River State, Nigeria. Three research questions and hypotheses were formulated to provide focus and to direct the study. The design of this study is quasi-experiment design involving pre-test-post-test. The sampling technique adopted in the study was a simple random sampling technique. The sample comprised of 90 Junior Secondary School III Mathematics Students. Two instruments were used for data collection; the first involved the design of one instructional package on modern teaching strategies and the second instrument was a Mathematics Achievement Test (MAT). The experimental group was taught using modern teaching strategies while the control group was taught using the conventional teaching method. The data obtained were analysed using analysis of covariance (ANCOVA). The result revealed that students taught with innovative teaching strategies, modern technologies and using of mother tongue outperformed those taught using the conventional teaching method. It was recommended that school administrators and government should organize workshops to introduce teachers to modern teaching strategies using innovative teaching, modern technology and using of mother tongue to enhance learning. Efforts should be made to provide well-equipped mathematics laboratory to junior secondary schools to support these modern teaching approaches.

KEYWORDS: Modern teaching strategies, Post–Covid–19 Era, Academic achievement, Junior Secondary School.

INTRODUCTION

The novel corona virus was initially named 2019-nCoV and officially as severe acute respiratory syndrome corona virus 2 (SARSCoV-2).

As of February 26, COVID19 has been recognized in 34 countries, with a total of 80,239 laboratory-confirmed cases and 2,700 deaths (WHO, 2020). Going to school is the best public policy tool available to develop skills and

Anne Meremikwu, Department of Science Education (Mathematics Education Unit) Faculty of Vocation and Science Education University of Calabar, Calabar

Cecilia Olunwa Ekwueme, Department of Science Education (Mathematics Education Unit) Faculty of Vocation and Science Education University of Calabar, Calabar

David Abua Opoh, Department of Science Education (Mathematics Education Unit) Faculty of Vocation and Science Education University of Calabar, Calabar

potentials, school time can be fun, and from an economic point of view the primary point of being in school is that it increases a child's ability to become a useful and acceptable member of the society. Even a relatively short time in school has a longer impact in the life of a child; a short period of missed school may have consequences for skill growth in future. This is why we cannot estimate how much the COVID-19 interruption will affect learning; it is only the visible effect we can see, the gradual decay of inbuilt abilities may not be easily noticed very precisely.

The outbreak of corona virus has shaken the educational sector of Nigeria off its strength. In fact, looking at the trend of the pandemic, it could be something we are going to live with for a long period of time. There is no doubt that there is going to be a serious set-back in the development of Nigeria education system if the corona virus pandemic lockdown is not properly managed by the government and concern personnel. Schools calendar have been disrupted, there is reduction in the economic development of the country which has affected the education finance as well. Since the family income depends on the economic growth of any country, most of the families in Nigeria are experiencing economic hardship as a result of the pandemic lockdown; some of the vulnerable families having their children under the federal government free feeding scheme are being faced with the challenge of going in search of food for their children while they are with them at home. This is certainly a trying time for the economy, a hit on the sustainable development of the country and it is not going to be an easy experience for some households who could barely afford daily balanced diet who have been sacrificing a lot for their children to get the best education for them to become a useful and acceptable member of the society. The outbreak of the corona virus coupled with the lockdown of schools at various levels of education in Nigeria has served as test for the education technology interventions for teaching-learning activities.

The achievement of any educational objectives has largely depended on the successful implementation of curriculum master plan that reflect the philosophical needs and objectives of education in the country. According to Ojerinde cited in Ekwueme and Meremikwu (2010), mathematics is a tool for use in science, technology, and industries; and if mathematics is really the tool for use in science, technology, and industries, then the mathematics curriculum should be such that will have leading contents to

those areas and involvement of competent mathematics teachers that will be abreast with the content.

The restriction of movements and social distancing, occasioned by the COVID-19 pandemic have brought changes in methods and strategies of teaching and learning. Therefore, there is a need for alternative approaches to teaching of Mathematics, which is with the use of modern teaching strategies. In the course of learners' and teachers' interaction in the classroom, different strategies are adopted to enhance understanding. Odogwu in Okri and Aglazor (2020) describe strategies in Mathematics teaching and learning as the procedures and processes used with the mathematics concepts under consideration. Strategy also represents the plan that is intended to be adopted or can also be described as the process of planning something and putting it with skillful operation. The intended strategies to be applied depends on the learning objectives in focus, and this in the long run affects how the class will be arranged and the activities for both the students and teachers that will eventually lead to the attainment of the objectives. The performance of students depends greatly on the instructional strategies adopted by the teachers (Okri and Aglazor, 2020). These strategies are important because students have different levels of understanding. The topics as well as the intended objectives under consideration are also different. This, therefore, means that if the same strategy is adopted for all lessons, the teacher cannot be effective.

The ultimate goal of integrating modern teaching strategies into the classroom is to facilitate learning efficiently and create a positive change in students' academic performance. It is the teachers' responsibility to equip students with knowledge that will enable them face the challenging world that relies heavily on mathematics, science and technology (Ekwueme, 2017). Consequently, teachers need to be ready to accept current changes and take the initiatives of education (Ekwueme & Meremikwu, 2007).

The National Policy on Education requested that students up to the Junior Secondary School level are taught mathematics in the language of their environment (FGN, 2004) cited in Meremikwu (2017). Research has shown that a child's first language is the optimal language for literacy and learning throughout primary school (Meremikwu, 2017). Using the language which the learner is familiar with will help to win more students in mathematics. Many

countries around the world (e.g. Asia, Africa and Europe) have developed policies on the use of the mother -tongue for teaching science and mathematics in the lower levels of their education (Okebukola, Owulabi & Okebukola 2006 cited in Meremikwu (2017). The researcher further asserted that using mother –tongue to teach science in lower basic primary school, found that those taught using mother – tongue performed better than those taught with the official language.

The importance accorded mathematics notwithstanding; many students in the Junior Secondary level still find it difficult to cope with the subject. Though some of these students may exhibit traits of interest in mathematics; it is clearly evident that the teaching and learning process is still void of the experiences, innovations and creativities needed to jolt and motivate their young and energetic minds into exploring the vast field of mathematics (Shirley, 2008). The Junior Secondary level is the stage where students ought to make meaning of mathematics, its usefulness to life and application to further studies. It is the stage where decision to pursue mathematics related subjects and career in future is made; hence teaching and learning of the subject with creativity, experiments and hands-on activities becomes crucial. This is to avoid pushing the career decisions of these young learners to hinge on bias and of course, regrets.

There is ample evidence to show that all over the world, majority of Secondary School students' performance in mathematics have been variously reported by individuals and group of persons to be generally poor. For instance, reports on students' poor performance on mathematics were noted (WASCE Chief Examiners' report, 2017 - 2021). It is unfortunate that the general performance of students in mathematics has been observed to be poor (WASCE Chief Examiners' report, 2021). This situation cannot be allowed to continue escalating without proper check. Some researchers noted that it was associated with poor teaching of the subject (mathematics) by teachers (Shirley, 2008; Ekwueme & Meremikwu, 2007). Specifically, accusing fingers have been pointed at the way mathematics is taught in schools, and the lack of relevance of mathematics content to the student's real life experiences (Ekwueme, 2017). Some reported that students detest mathematics, suggesting that the students are not working hard enough or learning the subject seriously. For instance, the inability of students to change to a

thinking mode suitable for the particular problem, or representing mathematical ideas deterred them from solving a wide range of mathematical problems (Orim & Opoh, 2022).

There are gaps of literatures in integrating modern teaching strategies in Calabar education zone. Hence, it is pertinent to carried out the study to assess modern teaching strategies and mathematics academic achievement among junior secondary school students in post– covid–19 era in Calabar education zone, Cross River State, Nigeria, with the hope of addresses the research gaps and questions.

STATEMENT OF THE PROBLEM

The importance of Mathematics for Sustainable Development Goals (SDG) and growth of any nation is not in doubt. People use Mathematics knowingly and unknowingly in solving their day-to-day problems. It is very true that Mathematics is a model of thinking and a very crucial tool in both Science and Arts. The persistence of poor academic achievement among junior secondary school Mathematics students in Nigeria has become of great concern to all stakeholders in education. Research has shown that teacher-centered instructional approach has dominated the teaching of Mathematics in Nigerian educational system including the Calabar education zone of Cross River State. There is a need to adopt modern teaching strategies which may have the capacity to improve the mindset of students' and enhance their academic achievement in junior secondary school Mathematics, This study seeks to find out the strategies for effective implementation of Mathematics curriculum and students' academic achievement.

PURPOSE OF THE STUDY

The purpose of this study is to investigate modern teaching strategies and mathematics academic achievement among junior secondary school students in post– covid–19 era in Calabar education zone, Cross River State, Nigeria.

Specific Objectives

1. Examine the effects of use of innovative teaching strategy on JSS students' academic achievement in Mathematics.
2. Investigate the effect of modern technologies strategy on JSS students' academic achievement in Mathematics.
3. Determine to what extent JSS students taught with use of mother tongue strategy differ with those taught in conventional method.

Research Questions

1. To what extent do the use of innovative teaching strategy influence JSS students' academic achievement in Mathematics?
2. To what extent do JSS students taught with use of mother tongue strategy differ in student's academic achievement in Mathematics from those taught with conventional approach?
3. What is the significant effect of modern technologies strategy on JSS students' academic achievement in Mathematics?

Research Hypotheses

1. There is no significant influence of the innovative teaching Strategy on JSS students' academic achievement in Mathematics.
2. There is no significant effect of JSS students taught with use of mother tongue strategy and with those taught with conventional method.
3. There is no significance effect of modern technologies strategy on JSS students' academic achievement in Mathematics.

METHODOLOGY

The design of this study is quasi-experiment design. This design considered appropriate because it is applied to a situation which is not purely experimental in nature involving human beings especially when all the threat to validity cannot be controlled. As a result, since the study was conducted under quasi-experimental conditions that do not permit total control, manipulation of variables or random selection of participant, the intact groups or classes were used to investigate the strategies for effective implementation of Mathematics curriculum and JSS students' academic achievement. Also, Junior Secondary School (JSS 3) students who participate in the study received treatment in their usual classes and were used as control in their classes without re-arranging the class setting.

The total population of this study comprised all Junior Secondary (JSS 3) Mathematics Students in Calabar South Education Zone. The sampling technique adopted in this study is simple random sampling technique. Two junior secondary schools were purposively selected for participation based on the two criteria listed below:

- a. The school must have registered students for the Basic Certificate Examination (BECE) for at least 10 years.
 - b. The junior secondary schools should be co-educational schools.
- Only one arm of Junior Secondary School (JSS 3) class was randomly selected for participation in each of the two schools. The students in the selected arms of JSS 3 classes in one of the schools were randomly assigned to the experimental groups, while the control group was assigned to the second school. A pre-test was administered to establish the homogeneity of the groups. Total of ninety (90) students (38 males and 52 females) from the two co- educational schools comprises of forty (40) students (18 males and 22 females) for the innovative teaching strategies and a total of 50 students (20 males and 30 females) participant for the conventional method were chosen as sample for the study.

The study used two instruments, the first was non-cognitive which involved the design of one instructional package on innovative teaching strategies and the second instrument for data collection in this study was consisted of Mathematics Achievement Test (MAT). The development of MAT which was used for this study involved the following stages:

- a. Content base Mathematics.
- b. Instrument Strategy Objectives.
- c. Table of specification.

To determine the reliability of the Mathematics Achievement Test on students' academic achievement, a trial test was conducted with 30 secondary schools students who were not part of the study sample. The 20 items on Mathematics achievement test passed the faced validation by other experts in test and measurement department in Faculty of Educational Foundations, University of Calabar. The reliability co-efficient of the MAT was determine with the use of Kuder Richardson formula KR-21 reliability method. The scores obtained from the administration of the instrument were analyzed using KR-21 to obtain an index of reliability of the instrument 0.72.

Procedure of Data Analysis

The pre-test and post-test of MAT scores of the participants or subject were used. The hypotheses were tested at .05 level of confidence and the specific procedures for data analysis are shown below.

Hypothesis 1

There is no significant influence of the innovative teaching Strategy on JSS students’ academic achievement in Mathematics. Analysis of Co-variance was employed to test data collected in respect to this hypothesis. The summary of result is as presented in table 3

RESULTS

Table 3

Analysis of Co-variance of the difference in Mean Scores of Experimental and Control Groups in the schools of study

Variable	N	X	SD		
Experimental group					
Control group	50	13.14	2.32		
Total					
	40	6.40	2.51.		
	90	9.77	2.42		
Source of variation	SS	Df	MS	F	Sig.
Corrected model	2723.22 ^a	2	1332.32	31.456	.000 ^b
Intercept	1731.13	1	1731.13		
	2413.20	1	1132.32	35.21	
Experimental/Control	131.34	1	1371.34	33.72	
Pretest	122.12	1	3.315	38.37	
Error	2333.02	88		*18.12	
Total	3073.20	90			
Corrected Total					

*significant at .05; df 1, 1 & 88; critical f –value = 2.33

The above table presents the obtained F-value as 18.12. This value was tested for significance by comparing it with the critical F-value at 0.05 level with 1,1 & 88 degree of freedom. The obtained F-value (18.12) is greater than the critical F-value (2.33). Hence, the result is significant. The result therefore shows significant difference in the mean scores of experimental and control groups in the schools of study with the use of innovative teaching strategies.

Considering the difference in the mean scores of experimental and control groups, the result of data analyzed in Table 3 shows that the mean

scores of experimental group is higher than that of the control group. This means that the difference between them is significant. The experimental group makes use of automaticity in learning.

Hypothesis 2

There is no significant effect of JSS students taught with use of mother tongue strategy and with those taught with conventional method. Analysis of Co-variance was employed to test data collected in respect to this hypothesis. The summary of result is as presented in table 4

Table 4

Analysis of Co-variance of the difference in Mean Scores of Experimental [Mother Tongue strategy (MT)] and Control Groups [Conventional Method (CTM)] in the schools of study

Variable	N	X	SD		
Experimental group					
Control group	50	23.32	2.33		
Total					
	40	14.01	3.51		
	90	18.67	2.92		
Source of variation	SS	Df	MS	F	Sig.
Corrected model	2483.23	2	2132.43	38.21	.000 ^b
Intercept	1921.15	1	1974.31		
Experimental/Control	2835.42	1	1713.50	37.31	
Pretest	206.38	1	1537.52	34.82	
Error	1821.02	1	7.3517	36.21	
	2831.42	88		*21.02	
Total					
Corrected Total	2973.42	90			

*significant at .05; df 1, 1 & 88; critical f –value = 2.33

The above table presents the obtained F-value as 18.12. This value was tested for significance by comparing it with the critical F-value at 0.05 level with 1,1 & 88 degree of freedom. The obtained F-value (21.02) is greater than the critical F-value (2.33). Hence, the result is significant. The result therefore shows significant difference in the mean scores of experimental and control groups in the schools of study with the use of innovative teaching strategies.

Considering the difference in the mean scores of experimental and control groups, the result of data analyzed in Table 4 shows that the mean scores of experimental group [Mother Tongue strategy (MT)] is higher than that of the control group [Conventional Method (CTM)]. Thus, the

null hypothesis which states that there is no significant effect of JSS students taught with use of mother tongue strategy and with those taught with conventional method was rejected and the alternative hypothesis upheld. This means that the difference between them is significant.

Hypothesis 3

There is no significance effect of modern technologies strategy on JSS students' academic achievement in Mathematics. Analysis of Co-variance was employed to test data collected in respect to this hypothesis. The hypothesis was tested at 0.05 level of significant. The summary of result is as presented in table 5.

Table 5

Analysis of Co-variance of the difference in Mean Scores of Experimental [modern technologies strategy] and Control Groups [Conventional Method (CTM)] in the schools of study

Variable	N	X	SD		
Experimental group					
Control group	50	26.12	3.21		
Total	40	16.43	3.31		
	90	21.28	3.26		
Source of variation	SS	Df	MS	F	Sig.
Corrected model	2247.53	2	3025.21	34.87	.000 ^b
Intercept	2205.31	1	2134.57		
Experimental/Control	2685.42	1	1935.32	35.97	
Pretest	369.38	1	1731.56	35.426	
Error	2023.12	1	9.1315	34.87	
	2820.60	88		*19.64	
Total	3123.42	90			
Corrected Total					

*significant at .05; df 1, 1 & 88; critical f –value = 2.33

The above table presents the obtained F-value as 18.12. This value was tested for significance by comparing it with the critical F-value at 0.05 level with 1,1 & 88 degree of freedom. The obtained F-value (19.64) is greater than the critical F-value (2.33). Hence, the result is significant. The result therefore shows significant difference in the mean scores of experimental and control groups in the schools of study with the use of innovative teaching strategies.

Considering the difference in the mean scores of experimental and control groups, the result of data analyzed in Table 5 shows that the mean scores of experimental group [Mother Tongue strategy (MT)] is higher than that of the control group [Conventional Method (CTM)]. Thus, the null hypothesis which states that there is no significance relationship between modern technologies strategy and JSS students' academic achievement in Mathematics was rejected and the alternative hypothesis upheld. This means that the difference between them is significant.

DISCUSSION OF FINDINGS:

The first hypothesis states that there is no significant influence of the innovative teaching strategy on JSS students' academic achievement in Mathematics. This null hypothesis was rejected on the ground that the calculated F-values obtained from the analysis of data were statistically greater than the critical F-value at .05 then the null hypothesis was rejected, and this implies that innovative teaching strategies have significant influence on mathematics achievement of students.

The finding of this hypothesis testing, agree with the earlier finding of Ekwueme (2017) who asserted that the ultimate goal of integrating technology into the classroom is to facilitate learning efficiently and create a positive change in students' academic performance. The researcher further revealed that it is the teachers' responsibility to equip students with knowledge that will enable them face the challenging world that relies heavily on mathematics, science and technology. Consequently, teachers need to be ready to accept current changes and take the

initiatives to adapt teaching methods in mathematics education accordingly.

The second hypothesis states that there is no significant effect of JSS students taught with use of mother tongue strategy and with those taught with conventional method. The result indicates that the experimental and control groups differ significantly from each other in academic achievement. Based on this result, therefore, hypothesis 2 is rejected.

The finding of this hypothesis agrees with the earlier finding of Meremikwu (2017) who showed that using the language which the learner is familiar with will help to win more students in mathematics. The researcher further asserted that using mother-tongue to teach science in lower basic primary school was effective, as it found that those taught using mother – tongue performed better than those taught with the official language.

The third hypothesis states that there is no significant relationship between modern technologies strategy and JSS students' academic achievement in Mathematics. This null hypothesis was also rejected on the ground that the calculated F-values obtained from the analysis of data were statistically greater than the critical F-value. The implication of this result is that there is a significant relationship between modern technologies strategy and JSS students' academic achievement in Mathematics in the study area.

The finding of this hypothesis is in line with the earlier position of Ekwueme & Meremikwu (2007) who stressed that teachers need to be ready to accept current changes and take the initiatives of improving mathematics education by integrating modern technologies strategy in classroom instructions.

CONCLUSION

Based on the findings of this study, we conclude that academic achievement of JSS students in Mathematics can be significantly enhance by the use of innovative teaching strategy, mother-tongue teaching strategy, use of modern technologies and the strategy of simplifying teaching with games. . Training and re-training of teachers in these strategies will help to enhance the needed qualitative education. Also providing essential infrastructure and textbooks will promote the smooth administration of instruction and enhance understanding of mathematics at the Junior Secondary school level.

SUGGESTION/ RECOMMENDATIONS

We recommend that government should regularly organize workshops, seminars, and short-term training to improve the capacity of mathematics teachers to apply the strategies shown by this study to positively influence students' academic achievement in mathematics namely innovative teaching strategies, the use mother tongue, modern technologies and simplifying with games strategy. Workshops on specific subjects should be organized separately for more effective coverage. Special workshops should be organized to handle specific themes where special difficult content/themes should be treated for greater understanding. Seminars should be organized for teachers before implementation of any new policy to educate and intimate them on the aims and objectives of such programmes. Efforts should be made to provide well-equipped mathematics laboratory to junior secondary schools to support these innovative teaching approaches. Also, Since it was observed that there were no proper plans in place to curb and manage the influence of corona virus on the educational system, it is highly recommended for the government and concerned educational personnel should ensure there are futuristic plans to in case of another similar experience. This is COVID-19, nobody knows what other occurrences will happen in future and will lead to interruption of the activities of the educational system of Nigeria, therefore plans are to be made in ensuring the future of the education system is secured and not been disrupted with emergence of disease.

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SCHOOL LOCATION AND LEVELS OF TEACHING EFFECTIVENESS OF MATHEMATICS TEACHERS IN TERMS OF KNOWLEDGE OF SUBJECT MATTER AND EFFECTIVE CLASSROOM COMMUNICATION IN CALABAR EDUCATION ZONE OF CROSS RIVER STATE, NIGERIA

OTU, BERNARD DIWA, OFIE, MARIA SUNDAY, OJINI, RICHARD AYUH,
ABANG, KINGSLEY BEKOM AND ITA, CAROLINE ISEROM

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ABSTRACT

This study examined school location and the levels of teaching effectiveness of Mathematics teachers in terms of knowledge of subject matter and effective classroom communication in Calabar Education Zone of Cross River State, Nigeria. To achieve the purpose of this study, one hypothesis was formulated to guide the study. Literature related to the variables under this study were reviewed accordingly. Survey research design was adopted for the study. The census sampling technique was adopted for the study. A sample of 201 teachers were randomly selected for the study. The questionnaire was the main instrument used for data collection. To test the hypotheses independent t-test and population t-test analysis statistical technique were adopted. The .05 level of significance was used for the statistical testing of the hypotheses. The result of the analysis revealed that, school location significantly influence teaching effectiveness of Mathematics teachers in terms of knowledge of subject matter and effective classroom communication. The result also revealed that the levels of teaching effectiveness of Mathematics teachers in terms of knowledge of subject matter and effective classroom communication in Calabar Education Zone of Cross River State are significantly high. Based on the findings of the study, it was recommended that teachers should use chalk that will give a sharp contrast and easy to the students' view, the teacher should write boldly and legibly. The teacher should face the students while explaining steps involved in calculation in mathematics, teachers should avoid blocking the students' view of the board while writing. Also, government should not relent in the effort in sustaining best school plant planning in schools.

INTRODUCTION

The importance of teachers in nation building is recognized all over the world.

The progress and development of a nation largely depend on its teachers' quality. This is because of their noble and massive contributions

Otu, Bernard Diwa, Department of Educational Foundations University of Calabar Cross River State
Nigeria

Ofie, Maria Sunday, Department of Educational Foundations University of Calabar Cross River State
Nigeria

Ojini, Richard Ayuh, Department of Educational Foundations University of Calabar Cross River State
Nigeria

Abang, Kingsley Bekom, Department of Educational Foundations University of Calabar Cross River State
Nigeria

Ita, Caroline Iserom, Department of Educational Foundations University of Calabar Cross River State
Nigeria

in nation building cannot be over emphasis. They offer remarkable contributions in making and shaping each and every person in the society. The quality of education is determined by the quality of teachers (Fakeye, 2012). This view was corroborated by Anagbogu, Idajor and Owan (2016) who attributed issues of examination malpractice to socio-economic factor. To make learning more meaningful, understandable and fruitful to a learner, effectiveness of teaching delivered by a teacher is a very essential condition. Fakeye (2012) defined 'teaching effectiveness' as a manifestation of knowledge of content, skills in lesson presentation and creating desirable atmosphere for learning. The author further viewed teaching effectiveness as a kind of classroom transaction that occur between teachers and students which result in increase in students' knowledge. Adeyemi (2010) also defines teaching effectiveness as the type of teaching characterized by the exhibition of intellectual, social and emotional stability, love for children and positive disposition towards the teaching profession and ability to inspire good qualities in students. The role of the teacher therefore is also to produce skilled manpower that can ensure effective development of the social, political, educational, economical, scientific and even military sectors of a nation. It is believed that the amount of learning that can be acquired from a teacher will vary directly with his/her personal variables such as age, gender, marital status, mastery of subject matter, qualification, experiences among others (Okon, 2014). Thus, there are certain factors or variables, both internal and external to the teacher that determine, influence or can be used to predict teaching effectiveness of the teacher. The teacher is a role model to learners under his/her control and must possess the qualities that can assist the learner to acquire the necessary knowledge and skills. In line with this, Jannana (2006) held that competent, experienced and effective teachers are those that give their students the opportunity to explore ideas for themselves by engaging them in activities that can enable them learn on their own. Teachers' experience can be observed in terms

of the changes in students' attitude towards learning and determining the level of students' learning which also affects teacher's effectiveness. The teacher is the curriculum implementer, a guide to learning, a facilitator and a major factor for instructional effectiveness which is crucial for the improvement of students' academic performance in any subject in school (Adewale, 2004). The task for quality education in Nigeria and the development of citizens and the nations have been placed on the teachers. There is need for adequate qualification, experience, additional training and retraining through pre-service, in-service and other environmental variables to be inculcated into the educational system to enhance effective teaching and learning. The bedrock of all science related courses is usually said to be Mathematics. It is the foundation of all technological advancement of every nation (Bassey, Owan, Amansoa and Otu, 2020). Being aware of this, the Federal Government of Nigeria through her National Policy on Education FGN (2014) maintains the compulsory nature of Mathematics in all levels of education, up to tertiary level (though as a general course at the tertiary level). Owing to this, governments at all levels are making serious efforts to provide high quality Mathematics education. It is worthy of note that recognizable attempts, by various stake holders, have been made to enhance teaching and learning of Mathematics. Erukoha (2013) asserts that students' poor performance in examination may not be completely linked to teachers' variables. The reason being that psychological, socio-economic, personal-social and environmental factors also influence students' academic performance which are not teacher related factors. Pickerin and Shaw (2017) opined that there appears to be concern amongst older people with regard to teaching effectiveness. Advancing in age and experiences may enhance teacher's effectiveness. Gender as one of the personal variables concerns women as well as men. The understanding of gender means understanding the opportunities and constraints as they affect both men and women.

Mathematics is important to every individual irrespective of culture, religion, tribe, social status, and gender, in a way that it merged along with daily life. Liakopoulou, (2011) noted that everywhere we go, everything we do or propose to do, either the structure of Mathematics or its application plays a vital role in national development and this is why most countries, races and people emphasized in all aspects of studying, developing, and applying Mathematics. At a psychological level, exposure to mathematics helps in developing an analytic mind and assists in better organization of ideas and accurate expression of thoughts.

The importance of mathematics can be understood by the definition given by (Aguale, 2004) who opined that mathematics is a language in which God has written the world. While science provides the springboard for the growth of technology, mathematics is the gate to sciences. In other words, it is the level of mathematics that determines the level of the science and technological component of any nation. Therefore, mathematics plays a vital role in nation building.

Azuka (2015) identified the fundamental reasons for teaching Mathematics in schools which include: contributing to the technological and socio-economic development of a society; contributing to its political ideology, cultural maintenance and development and providing individuals with prerequisites which may help them cope with life in the various spheres of education or occupation, private life, social life and life as a citizen. Effective teaching, according to Erickson (2013), requires careful listening since it builds on how students think; and to use students' mathematical thinking, teachers need to listen with the intent of using that thinking in order to build the classroom understanding of the mathematics.

Apart from the knowledge of mathematics concepts, awareness of any classroom occurrence that can lead to learning in mathematics class is very relevant. The basic ingredient of learning mathematics is active participation of learners (Akinoso, 2016). Noting the relevance of mathematics to everything in life, poor performance of students in the subject at every level of education, as well as low enrolment ratio in higher institution both for mathematics as a course and other related subjects is a concern to education stakeholders, researchers and even

students themselves. The teaching of Mathematics in schools develop in the individuals the ability to explain reality, predict reality, and make decisions about the reality of the time to proffer solutions to problems that arise in the day-to-day living. Mathematics, being a core subject has its application in every other subject.

There is also the locational problem of schools. Some schools are located in the urban while some are in the rural settlements. Rurality is synonymous with depravity. Students in rural schools are, therefore, deprived of sound teachers, electricity supplies, pipe-borne water and other facilities and amenities that would enable them enjoy the rich tapestry of life. The location of a school can predict or determine teachers' teaching effectiveness and students' achievement in Science. The location of a school has a significant effect on teaching effectiveness and academic performance of the students. Since teaching effectiveness could have effect on both teachers' and students' proficiency, environmental factors such as school location (rural or urban) could also have effect or impact on the proficiency or academic achievement of students.

School location is the physical environment which the school stands. In a bid to expand the frontiers of education to all the nooks and crannies of Cross River State, the State Government establishes public Secondary Schools in both rural and urban settlements. It is speculated that this rural-urban configuration of the State have a telling effect on the quality of intellectual ability of students in the State.

Despite government efforts to maintain standard in mathematics education, the goal is yet to be adequately achieved. Mathematics instructions have not been effectively managed to bring about the desired change in students in the society. It is based on this backdrop that the researcher is interested in investigating school location, knowledge of subject matter and effective classroom communication affecting teaching effectiveness of mathematics teachers in Calabar Education Zone of Cross River State, Nigeria.

Location of the school and medium of instruction could not influence the teachers' effectiveness to the extent to produce gender specific differences, which suggests that an effective teacher may remain so whether associated with rural or urban school. This trend is consistent with previous studies exhibiting similar outcomes (Raju, 2013).

Effectiveness of teachers, in most of the cases, may depend more on other factors than location or school context. These may include job satisfaction, teaching aptitude, attitude towards teaching, motivation etc. However, some other researchers have reported location of the school as having effect on effectiveness of teachers. Teachers working in urban schools were found to be more effective than those in rural schools (Shweta, 2013). Thomas (2012) revealed that the rural female teachers had secured comparatively better scores than the rural male teachers in teacher effectiveness.

Adeyemi (2013) asserted that reasons for variations in teachers' teaching effectiveness are geographical locations (rural or urban), resources, availability of technology and quality of teachers. In other words, students tend to learn and perform better in an educationally stimulating environment that is likely to arouse a higher degree of interest. Adeyemi found that there was significant main effect of school location on teachers' teaching effectiveness in Economics. To buttress this, Adeyemi also found that rural schools are typically less active than urban schools in the United States of America, although with some variation between states and countries. They claim that there is a large Mathematics achievement gap between rural and non-rural areas, although some rural areas are above average and others are just average.

Similarly, Durowaju and Onuka (2015) investigated the effect of school location on teachers' teaching effectiveness in Economics in Senior Secondary Schools in Ibadan Metropolis of Oyo State, Nigeria. Three hypotheses were tested at 0.05 level of significance. Multi-stage sampling procedure was adopted in the study. Sixty schools (30 urban and 30 rural) were randomly selected. Consequently, 60 Senior Secondary Economics Teachers (30 urban and 30 rural) whose classes were used as intact class were involved in the study. Two instruments namely: Teachers' Teaching Effectiveness Enhancement Scale (TSES) was used to generate data for the study. The Reliability coefficients of the instruments were 0.79 and 0.74 respectively. Some of the findings were: school location had significant main effect on

teachers' teaching effectiveness in Economics. While school location had no significant interaction effects on teachers' teaching effectiveness and students' achievement in Economics. It was recommended that teachers should be exposed to teaching effectiveness program to enable them imbibe the spirit of teaching effectiveness in carrying out their assignments.

More so, Radha and Ujjwal (2018) investigated school location and teacher effectiveness: A self-report study on secondary school teachers. The study was conducted on 400 teachers of secondary schools in three selected districts in West Bengal. The teaching effectiveness was estimated by a self-rating scale, namely Teacher Effectiveness Scale (JTES) developed by Jayaramanna. The primary aim of the study was to explore the differences in teaching effectiveness of the secondary school teachers in terms of their gender, locality of the schools and their designation.

The location of a school can predict or determine teachers' teaching effectiveness and students' achievement in Science. To corroborate this, Adeyemi (2013) submitted that the location of a school has a significant effect on teaching effectiveness and academic performance of the students. Since teaching effectiveness could have effect on both teachers' and students' proficiency, environmental factors such as school location (rural or urban) could also have effect or impact on the proficiency or academic achievement of students. According to Onuka and Emunemu (2010), schools that have provided generations of children and young people with knowledge, skills and attitudes need to become autonomous and responsive. Schools play a vital role in developing and sustaining rural communities and are crucial to Nigeria's sustainable growth and development. According to Nginah (2012), in the United States of America, rural means a small town having a population of twenty five thousand people and less, but in Nigeria, rural is rather defined by the amenities available or non-existent. Such amenities include electricity, good schools, pipe-borne water, motorable roads, and health

facilities, among others (Onuka & Emunemu, 2010).

Yusuf, Ajayi and Sofoluwe (2013) examined the influence of school type and location on teaching effectiveness in South West Nigerian secondary schools. A descriptive research of the survey design was used in the study. The sample consisted of 150 school principals. Stratified and simple random sampling techniques were used to select the sample. The data collected were analysed using frequency counts, percentages, means score, standard deviation and t-test statistical analysis. The research question was answered descriptively while the two null hypotheses formulated were tested at 0.05 level of significance. The study revealed that the teachers' effectiveness was low in the rural area and high in the urban. The study further revealed that there was no significant difference in teaching effectiveness between private and public secondary schools both in rural and urban areas. Based on the findings, it was recommended that government should not relent in the effort in sustaining best school plant planning in schools. This shows that the teachers' in the urban areas perform higher in their effectiveness than those the rural area, this could be as a result of availability of facilities.

Knowledge of the subject matter is essential for every teacher to have. This is because, for the teacher to convincingly earn the respect from his colleagues and students, he must demonstrate high degree of knowledge of his or her discipline. This view presupposes that such a teacher has got a sound academic training in the subject, has undergone a professional course in teaching and maintained a continuous academic growth.

In a study of 60 sciences (Mathematics inclusive) teachers from 20 secondary schools in old Owerri Local Government Area Njoku (2001) found that between 95% of the sampled teachers applied the wrong principles in one form or the other during the observed teaching of mathematics. This is dangerous for our educational system. Also Tsui and Cheng (2000) posit that teacher effectiveness includes three domains of subject competencies. One of which is the cognitive where the teacher builds a reservoir of knowledge of subject matter and skills for impartation of content to students. Adey (2005) opined that teacher understanding of the subject matter is basic to effective teaching.

Teacher education curriculum should contain a high percentage of knowledge of subject matter which the teacher is supposed to teach. In the same vein, the Nigerian education research council in a document published in 2004 stated that anyone who teaches (a subject) should know that subject, like it, continue to teach it and should be able to communicate well with the learner and understand its learning processes.

Bassey, Owan, Amansoa and Otu (2020) summarizes the view by saying that if education is to help students make sense of their environment and prepare them for the challenges of a technologically drive and an internationally competitive world, then it must be based on current knowledge. Available teachers must possess that knowledge and know how to transmit it to their students.

The need for communication is very obvious in any teaching-learning process, this is because the ultimate purpose of acquiring knowledge is to use it for communication. This can be done through the use of variety of teaching methods to help students understand the course content, clear presentation of material, giving practical work to support learning, speak clearly and loudly or write clearly on the chalkboard. Students at any level are deliberately being exposed to various forms of activities that lead to effective communication; they have to speak, write debate, argue and read. For students to accurately carry out the above tasks demands that the teacher himself must communicate effectively the desired learning experiences to the learners. Where this is lacking, we believe that learning might not be facilitated. This is why this study needs effective classroom communication as one of the attributes of effective teaching.

According to Agbi (2004) in the classroom, the basic elements in communication include the communicator, (the teacher), encoding (the language), message (the medium), decoding (interpretation), receiver (the students), feedback and noise (distraction). In simple terms, the teacher (communicator) has an idea (or message of instruction) to transmit to the receiver (student). To transmit the idea, the teacher must translate the idea into a meaningful form (encoding) and send the message by verbal or non-verbal means (medium). The message is received through the sense of the student (receiver) and translated into a meaningful form

(decoding). With a nod of the head, a facial expression, or some action, the student acknowledges whether understanding has been achieved (feedback).

Yoderu (2003) explored differences in perceptions or effective teaching of elementary education students in four countries-Finland, United States of America, Botswana and Zimbabwe. A random sample of teachers in training was used to rank 14 teacher characteristics which they perceived to have contributed towards making effective teachers. The result showed broad agreement among respondents on communication skills of the teacher with respect to effective and ineffective teacher. Observed disagreement was only reflected in areas of educational traditions, social and cultural contexts.

With the mathematics classroom, we may summarize the stages of effective communication/management as follows: the message, the curriculum or the topic originates in the mind of the curriculum designer who conceives what planned experiences are desired for the mathematics class; the message is encoded by the teacher and put into the mathematics lesson plan; the lesson is transmitted to the student through a well-articulated method, either through a discussion or demonstration with a chalkboard, a computer or other class members; the students for whom the message is transmitted, receive(s) it; The student (the receiver) decodes the message by trying to make meaning out of what has been communicated. Sometimes he/she own language or medium of understanding; and based on this understanding, he reacts and sends back a reply or a feedback to the sender to enable him knows whether the message has been grasped. (Yoderu, 2003)

The predominant communication in the classroom setting is oral communication. However, Uchegbue, Edet, Otu, Amalu, and Oyo-Ita (2021) in their study, found out that 85% of the talk that went on in the classroom was done by the teacher and mostly through demonstration method. Teachers described, directed and explained, with very little time (15%) for student talk-back. Even when the students do talk, one

had to strain to call it communication. It was true that the students responded to questions, condensed the materials from text, and translated their experiments or field trips into the written words, but they did not typically and verbally communicate their feeling, interest and doubts to the teacher. They often tried perhaps inadvertently to communicate their feelings and uniqueness non-verbally and sometimes violently with attacks on school authority and inanimate objects. Flomodo (2007) therefore, indirectly advised educators that classroom communication should be shared time between teacher and student. This sharing should be in a fairly even proportion with allowance for greater student participation in class activity.

In the principles enunciated by Ntino (2004), indicated that communication is a process; communication is inevitable; communication is continuous. Other principles include that interpersonal communication occurs on more than one level, that self-concept is affected by interpersonal communication. If a teacher is therefore not communicating with his students based on the above principles, he/she is likely to run into several communication barriers. These barriers according to Cole (2000) are individual bias and selectivity, status differences, fear and other emotional overtones, lack of trust, verbal difficulties and information overload.

Aside from oral communication, another type of classroom communication is in a written form. It takes the form of chalkboard sketches, textbooks, visual aids and other written materials. The use of chalkboard is still indispensable particularly in developing countries like Nigeria, etc. Planned boards are yet not widely used in Nigerian schools, even universities, but they are very useful tools for display of pictures and other written materials (Onwuakpa, 2008). Onwuakpa recommends the following: the chalkboard should be mounted in a stationary position preferably on the wall in front of the classroom; it must be at a conspicuous position visible in all areas of the classroom, the board should always be neat and sightful. Teachers should use chalk that will give a sharp contrast and easy to the students' view, the teacher should write boldly and legibly. The chalkboard must be ruled to show the positioning

of the characters, teacher should avoid talking to the chalkboard ignore the students while writing on it. The teacher should face the students while explaining steps involved in calculation in mathematics, teachers should avoid blocking the students' view of the board while writing. The students will appreciate a good standing position outside the view of the written material.

Onwuakpa also added that for textbooks to be effective methods of communication especially in mathematics, these should be followed: the characters of the text must be legible and attractive; the language must be simple and easy to understand not in ambiguous form; the steps must be easy to follow and make reading and calculation enjoyable; the book must contain illustrations of pictures of mathematics like formula, graphs, charts and other concepts; there should objectives at the beginning of each chapter and a summary at the end; the text must contain review questions at the end of every example given and pages should be created for possible answers and their content must be rich and cover the syllabus fairly well.

Another method of communication is through eye contact, gestures, hands and body movement. These could be classified under what Bassey (2006) called "Teaching as a performing Art". It is an activity in which the teacher acts out his part in the classroom with the intention of making a lasting impression on the students' mind. He changes the pitch and volume of his voice to have effect, he passes and stops, uses his hands and body movement to draw students attention. He pauses at crucial movements, cracks a relevant joke and throws sudden questions to keep his students in suspense. He attracts attention and conveys the message with effect such that at the end of the lesson his students look forward with expectation to come back to the next class for more. This method of communication is very good for mathematics class especially for those students who have phobia in mathematics.

These, combined with knowledge of subject matter, is what makes teaching effective. In a study of 100 teachers in two Local Government Areas of Akwa Ibom State, Etim (2005) found out that the level of communication

is significantly related to teacher effectiveness and teacher interaction with students. Students also perceived such teachers as effective in the following ways; they made room for two way communication and interaction between teacher and students; they adopted the formal and informal channel of communication where students had access to them in a less bureaucratic manner. This helped to solve problems, resolve conflicts, reduce tension, motivate students and generate love; and they adopted leadership styles that were less threatening but allowed free flow of information from subordinates (students) and colleagues.

Adelste (2006) stated that communication in the mathematics class is often done with tools that are visual. In today's world, the industrial sector is flooding the market with various tools of communication like the use of computer in solving mathematical problems. The Nigerian school system is, in most cases, operating without these tools. Classroom communication will be effective or enhanced if the school system is supplied with these tools hence the need of this study.

METHODOLOGY

The research design adopted for this study is ex-post facto design. The design, is suitable for this study because the researcher has no control over the independent variables since they have already occurred in the population. The study area is the Calabar Education Zone of Cross River State. The Calabar Education Zone is located between Latitudes $4^{\circ}28'$ and $6^{\circ}31'$ North of the Equator, and Longitudes $7^{\circ}50'$ and $9^{\circ}28'$ East of the Greenwich Meridian. The population for the study consists of all the 201 Mathematics teachers in Calabar Education Zone. The sampling technique used in this study is the purposive (census) sampling technique because the population was not large enough. The sample is made up of all 201 Mathematics teachers in the 72 public secondary schools in the Education Zone.

The instrument used for the study is titled "Teaching Effectiveness of Mathematics Teachers Questionnaire" (TEMTQ). The validity of the instrument was established by experts in Measurement and Evaluation Unit. To ascertain

the reliability of the research instrument, a trial test was conducted using 50 mathematics teachers drawn from the population outside the actual sample. Split-half method of reliability was used to determine the reliability estimate of the instrument. The scores derived from the two sets were correlated using Pearson's Product Moment Correlation and corrected with Spearman Brown prophecy formula. The reliability coefficient ranges from .78 to .85 which were considered high. The copies of the questionnaire were administered in each of the sampled schools with the help of two research assistants.

HYPOTHESES OF THE STUDY

The following two hypotheses were formulated to guide the study;

1. School location do not significantly influence teaching effectiveness of Mathematics teachers in terms of knowledge of subject matter and effective classroom communication.

Mathematics teachers in terms of knowledge of subject matter and effective classroom communication in Calabar Education Zone of Cross River State are not significantly high.

PRESENTATION OF RESULTS

Hypothesis one

School location do not significantly influence teaching effectiveness of Mathematics teachers in terms of knowledge of subject matter and effective classroom communication.

The independent variable in this hypothesis is School location which is categorized into two (urban and rural), while the dependent variable is teaching effectiveness of Mathematics teachers in terms of knowledge of subject matter and effective classroom communication. To test this hypothesis, each of the two categories of School location was compared with the two dimensions of teaching effectiveness of Mathematics teachers in terms of knowledge of subject matter and effective classroom communication using Independent t-test analysis. The result is presented in Table 1

TABLE 1: Independent t-test analysis of the influence of School location on teaching effectiveness of Mathematics teachers in terms of knowledge of subject matter and effective classroom communication (N=201)

Teaching effectiveness	School location	N	\bar{X}	SD	t-value
Classroom management	Urban	119	38.87	2.97	12.80*
	Rural	82	33.26	3.11	
Effective classroom communication	Urban	119	36.92	3.18	10.76*
	Rural	82	32.63	3.26	

*Significant at .05 level, df = 199

The result of the analysis in Table 1 reveals that the t-value for classroom management (12.80) and effective classroom communication (10.76) are respectively higher than the P -value of .000 at .05 level of significance with 199 degrees of freedom. With this result, the null hypothesis that School location do not significantly influence teaching effectiveness of Mathematics teachers

in terms of knowledge of subject matter and effective classroom communication was rejected. This implies that school location significantly influence teaching effectiveness of mathematics teachers in terms of knowledge of subject matter and effective classroom communication.

Hypothesis two

The levels of teaching effectiveness of Mathematics teachers in terms of knowledge of subject matter and effective classroom communication in Calabar Education Zone of Cross River State are not significantly high.

There is only one variable in this hypothesis, which is level of teaching effectiveness of Mathematics teachers; but there are two types of teaching effectiveness at focus in this study. These are knowledge of subject matter and effective classroom communication. The researcher reasoned that for a teacher's

$$\text{Thus, the Reference mean score} = \frac{(4+3+2+1)}{4} \times 10 = 25.00$$

teaching effectiveness to be considered significantly high, his/her effectiveness level should be significantly higher than an average level represented by a reference mean score. This reference mean score was obtained by multiplying the average of the scores assigned to the four response categories of strongly agreed, agreed, disagreed and strongly disagreed for each of the items on the questionnaire by the number of items used to measure each type of the teaching effectiveness (which was 10).

Testing hypothesis 2 involved comparing the sample mean on each of the two levels of teaching effectiveness, knowledge of subject matter and effective classroom communication with the reference mean score of 25.00. The statistical technique deploy to do this comparison was the t-test of one sample mean (also known as population t-test). The results of the analyses are presented in Table 2.

TABLE 2: Population t-test analysis of whether the levels of teaching effectiveness of Mathematics teachers are significantly high (N=201)

Teaching effectiveness	N	Sample Mean	Sample SD	Reference Mean	t-value	Sig level
Knowledge of subject matter	201	37.6866	2.26854	25.00	79.31*	.000
Effective classroom communication	201	33.2935	4.11198	25.00	28.62*	.000

* p < .05; df = 200

The results of analysis presented in Table 2 show the mean and standard deviation of the levels of teaching effectiveness of Mathematics teachers on each of the two types of teaching effectiveness of Mathematics teachers and reference mean at focus in this study. The comparison of each of these sample means of 37.69 and 33.29 with the reference mean score of 25.00 yielded t-values of 79.31 and 28.62. The calculated absolute t-values for knowledge of subject matter 79.25 and effective classroom communication 28.59 are each higher than the p-value of .000 at .05 level of significant with 200 degrees of freedom. With these results, the null hypothesis is rejected in the two instances of knowledge of subject matter and effective classroom communication. This implies that the levels of teaching effectiveness of Mathematics teachers in terms of knowledge of subject matter and effective classroom communication in

Calabar Education Zone of Cross River State are significantly high.

DISCUSSION OF FINDINGS

The result of the first hypothesis revealed that school location significantly influence teaching effectiveness of Mathematics teachers in terms of knowledge of subject matter and effective classroom communication in Calabar Education Zone of Cross River State. The finding are in line with the view of Adeyemi (2013) who asserted that reasons for variations in teachers' teaching effectiveness are geographical locations (rural or urban), resources, availability of technology and quality of teachers. In other words, students tend to learn and perform better in an educationally stimulating environment that is likely to arouse a higher degree of interest. The author also found that rural schools are typically less active than

urban schools in the United States of America, although with some variation between states and countries. They claim that there is a large Mathematics achievement gap between rural and non-rural areas, although some rural areas are above average and others are just average.

The result of the second hypothesis revealed that the levels of teaching effectiveness of Mathematics teachers in terms of knowledge of subject matter and effective classroom communication in Calabar Education Zone of Cross River State are significantly high. The finding are in line with the view of Bassey, Owan, Amansoa and Otu (2020) who summarized the view by saying that if education is to help students make sense of their environment and prepare them for the challenges of a technologically drive and an internationally competitive world, then it must be based on current knowledge. Available teachers must possess that knowledge and know how to transmit it to their students. The need for communication is very obvious in any teaching-learning process, this is because the ultimate purpose of acquiring knowledge is to use it for communication. This can be done through the use of variety of teaching methods to help students understand the course content, clear presentation of material, giving practical work to support learning, speak clearly and loudly or write clearly on the chalkboard.

Uchegbue, Edet, Otu, Amalu, and Oyo-Ita (2021) in their study, also found out that 85% of the talk that went on in the classroom was done by the teacher and mostly through demonstration method. Teachers described, directed and explained, with very little time (15%) for student talk-back. Even when the students do talk, one had to strain to call it communication. It was true that the students responded to questions, condensed the materials from text, and translated their experiments or field trips into the written words, but they did not typically and verbally communicate their feeling, interest and doubts to the teacher. They often tried perhaps inadvertently to communicate their feelings and uniqueness non-verbally and sometimes violently with attacks on school authority and inanimate objects. Flomodo (2007) therefore, indirectly advised educators that classroom communication should be shared time between teacher and

student. This sharing should be in a fairly even proportion with allowance for greater student participation in class activity.

CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study it was concluded that the levels of teaching effectiveness of Mathematics teachers in terms of knowledge of subject matter, effective classroom communication and effective classroom management in Calabar Education Zone of Cross River State are significantly high. It was also concluded that school location significantly influence teaching effectiveness of Mathematics teachers in terms of knowledge of subject matter and effective classroom communication in Calabar Education Zone of Cross River State.

Based on the conclusions of the study it was recommended that the chalkboard should be mounted in a stationary position preferably on the wall in front of the classroom; it must be at a conspicuous position visible in all areas of the classroom, the board should always be neat and sightful. Teachers should use chalk that will give a sharp contrast and easy to the students' view, the teacher should write boldly and legibly. The chalkboard must be ruled to show the positioning of the characters, teacher should avoid talking to the chalkboard ignore the students while writing on it. The teacher should face the students while explaining steps involved in calculation in mathematics, teachers should avoid blocking the students' view of the board while writing.

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TEACHERS' GENDER AND EFFECTIVE CLASSROOM MANAGEMENT AND TEACHING METHODS AS A DIMENSION FOR TEACHING EFFECTIVENESS OF MATHEMATICS TEACHERS IN IKOM EDUCATION ZONE OF CROSS RIVER STATE, NIGERIA

OTU, BERNARD DIWA, OJINI, RICHARD AYUH, UCHEGBUE, HENRIETTA OSAYI
AND ABANG, KINGSLEY BEKOM

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ABSTRACT

The purpose of this study was to determine teachers' gender, effective classroom management and teaching methods as a dimension for teaching effectiveness of Mathematics Teachers in Ikom Education Zone of Cross River State, Nigeria. To achieve the purpose of this study, two hypotheses were formulated to guide the study. Literature related to the variables under this study were reviewed accordingly. Survey research design was adopted for the study. A sample of 145 mathematics teachers were selected from a population of 182 teachers for the study. The selection was done through the census sampling technique. The questionnaire was the instrument used for data collection. To test the hypotheses independent t-test and population t-test statistical analysis were adopted. The .05 level of significance was used for the statistical testing of the hypothesis. The result of the analysis revealed that, teachers' gender significantly influence teaching effectiveness of Mathematics teachers in terms of knowledge of subject matter and effective classroom communication. The result also revealed that effective classroom management and teaching methods as dimensions for teaching effectiveness of Mathematics Teachers in Ikom Education Zone of Cross River State, Nigeria are significant high. Based on the findings of the study, it was recommended that teachers' should develop good student-teacher relationship to asset for effective teaching. Workshops, seminars, and conferences should be organized by government and other professional bodies to enlighten the teachers on the importance of teaching effectiveness in the school system.

INTRODUCTION

The education system in Nigeria is characterized by a number of problems such as poor academic performance of students, wide spread examination malpractice, among others. These problems revolve around teacher

Otu, Bernard Diwa, Department of Educational Foundations University of Calabar Cross River State Nigeria

Ojini, Richard Ayuh, Department of Educational Foundations University of Calabar Cross River State Nigeria

Uchegbue, Henrietta Osayi, Department of Educational Foundations University of Calabar Cross River State Nigeria

Abang, Kingsley Bekom, Department of Educational Foundations University of Calabar Cross River State Nigeria

effectiveness, and this is derived from the manipulation of some of teachers' personal and environmental variables in the teaching of mathematics in the secondary schools. The researcher observed that secondary schools have been affected by this situation as most of the teachers still depend on the traditional classroom strategy where the teacher dominates the teaching process which in turn affects their effectiveness in teaching mathematics in the knowledge based world of today. Studies have been conducted to find lasting solutions to this unwanted situation where students still do not learn mathematics at convenient time and location. Some researchers attributed this to poor incentive system from the part of government for teachers to procure instructional materials that can enable them be effective, while others traced the problem to inadequate skills on the side of both the teachers and students, age and gender differences, poor learning environment among others.

The relative rate of adverse selection between genders in the teaching profession can result in performance differences between male and female teachers. Several mechanisms might explain a different rate of adverse selection among gender in the teaching profession. First, if in the case of men being a teacher is not a very prestigious job, the small portion of male teachers may mostly consist of men whose life goal is to teach, which will result in male teachers performing better on average. Another argument says that due to the unpopularity of teaching, only the worst skilled men choose this profession, which results in better female teachers on average (Joseph, 2013).

Government in response to various recommendations made, had in recent times reviewed teachers incentive packages, and also encouraged in-service programmes for teachers to update their skills that will enable them become effective in lesson delivery. Nevertheless, the problem still persists in secondary schools in Cross River State and this has led the researcher to ask the question; how do effective classroom management and teaching methods influence teaching effectiveness of mathematics teachers in Calabar Education Zone of Cross River State, Nigeria?

Gender refers to the socially constructed characteristics of women and men, such as norms, roles, and relationships of and between groups of women and men. Teacher's gender plays significant roles towards their teaching effectiveness.

Asikhia (2010) conducted a study on students' and teachers' perception of the causes of poor performance in mathematics in Ogun State secondary schools, Nigeria. The study had a target population consisting of all senior secondary II (SSII) students in Ogun State. That is 135 (SSII) students and 50 teachers were selected from five (5) secondary schools for the study through stratified random sampling. The instrument used for data collection was a self-designed questionnaire on the perception of students' performance in mathematics. The data obtained were analyzed using frequency count and chi-square statistical analysis. Findings showed that teachers' gender and qualification did not influence teachers' teaching effectiveness but teachers' method of teaching influenced their teaching effectiveness.

Similarly, Ekanem (2005) investigated teachers' characteristics as predictors of teaching effectiveness of mathematics teachers in Cross River State, Nigeria. Predictors of teaching effectiveness was determined based on; job satisfaction, attitude to teaching, professional commitment, general self-concept, academic self-concept and achievement motivation. The researcher also determined the influence of teachers' gender, academic qualification and teaching experience on teaching effectiveness of mathematics teachers. Ekanem further determined the interaction effects of gender, academic qualification and teaching experience on overall teaching effectiveness of mathematics teachers. Five null hypotheses guided the study; survey research design was adopted with a sample of 181 mathematics teachers in public secondary schools in Cross River State. A 36 items mathematics teachers' questionnaire for teachers' characteristics and 48 items for evaluation of instruction in mathematics. Multiple regression, independent t-test, one-way ANOVA and three-way ANOVA were used to test the hypotheses at .05 level of significance. It revealed that; the achievement motivation of teachers was significant predictor of their

teaching effectiveness while job satisfaction, attitude to teaching, professional commitment, general self-concept and academic self-concept of mathematics teachers were not significant predictors of their teaching effectiveness. Gender of mathematics teachers had no significant influence on their teaching effectiveness but there was significant interaction effect of mathematics teachers' gender and academic qualification on overall teaching effectiveness. The study recommended that; workshops, seminars, and conferences should be organized by government and other professional bodies to enlighten the teachers on the importance of teaching effectiveness in the school system. However, one important teacher gender distinction is that female teachers tend to be more student-centred and supportive of students than male teachers. Female teachers also appear to use class discussion more frequently and encourage collaboration. Ekanem(2005) concluded that the relationship between gender differences in teachers' beliefs and gender differences in their classroom instructions in mathematics need to be explored. Gender differences in primary mathematics teachers' personal goal orientations for teaching, instructional practices, and personal teaching effectiveness were examined (Thronsen & Turmo 2012). The relationships between these constructs and student mathematics performance, i.e. male and female students' achievement, respectively, were also investigated. Thus, the knowledge about relations between primary teacher beliefs and practices in mathematics and student achievement is sparse. Surajit (2012) observed that even when the abilities and performances of males and females were similar, males were seen to be more able than females and so females have less access to opportunities and leave them with less capacity to advance than men. Little real change has occurred despite the clear articulation by Indian educational policy and planning of what is necessary to create democratically structured programmes that will facilitate gender sensitivity and equity Islahi and Nasreen, (2013). The recruitment and promotion of teachers in schools is not solely based on teaching effectiveness or location. In certain quarters such as physical education (sports), excursions and tours, conducting examinations, maintaining law and order, and management, males always get

preference over their counterparts by the school management in spite of comparable qualifications and locations (Islahi & Nasreen, 2013).

Furthermore, Thronsen's and Turmo's (2012) study shows relatively high values for male and female teachers' mastery goal structure for students and mastery approaches to instruction, while performance goal structure for students and performance approaches to instruction had a relatively low average in both groups. This result indicates that Norwegian mathematics teachers in Years 2 and 3 are generally more oriented towards mastery goals than performance goals for their students, and that they are inclined to utilize instructional approaches creating learning environments that foster students' mastery orientation. In other words, students at the lowest grade levels are more strongly exposed to instructional strategies in mathematics that reflect a mastery orientation to learning. Prior research has shown grade level differences in classroom goal structures, i.e., teachers of students in higher grade levels reported using performance oriented practices more than teachers of students in the lower grades which demonstrate their teaching effectiveness.

Osang (2016) evaluated instructional effectiveness of mathematics teachers in secondary schools in Calabar Education Zone, Cross River State, Nigeria. Using their students, the researcher evaluated based on teachers' sex, students' sex and school location. The ex-post facto research design was adopted. They consisted of 121 mathematics teachers and 726 students randomly selected for the study. The questionnaire was the instrument used for data collection. Independent t-test, population t-test and percentage analyses were the statistical analysis techniques adopted to test the hypotheses at .05 level of significance. The result revealed that; the level of instructional effectiveness of mathematics teachers was significantly high. Mathematics teachers' sex, sex of students and school location significantly influenced students' evaluation of instruction in mathematics in secondary schools in Calabar Education Zone.

Similarly, Tukur, Abimbola and Adeshina (2013) investigated the factors that influence effective learning of mathematics at senior secondary school in Gombe metropolis of Gombe state-Nigeria. Survey research design was adopted and one hundred and twenty (120) students of

senior secondary II were purposively sampled from four senior secondary schools, out of twenty six senior secondary schools in Gombe Metropolis. In each of the sampled school, thirty (30) students comprising of fifteen (15) males and fifteen (15) females were involved and all the teachers teaching Mathematics were used as participants for the study. The three hypotheses formulated in the study were tested using t-test and chi-square at 0.05% level of significance. The results revealed that teachers' qualification and teachers' gender had no significant effect on teaching effectiveness in Mathematics. The study recommended that only professionally qualified Mathematics teachers should be allowed to teach mathematics and that mathematics teachers should be devoted to their duties by covering the content of mathematics in each class. Furthermore, the size of classes in secondary schools should be reduced to manageable number (30-40) students per class and finally government should make available and affordable Mathematics textbooks to students by subsidizing the cost of the books.

According to goal orientation theory, the classroom goal structure and the instructional strategies teachers use are precursors of students' personal goal orientation, and students' perceptions of the learning environment are crucial for the goal orientation they adopt (Anderman & Midgley, 2002).

In addition, Throndsen and Turmo (2012) examined differences in male and female teachers' beliefs about their mathematics instruction, and the relationship between boys' and girls' mathematics achievement and teachers' beliefs. The samples were primary mathematics teachers (N=521), Year 2 and Year 3 students (N=9980) from 127 schools. A questionnaire on Primary Mathematics Teachers' Goal Structure for Students, Approaches to Instruction, and Personal Teaching Efficacy was used. Students' mathematics achievement was assessed by a National Diagnostic Mathematics Tests. The teachers were generally oriented towards mastery goals and mastery approaches to instruction, and reported high personal teaching efficacy. However, female teachers reported somewhat higher levels of teaching effectiveness and mastery approaches to instruction, while male teachers reported a Lower

level of teaching effectiveness in approaches to instruction. Positive relations between students' mathematics performance and teachers' teaching effectiveness, mastery approaches to instruction, and teaching efficacy were also found. These relationships were somewhat stronger for female teachers than for male teachers. In conclusion, the relationship between teachers' beliefs and students' performance were different for male and female teachers, respectively.

The teacher may have a good curriculum and all the materials needed for teaching, but where he/she cannot manage his/her class well it will result to chaotic and ineffectiveness of teaching-learning activity. For a teacher to manage his/her class well, he/she must be efficient, focused and prepared. Students prefer instructors who are organized in their teaching and in their approach to the subject matter and also in their dealings with students. An organized instructor's actions include having lesson prepared; make sure students be on their seat, no noise in the class, use clear visual aids, being coherent in class and providing feedback consistently throughout the course.

Ralph (2013) revealed that students prefer an instructor that is being prepared in terms of maximizing instructional time and to know course content. Instructors that would tell students what they will be learning and what is expected of them. Instructors that are not focused on topic makes it difficult for students to understand or pay attention.

Norton (2002) considers teaching effectiveness as a direct function of effective classroom management. This is borne out of the effective practitioner who is caring, committed, highly creative, a proficient reflective thinker with a strong internal locus of control. What makes the class is its environment and the environment is constituted of those elements that influence it within and without. In a study of students in 20 secondary schools in Oyo state, Onwuchekwa (2003) found out that a good classroom environment helps the development of cognitive ability of the students. This study supported findings by psychologists (Palmer, 2003) that children raised in conducive environment talk and learn faster. Frame (2005) also found out that the classroom and its environment had a significant effect on teachers' effectiveness and perception

of work competencies. Teachers who lived in a challenging and highly competitive environment tended to set higher goals and life ambitions and so work harder to attain these goals. They worked hard in their studies and improved their class management styles and skills.

Comadena (2001) support these findings in his study of 71 traditional undergraduate students and 105 adult learners to whom he administered questionnaires designed to measure teacher effectiveness and use of power in the classroom. Findings show that in the sample of adult learners, teacher effectiveness ratings were significantly and negatively related to teacher use of coercive power (i.e authoritarian leadership) and positively related to teacher use of expert power.

Etim (2005) conducted a study on effective participation in decision making and teacher-effectiveness in school system, data were collected from 1200 teachers and analyzed using simple percentage. The finding revealed that teachers' level of effectiveness is independent of their participation in school decision-making process and also that there is no significant and inverse relationship between teachers level of participation in decision-making and their level of effectiveness in terms of teachers' ability to motivate students, the student-teacher relationship and knowledge of subject matter. However, another study by Etim (2008) have proved that teachers manage their classes better by building a teacher-student partnership. Thus, an increased role for students will improve instruction and instill order in the classroom. The advantages of this teacher-student partnership in classroom is that, students feel a personal commitment to the learning task; teachers do not need to use coercion to get student to work; create classes that are organized for student-teacher success; improve instruction and instill order in the class.

Medlemo (2005) summarizes 300 studies on teacher effectiveness and found out that management of instructional time or 'time on task' is the most singled out variable cited as one which most frequently affects students' achievement. The statement 'time is money' is quite popular. In the classroom we can modify this statement to read 'time is knowledge'. Therefore, time wasted is knowledge wasted. Jones-Hamilton (2002) stated that an effective teacher avoids all the elements that waste

teaching and learning time. Such elements include (i) poor planning of the lesson by the teacher; (ii) late starting of the lesson; (iii) non-performance of non-instructional duties such as adhering to established laws, policies, rules and regulations.

Pawless (2006) opine that the teacher has a critical role to play in establishing rules and procedure that govern all students participation and routines in the classroom. Teachers should demonstrate effective classroom management always and constantly monitor the behavior of their students and redirect in appropriate behavior. These monitoring and redirecting inappropriate behavior is not easy and it consume time especially if they occur frequently.

A model class should never be dull but one which the students look forward to attending with excitement. The methods, techniques and devices employed by the teacher reflect on his competences. Inadequate presentation strategies can be a serious limiting factor for both the teacher and the students. An effective teacher must not only master but more importantly be able to apply the basic principles of human behavior, growth and development.

Ntino (2008) opined that if the school curriculum could be regarded as a 'Rocket' about to be launched, it is appropriate to regard teaching methods as the 'launching pad' upon which the rocket may be fired. However, good and excellently the rocket may have been built, if the launching pad is faulty, the enterprise will be disastrous. Thus teaching method is one of the major dimensions of teaching effectiveness. Ntino (2008) stated that some methods were more appropriate in teaching certain topics than others. Some students perform better with some methods than with others. In mathematics, demonstration and explanation method is better than lecture method.

Ayuk (2005) opined that every teacher should be conscious of the value of the school and factors of the school environment. He must strive to make it conducive for learning. The choice of an appropriate method of teaching is one of the factors of a conducive learning environment. It aims at creating and sustaining interest, and providing variety by which the student sees the learning and the need to explore further knowledge as very attractive. Ayuk further asserted that "the informal lecture can be more effective of introducing a unit,

teaching a new lesson, presenting a problem and providing information which is difficult for students to find. He sees the lecture method as a convenient means used by most lecturers in tertiary institutions to awaken critical skills in the students. That it is less expensive in terms of time and manpower needs. The author stated that the lecture method, especially in the sciences is much clearer and less wasteful of time when dealing with complex materials. With the invention and use of close circuit television, lecture can be delivered to a very large audience in different locations at the same time. However, this method (lecture) is not very good in teaching mathematics because mathematics involves step by step procedure, students on the other hand may not understand the procedures involved in calculation if lecture method is being used.

Amaechi (2006) study concluded that if teachers concern is to get students learn problem solving and evaluate their teaching effectiveness positively, the guided activity method is oriented approach is the one to be used but if it is concerned with how students will do well in a test after they had been taught, the traditional lecture method is required. It is not surprising therefore to understand why most teachers in Nigeria claim that teaching has become examination-centered. But from observation, learning made in traditional lecture method tend to be shallow and easily forgotten after a while hence the emphasis on guided activity-oriented teaching method which ensures deep seated learning and more positive ratings by students should be encourage. Dubin and Tavegia (2009) studied whether student ratings of teaching effectiveness depended on the teaching methods used by teachers', they concluded that the data demonstrated clearly and unequivocally that there is no difference among truly distinctive methods of college instructions when evaluated by students performance on final examination.

Ntino (2008) assessed knowledge and use of various teaching methods in two tertiary institutions in Cross River State, using 268 lecturers in six faculties. He found out that about 72% of the lecturers in the study sample had no formal teacher's education. Over 80 of these have never attended a seminar or read books on pedagogy. There was fair knowledge of the various teaching methods but lecturers preferred

to stick to the lecture method. On the whole, teachers preferred lecture methods and use them more frequently than other methods.

Students in the other hand, reacted more favourably to discussion, demonstration and activity methods than the traditional lecture method. Although teachers agreed that the use of a variety of methods would actually improve their performance, they stuck to the traditional lecture method. The reasons perhaps may be the lack of adequate knowledge and understanding of how to use these other methods and the advantages derived from them. What may help them to implement this could be a short course in teacher education or a seminar on the use of teaching methods.

Despite the efforts by various authorities above, there is still a gap that is left unfilled that bothered this study. This includes how teachers' gender, effective classroom management and teaching methods influence teaching effectiveness of mathematics teachers in Ikom Education Zone of Cross River State, Nigeria hence, the necessity of this study.

METHODOLOGY

The research design adopted for this study is ex-post facto design. The design, is suitable for this study because the researcher has no control over the independent variables since they have already occurred in the population. The study area is the Ikom Education Zone of Cross River State. Ikom Education Zone lies between Latitude 6°05' North of the Equator and Longitude 8°37' East of the Greenwich Meridian. Ikom Education Zone is bounded on the north by Obudu, Obanliku and Ogoja Local Government Areas, on the south by Akamkpa and Biase Local Government Areas; on the West by Ebonyi and Abia States and on the East by Cameroon Republic (Ministry of Land and Survey, Calabar, 2021). The population for the study consists of all the 182 Mathematics teachers from 109 public secondary schools in Ikom Education Zone. A breakdown of the figure shows that 107 are male, while 73 are female. The sampling technique used in this study is the stratified random sampling. The stratification was based on the criteria of gender and local government area in Calabar Education Zone. Within each Local Government Area, 80% of mathematics teachers

were proportionately selected. The teachers sample proportion of 80% was used to select a sample size of 145 mathematics teachers selected from the Mathematics teachers population of 182.

The instrument used for the study is titled "Teaching Effectiveness of Mathematics Teachers Questionnaire" (TEMTQ). The validity of the instrument was established by experts in Measurement and Evaluation Unit. To ascertain the reliability of the research instrument, a trial test was conducted using 50 mathematics teachers drawn from the population outside the actual sample. Split-half method of reliability was used to determine the reliability estimate of the instrument. The scores derived from the two sets were correlated using Pearson's Product Moment Correlation and corrected with Spearman Brown prophecy formula. The reliability coefficient ranges from .78 to .85 which considered high.

The copies of the questionnaire were administered in each of the sampled schools with the help of two research assistants.

Hypotheses of the study

1. Teachers' gender do not significantly influence teaching effectiveness of Mathematics

teachers in terms of effective classroom management and teaching methods.

2. The levels of teaching effectiveness of Mathematics teachers in terms of effective classroom management and teaching methods in Calabar Education Zone of Cross River State are not significant high.

Presentation of results

Hypothesis one

Teachers' gender do not significantly influence teaching effectiveness of Mathematics teachers in terms of effective classroom management and teaching methods.

The independent variable in this hypothesis is teachers' gender which is categorized into two (male and female), while the dependent variable is teaching effectiveness of Mathematics teachers in terms of effective classroom management and teaching methods. To test this hypothesis, each of the two categories of teachers' gender was compared with the two dimensions of teaching effectiveness of Mathematics teachers in terms of effective classroom management and teaching methods using Independent t-test analysis. The result is presented in Table 1

TABLE 1: Independent t-test analysis of the influence of teachers' gender o teaching effectiveness of Mathematics teachers in terms of effective classroom management and teaching methods (N=145)

Teaching effectiveness	Teachers' gender	N	X̄	SD	t-value
Classroom management	Male	85	33.97	2.75	6.65*
	Female	60	30.76	3.01	
Teaching methods	Male	85	36.28	2.44	13.99*
	Female	60	29.76	2.97	

*Significant at .05 level, df = 143

The result of the analysis in Table 1 reveals that the t-value for classroom management (6.65) and teaching methods (13.99) are respectively higher than the P -value of .000 at .05 level of significance with 143 degrees of freedom. With this result, the null hypothesis that teachers' gender do not significantly influence teaching effectiveness of Mathematics teachers in terms of effective classroom management and teaching methods was rejected. This implies that teachers' gender significantly influence teaching effectiveness of Mathematics teachers in terms of

effective classroom management and teaching methods.

Hypothesis two

The levels of teaching effectiveness of Mathematics teachers in terms of effective classroom management and teaching methods in Calabar Education Zone of Cross River State are not significantly high.

There is only one variable in this hypothesis, which is levels of teaching effectiveness of Mathematics teachers; but there are two types of teaching effectiveness at focus

in this study. These are effective classroom management and teaching methods. The researcher reasoned that for a teacher's teaching effectiveness to be considered significant high, his/her effectiveness level should be significantly higher than an average level represented by a

reference mean score. This reference mean score was obtained by multiplying the average of the scores assigned to the four response categories for each of the items on the questionnaire by the number of items used to measure each type of the teaching effectiveness (which was 10).

$$\text{Thus, the Reference mean score} = \frac{(4+3+2+1)}{4} \times 10$$

$$= 25.00$$

Testing hypothesis 5 involved comparing the sample mean on each of the teaching effectiveness with the reference mean score of 25.00. The statistical technique deploy to do this

comparison was the t-test of one sample mean (also known as population t-test). The results of the analyses are presented in Table 2.

TABLE 2: Population t-test analysis of whether effective classroom management and teaching methods as predictors of teaching effectiveness of Mathematics teachers are significantly high (N=201)

Teaching effectiveness	N	Sample Mean	Sample SD	Reference Mean	t-value	Sig level
effective classroom management	145	31.2000	4.28422	25.00	17.22*	.000
Teaching methods	145	36.8667	3.58120	25.00	39.57*	.000

* p < .05; df = 144

The results of analysis presented in Table 2 have shown the mean and standard deviation of the levels of teaching effectiveness of Mathematics teachers on each of the two types of teaching effectiveness of Mathematics teachers in this study. The comparison of each of these sample means with the reference mean score of 25.00 yielded t-values of 17.22 and 39.57. The calculated absolute t-values for classroom management 24.80 and teaching methods (54.53) are each higher than the p-value of .000 at .05 level of significant with 144 degrees of freedom. With these results, the null hypothesis is rejected in the three instances of teaching methods, teacher-student relationship and evaluation of students' learning activities. This implies that the levels of teaching effectiveness of Mathematics teachers in terms of classroom management and teaching methods in Ikom Education Zone of Cross River State are significantly high and positive.

DISCUSSION OF FINDINGS

The result of the first hypothesis revealed that teachers' gender significantly influence teaching effectiveness of Mathematics teachers in terms of effective classroom management and teaching methods in Ikom Education Zone of Cross River State. The finding are in line with the view of Throndsen and Turmo (2012) who observed that, female teachers reported somewhat higher levels of teaching effectiveness and mastery approaches to instruction, while male teachers reported a Lower level of teaching effectiveness in approaches to instruction. Positive relations between students' mathematics performance and teachers' teaching effectiveness, mastery approaches to instruction, and teaching efficacy were also found. These relationships were somewhat stronger for female teachers than for male teachers. In conclusion, the relationship between teachers' beliefs and students' performance were different for male and female teachers, respectively.

The result of the second hypothesis revealed that the levels of teaching effectiveness of Mathematics teachers in terms of teaching methods, teacher-student relationship and evaluation of students' learning activities in Ikom Education Zone of Cross River State are significant high. The finding are in line with the view of Ayuk (2005) who opined that every teacher should be conscious of the value of the school and factors of the school environment. He must strive to make it conducive for learning. The choice of an appropriate method of teaching is one of the factors of a conducive learning environment. It aims at creating and sustaining interest, and providing variety by which the student sees the learning and the need to explore further knowledge as very attractive. Ayuk further asserted that "the informal lecture can be more effective of introducing a unit, teaching a new lesson, presenting a problem and providing information which is difficult for students to find. He sees the lecture method as a convenient means used by most lecturers in tertiary institutions to awaken critical skills in the students. That it is less expensive in terms of time and manpower needs. The author stated that the lecture method, especially in the sciences is much clearer and less wasteful of time when dealing with complex materials. With the invention and use of close circuit television, lecture can be delivered to a very large audience in different locations at the same time. However, this method (lecture) is not very good in teaching mathematics because mathematics involves step by step procedure, students on the other hand may not understand the procedures involves in calculation if lecture method is being used.

Bassey, Owan, Amansoa, and Otu, (2020) also opined that developing a good student-teacher relationship is a great asset for effective teaching. It has been observed that when teachers build the bridge in communication and interaction with students, they get their cooperation, interest and willingness to learn what the teacher is teaching. What these studies show is that there is need for student-teacher interaction both within and outside the classroom. Students perceive teachers' attitude toward them as important as class content, and they perceive teachers who interact in this way as effective. Therefore, interest that the teacher displays in the student will determine to a great extent the interest the student exhibits in the subject.

Mansray (2007) also found that effective teachers use assessment of students' activities to motivate students. He said that the use of homework, assignment, weekly quizzes, classroom questioning, project reports and examination if administered appropriately and objectively make students to be anxious to receive more what was taught hence improving their academic ability. Mansray concluded that the difference between effective and ineffective teachers depends on the appropriateness of perception and application of those roles in classroom situation.

CONCLUSION/RECOMMENDATIONS

Based on the findings of the study it concluded that the levels of teaching effectiveness of Mathematics teachers in terms of teaching methods, teacher-student relationship and evaluation of students' learning activities in Calabar Education Zone of Cross River State are significantly high. It was also concluded that that teachers' gender significantly influence teaching effectiveness of Mathematics teachers in terms of effective classroom management and teaching methods in Ikom Education Zone of Cross River State. Based on the conclusions of the study it was recommended among others that teachers' should develop good student-teacher relationship to asset for effective teaching.

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DOES BIRTH ORDER OR GENDER INFLUENCE STUDENTS' ATTITUDE TOWARD MATHEMATICS IN JUNIOR SECONDARY SCHOOLS IN EKET AKWA IBOM STATE, NIGERIA?

IBOK, EKPENYONG EFFIONG, MEREMIKWU, ANNE NDIDI, ORIM, RICHARD EKONSI, ANDITUNG, PETER AGBUDU AND INAH LOVINA IDOKO.

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ABSTRACT

This study examined influence of birth order and gender on junior secondary school students' attitude toward Mathematics in Eket southern Nigeria. Ex-post facto research design was used. A sample of 1000 students was selected by stratified, random sampling procedures. Data was collected with a structured Questionnaire; with a Cronbach Alpha reliability estimate of .77. One-way Analysis of Variance (ANOVA) and Independent t- test were used for statistical test of the hypotheses at .05 level of significance. The result showed that first-borns had more positive attitude toward Mathematics than their other siblings (ANOVA: $F= 16.096$; $p=0.000$). Male students showed more positive attitude to Mathematics than their female counterpart ($t=6.110$; $p=0.001$). Study concluded that birth order and gender influenced students' attitude to mathematics Eket Nigeria. It was recommended that Mathematics teaching and evaluation strategies should be gender-sensitive so as to minimize gender-related bias and inequity.

KEYWORDS: Birth order, Gender, Student's Attitude. Mathematics

INTRODUCTION

Mathematics is one of the core and compulsory subjects in the Junior and Senior Secondary School Curriculum which reflects the recognition of the vital role it plays in contemporary society.

The broad goals of secondary education as captured in the National Policy on Education is the preparation for higher education, and specifically; to equip the learner to live effectively in the modern age of science and technology. It is clear that the knowledge of Mathematics is

Ibok, Ekpenyong Effiong, Department of Science Education, Faculty of Vocational and science Education, University of Calabar, Calabar

Meremikwu, Anne Ndidi, Department of Science Education, Faculty of Vocational and science Education, University of Calabar, Calabar

Orim, Richard Ekonsi, Department of Science Education, Faculty of Vocational and science Education, University of Calabar, Calabar

Anditung, Peter Agbudu, Department of Science Education, Faculty of Vocational and science Education, University of Calabar, Calabar

Inah Lovina Idoko, Department of Science Education, Faculty of Vocational and science Education, University of Calabar, Calabar

very necessary for the attainment of these goals (Federal Republic of Nigeria, 2014). In spite of the importance attached to Mathematics, students' academic achievement in secondary schools over the years has been reported low especially in external examinations such as West African Secondary School Certificate Examination (WASSCE) and National Examination Council (NECO). This has been attributed partly to the declining standard of education in Nigeria (Ana & Adina, 2012).

There is generally low interest in the study of mathematics and mathematics related-disciplines among students at all levels of education in Nigeria (Mohamed & Waheed, 2011). Interest is believed to have a very strong influence on the teaching and learning of mathematics. The degree and direction of attitude towards mathematics are largely determined by the kind of interest developed by students for it. Generally, attitudes are fundamental to the dynamics of behaviour change. Thus, a student with positive attitude towards mathematics is devoted to the study of mathematics because he likes it. Although mathematics is compulsory for all secondary school students, it is common knowledge that the majority of students show little interest in mathematics or simply hate the subject. Some of these students often boycott mathematics lessons and those who attend mathematics classes pay little or no attention in class. It is far less likely for such students to practice how to solve mathematics problems on their own. A student that takes interest in mathematics will get satisfaction from acquiring mathematics ideas. Students are likely to work more diligently and effectively at performing tasks in which they have interest. This therefore implies that a major challenge in mathematics education is the task of building positive attitude in learners (Sanchez, & Zimmerman, 2004)

Attitude towards learning is a function of dynamic change in behaviour, as learning will not take place except there is that change in behavior through experience and continuous practice. Thus, a student who possesses a positive attitude towards his/her studies in Mathematics spends more time studying and makes a positive achievement. Such students understand better and make achievements to expected standard because they have positive attitude towards this particular subject (Toil, Mauindi, & Kithinji, 2007). Positive attitude towards mathematics reflects a positive emotional disposition in relation to the

subject and, in a similar way, a negative attitude towards mathematics relates to a negative emotional disposition. These emotional dispositions have an impact on an individual's behavior, as one is likely to achieve better in a subject that one enjoys, has confidence in or finds useful. For this reason, positive attitude towards mathematics is desirable since it may influence one's willingness to learn and also the benefits one can derive from mathematics instruction. Nicolaidou and Philippou (2003) stated that negative attitudes may be the result of frequent and repeated failures or problems encountered when dealing with mathematical tasks and these negative attitudes may become relatively permanent. Udo, (2019) observed that students tend to lose interest in a subject when they repeatedly experience difficulties. These difficulties may come as a result of the language used in teaching, the complexity of mathematical calculations involved, difficulty with understanding the symbols associated with it, fear and poor attitude of the teacher. A common pattern of behaviour among student's that dislike mathematics is the tendency to give up too soon. Once they try solving a particular concept but could not understand or get it correct, they close their books for days (Aderanti, 2010). If the current trend of lack of interest in mathematics is not checked, it could lead to a dearth of Mathematician and Mathematics educators in the nation in future.

The construct of attitude is shaped within the context of social psychology as orientation to behave in a certain way, hence with an explicit attention to its relationship with behavior, and particularly to predicting behavior. During the first phase of research on attitude – as it happened for beliefs – theoretical aspects stay in the background, whereas the construction of observation instruments comes to the forefront. The first studies on attitude in mathematics education show this approach, as well as the belief that 'something called "attitude" plays a crucial role in learning mathematics' (Neale, 1969, p. 631). In actual fact, these studies, more than searching for a relationship between attitude and mathematics learning, mainly try to identify a cause/effect relationship between positive attitude and achievement in mathematics. This of course poses the problem of characterizing positive attitude. This problem is tackled without theoretical subtleties, and most of all,

without a specific definition of attitude to draw on. According to many researchers (Kulm, 1980; Leder, 1985; McLeod, 1992; Ruffell et al., 1998), one of the reasons that have hindered the development of an adequate theory is exactly the fact that most studies have concentrated on the creation of measurement instruments, rather than on the development of a theoretical base. Di Martino and Zan (2011) in their study on Attitude towards mathematics: A bridge between beliefs and emotions proposed a characterization of attitude towards mathematics grounded in students' experiences, which includes students' emotional disposition, their vision of mathematics, and their perceived competence

The most recent theories make reference to a tripartite model, according to which attitude has a cognitive, an affective, and a behavioral component (Triandis, 1971; Eagly & Chaiken, 1998). Within the field of mathematics education, many explicit definitions of attitude towards mathematics refer to this tripartite model (Leder, 1992; Ruffell et al., 1998; Grigutsch & Törner, 1998), even if it is possible to find some explicit definitions according to which attitude is simply a general emotional disposition (Haladyna et al., 1983). Daskalogianni and Simpson (2000) proposed a bi-dimensional definition, in which behavior does not appear as an explicit component: attitude is seen as the pattern of beliefs and emotions regarding a certain subject tackled without theoretical subtleties, and most of all, without a specific definition of attitude to draw on. Students' perceived competence in mathematics is related to their idea of success in mathematics, so the link between negative emotional disposition and low perceived competence may be diversified depending on the different ideas of success that emerge (Di Martino & Zan, 2010).

In Nigeria, several efforts have been made to motivate children to take more interest in the subject of mathematics but these have obviously not been very successful hence the persistence of poor students interest and high failure rates in the subject. Government has provided motivational incentives such as scholarships for the best students in Mathematics, laboratory, library, and established model schools with qualified educators. Non-governmental organizations also organize Mathematics and Science competitions for students and present awards to students with the best performance every year. All these are to enable students gain

interest and develop positive attitudes to Mathematics but it is sad to know that despite all these measures, a high proportion of students in secondary schools still have poor attitude to mathematics and perform poorly in Mathematics examinations like the West African Senior Secondary Certificate Examination (Ana & Adina, 2012). The need to identify and address factors that may be contributing to this lack of interest has been the subject of several research, and remains a research priority. In a bid to explore factors that may influence the attitude of students towards mathematics, the study of birth order and gender became necessary because both factors had been implicated in research to have some association with behavioural patterns.

The birth order is a child's position in the sequence of birth among children (sibling) born to the same parents. Birth order is often believed to have a profound and lasting effect on psychological development and learning. The first child is normally the oldest child that is born into a family. The middle child can be the second or third child all the way to the last born or the baby of the family. The birth order can change if there is a large difference in ages from one child to the next. The birth order of a child who is the second born can change if the child has an older sibling that he/she was not raised with. The birth order then changes for the child to be a second first born child of the parent (Fergusson, Horwood & Boden, 2006).

Research has shown that the climate in which a child spends his or her childhood has a deep and lasting impact on his or her cognitive, emotional, and social development (Holmgren, Molander, & Nilsson, 2006; Leman, 2009). Most scientists and researchers acknowledge that a child's overall development is shaped and formulated by variables within the home environment, such as quality of parenting, and the resources which are readily made available to the family (Downey, 2001). Downey (2001) further stated that it may seem surprising to some researchers and laypeople to learn that "one of the most consistent predictors of educational outcomes is the number of siblings, or sibship size" (p. 497). As such, the importance of sibling relationships and impact of birth order cannot be overstated. Since the works of Adler (1927, 1946; Ansbacher & Ansbacher, 1956) were published in the early 20th century, researchers have been working to find links between the family of origin and variables such as academic achievement, personality development and socioeconomic

status (Fergusson, Horwood, & Boden, 2006). Adler (1927, 1946; Ansbacher & Ansbacher, 1956) believed that children's characters are primarily shaped by familial environment (Campbell, White, & Stewart, 1991). Children must work to create an individual and important role, or niche, which thus spurs and supports development (Sulloway, 1997). In working to create a role unique from those of their siblings, children are naturally assisted by their birth orders (Sulloway, 1997). According to Adler (1927, 1946), there are two types of birth order: biological and psychological. Biological birth order is defined as the placement into which one is born – first born, middle child, last born, or only child (Leman, 2009). Psychological birth order, which is the focus of this study, is defined as the birth order role with which one most closely identifies, regardless of one's biological position (Campbell, White, & Stewart, 1991). It is quite possible for one's biological birth order to differ from one's psychological birth order due to a variety of variables such as divorce or sibling handicap (Leman, 2009).

Some families have several babies in one family that is not directly related to the order of the birth. If children are raised alone then the child could be considered either a first born or the baby. Alfred Adler is recognized as the first to identify birth order as a significant factor in personality development. He described the characteristics that the various birth orders seem to share, and showed that in addition to difference in behavior, siblings do differ in terms of personality characteristics and intelligence among other attributes (Tobias 2003). Adler and many subsequent authors in this subject area were known propagate the believe that firstborns, by virtue of their position in the birth order, become endowed with such superlative attributes as being very responsible, conscientious, well organized, serious, self-reliant, goal-oriented and high achievers. (Fergusson, Horwood & Boden, 2006). These researchers suggest these positive characteristics motivate the first born or oldest child to succeed academically and professionally ahead of his/her siblings.

Tshuiand Tam (2018) investigated birth order effect on personality and academic performance amongst 120 Malaysians. Results indicated that participants of different birth positions did not differ significantly in terms of personality and academic performance. Also Kogce., Yildiz, Aydın, and Altındağ, (2009) in their studies on birth order and student's attitude toward

Mathematics found significant differences between younger and older students' attitudes towards mathematics with 8th graders having lower attitudes than 6th graders. Ekpo (2006) examined the influence of family socio – economic status and birth order on attitude toward learning among 600 senior secondary school students in Calabar Metropolis, Cross River state. The results obtained revealed that birth order significantly influenced students' attitude toward learning, with the first-borns performing better as high achievers.

The findings of several studies on the relationship of birth order with intelligence have shown that the oldest child in the families studied was more likely to have the highest IQ score, and the scores declined with each successive younger sibling (Saraglou & Fiasse, 2003; Healy & Ellis, 2007; Conley, Pfeiffer & Velez, 2007). Also Asikhia (2010) reported that on average, firstborn children were more likely to have higher educational aspirations than others, achieve higher education and spend more years in school. There were however, similar studies with results that did not support the findings that firstborns were more likely have higher IQ scores or perform better academically than their siblings (Guo & VanWey, 1999; Retherford & Sewell, 1991).

Weng (2009) conducted a study to determine if motivation style was the underlying construct that bridges the influence of birth order with intelligence, school performance and personality. That study assessed participant's motivation style as a measure of the tendency to activate or inhibit behavior based on learned rewarding or punishing environmental cues. The result showed that family size and academic achievement were positively correlated, and that the only and oldest child had higher academic achievement scores than children of other birth orders.

Gender differences in secondary mathematics is a prominent issue that has been the focus of many studies, but reported differences in mathematics achievement between boys and girls remains a contentious issue. The literature has not come to a clear consensus; some studies have shown girls outperforming boys (e.g., Stevens, Wang, Olivarez, & Hamman, 2007), while others found boys outperforming girls (e.g., Preckel, Goetz, Pekrun, & Kleine, 2012). Recent research from large-scale studies such as the Trends in International Mathematics and Science Study (TIMSS) has found that "there were no gender differences in 22 of the 42 countries that

were tested at Year 8, including Australia, where no gender differences were found within any single state or territory (Thomson, Hillman, & Wernert, 2012, p. 20). There also studies that undoubtedly do find differences between boys' and girls' achievement in mathematics. However, while studies focusing on gender differences in achievement are inconclusive, there is clearer evidence that positive attitudes, behaviour and participation rates in mathematics generally favour boys.

There are also noticeable differences in the beliefs held by boys and girls. Girls tend to show negative attitude and have lower mathematics self-concept than boys. Asante (2012) observed that, when compared with boys, "girls lacked confidence, had debilitating causal attribution patterns, perceived mathematics as a male domain, and were anxious about mathematics" The research carried out by Asante (2012) in Ghana, showed that boys had more positive attitudes towards mathematics than girls. Similarly, Sanchez, Zimmerman, and Ye (2004) in their study of North American students found significant gender differences in eighth grade students' attitudes towards mathematics. American boys showed more interest in mathematics than girls, but girls perceived mathematics as more important than boys. Girls also presented higher scores on items with regard to difficulties with mathematics. Asante (2012) identified factors that may contribute to the differences between attitude of boys and girls towards mathematics to include school environment, developmental changes in gender identity, teacher and parent attitudes and student beliefs towards mathematics.

Georgiou, Stavrinides and Kalavana, (2007) in their studies on gender inequality in Mathematics found no difference either in mathematics achievement or in mathematics attitudes between boys and girls. However, high achieving boys and girls, considered mathematics as an attractive subject but differed in the explanations they gave for their performance. Since the ability attributions of boys were higher, they believed that their grades were due to their intelligence more consistently than girls did. Sanchal (2017) study investigated the impact on Year 10 students' attitudes towards mathematics when learning mathematics in a sporting context in Kuiti High School New Zealand Sashi Sharma. A closed ended, self-reported questionnaire with 4-point Likert type statements was used to collect data. Individual statements were analysed by comparing the percentage of students agreeing

or disagreeing pre-teaching and post-teaching. In this study, students' attitude comprised of their confidence, awareness of mathematics and engagement. This study concluded that when students learn in a sporting context, their confidence, perception about the importance of mathematics and engagement increase for both male and female students but male students developed more positive attitude toward studying Mathematics than their female counterpart.

Gender differences are a recurrent theme throughout the literature in academic studies in general and in mathematics studies in particular. Mathematics is often considered to be a domain in which boys are higher achievers, both in terms of attitudes and self-concept. Contrary to this, a meta-analysis conducted by Lindberg, Hyde, Petersen, and Linn, (2010) with data from 242 studies representing 1.286.350 people, found no significant gender differences and nearly equal male and female variances. According to Asikhia (2010) among the variables that influence senior secondary school students' attitude toward science, gender has generally been shown to have a consistent influence. Male students were more likely to have positive attitude toward science than their female counterpart. In the Mathematics classes, most girls saw themselves as inferior to the boys and were not sufficiently motivated for the learning process. The feeling of being inferior and lack of motivation made the girls to withdraw from the learning task. They tended to lose interest, effort and concentration from studying physics and mathematics, which may consequently hinder their achievement in these subjects.

The foregoing discourse on the potential influence of birth order and gender on attitude and learning justify this study which sought to explore how these factors could be contributory to the prevailing low level of students' interest in mathematics in Nigeria.

Theoretical framework

The theoretical basis for this paper derive from postulates drawn from Alder's theory and Bandura's social cognitive theory.

Adler's theory: The earliest theoretical constructs on birth order were credited Alfred Adler. Adler theory proposed that the order of birth is a major social influence in childhood, one from which we create our style of life. He theorized that though siblings have the same parents and live in the same house, they do not have identical social environments. Adler's

postulate holds that firstborn children are concerned with power and authority (Adler 1963; Adler 1970 as cited by Tobias 2003) This theory suggests that being older or younger than one's siblings and being exposed to differing parental attitudes create different childhood conditions that help determine personality. It explained that being older or younger than one's siblings and being exposed to differing parental attitudes create different childhood conditions that help determine personality. His predictions focus on the effects of both parent-child and sibling interactions and emphasized the importance of power relationships in the family.

Bandura's theory: The second theoretical basis for this study is drawn from the Social cognitive theory (SCT) of Bandura which has been widely implemented in the domains education, communication and psychology. This theory proposes that acquisition of knowledge occurs through inter-related processes of direct observation, interaction, experiences and outside media influence (Bandura 2002). SCT seeks to explain the interrelationship between behaviour, environment factor and personal factor in the process of learning. Environment factor includes both social and physical environment. While social environment typically refers to family and friends, physical environment refers to physical characteristics that determine the presence of comfort or its absence (Gopalan 2017). The two hypothesis proposed in this study seek to explore how birth order and gender may influence the students' attitude to mathematics. The social interactions implied in the construct of the SCT could relate to the influence that the child's birth order in the family or gender identity in society could have on his or her attitude to mathematics. In fact, formulation of the Social Cognitive Theory drew from Bandura's experiment to prove that social influences affect people including children (Bandura 1989). This postulate on influence of social context could be applied to explanation of the influence of the child's social context regarding his/her birth order or gender may have on the child's attitude to mathematics as hypothesized in our study.

Statement of hypotheses

The following null hypotheses were formulated to guide the study.

1. There is no significant influence of birth order on students' attitude to Mathematics.

2. Gender does not significantly influence students' attitude to Mathematics.

METHODOLOGY

The study area was Eket Education Zone of Akwa Ibom State in southern Nigeria. The research design adopted was Ex-post facto design. Ex-post facto research is a method of testing possible antecedents of events that have happened and cannot, therefore, be manipulated. The information collected from the sample through the questionnaire was quantified, analysed and interpreted using appropriate statistical techniques, which allowed for valid generalizations.

The population for the study consisted of all the Junior Secondary School (JSS) III Students in Uyo Education Zone of Akwa Ibom State. There are 10,888 JSS III male and female students in the educational zone. A multi-stage sampling technique involving stratified, proportionate and simple random technique was adopted in selecting 1000 students for the study.

The instrument used was a structured four-point Likert Scale questionnaires designed to elicit determinants of students' attitude toward Mathematics. The questionnaire consisted of two sections (A&B). Section A described the bio data of the respondents such as birth order, gender, class while section B dwelt on the main variables which is attitude toward Mathematics. The questionnaire was based on four point Likert scale used in measuring respondent's opinion level of agreement or disagreement, namely; Strongly agreed, Agreed, Disagreed and Strongly disagreed. The instrument was face validated by two experts in measurement and evaluation from the University of Calabar. Areas that needed corrections were pointed out by the expert and adjusted by the researchers to enhance the validity of the instrument. The reliability estimate of the questionnaire was established through Cronbach Alpha reliability which gave an estimate of .77

Statistical analysis: The Statistics Package for Social Sciences (SPSS) computer programme was used to analyze the data collected. Inferential statistical methods used for testing the hypotheses were One Way Analysis of Variance (ANOVA) for hypothesis one and independent t-test for hypothesis two. The result of the analysis is presented in the tables 1, 2&3. The hypotheses were tested at .05 significance level.

RESULTS**Hypothesis one**

There is no significant influence of birth order on students' attitude toward Mathematics.

The independent variable in this hypothesis is birth order while the dependent variable is students' attitude toward Mathematics. To test

this hypothesis, birth order was categorized into three sub-groups (First, Middle and last). Based on this categorization, one-way analysis of variance (ANOVA) test statistic was employed in testing the hypothesis based on their attitude toward Mathematics. The result of the analysis is presented in Table 1.

TABLE 1: One-way analysis of variance (ANOVA) of influence of birth order on students' attitude to Mathematics

Birth order	N	X	SD		
First	491	16.99	5.40		
Middle	221	15.73	5.02		
Last	288	15.38	5.56		
Total	1000	16.25	5.93		
Source of variation	SS	df	MS	F-ratio	p-level
Between Group	1,026.212	2	1026.212	16.096	.000
Within Group	63,564.010	997	63.755		
Total	64,590.222799				

* Significant at 0.05 level (Critical $F_{2, 997} = 3.00$)

The result of the analysis ($F = 16.096$; $p = 0.000$) as presented in Table 1 indicates that there is a significant influence of birth order on students' attitude toward Mathematics. With this result, the null hypothesis was rejected at 0.05 level of significance and alternative hypothesis was accepted. The result also shows that first born

were more likely to show positive attitude toward Mathematics than the others, with Mean score of 16.99, followed by middle born with mean score of (15.73) and then by last born with mean score of (15.38). Based on the above result, a post hoc test-multiple comparison was performed and the result is presented in Table 2.

TABLE 2: LSD post hoc test analysis of the influence of students' perception of teachers' classroom management on their academic achievement in Algebraic processes

Birth Order	First (n=491)	Middle (n=221)	Last (n=288)
First	16.99 ^a	-1.26 ^b	-1.61
Middle	-1.95 ^c	15.73	-0.35
Last	-2.72	-0.49	15.38
Ms within 63.755			

$P < .05$

a= Group mean along the principal diagonal

b= Mean differences above the principal diagonal

c= t-values below the principal diagonal.

The Post hoc test-multiple comparisons result also indicates that the Fisher's significant t-value of -2.72 and a non-significant t-value of -1.95 and -0.49. This implies that, for students' of the first born order and last born order, birth order had a significant influence on attitude toward Mathematics ($t = -2.72$; $p = 0.000$)

Hypothesis two

Gender does not significantly influence students' attitude to Mathematics.

The independent variable in this hypothesis is gender while the dependent variable is students' attitude toward Mathematics. To test this

hypothesis, birth order was categorized into two sub-groups (Male and Female). The mean scores derived from their responses on attitude toward Mathematics were compared using the independent t-test analysis. The result is presented in Table 3.

TABLE 3:

Independent t-test analysis of influence of influence of gender on students' attitude to Mathematics

Variable	N	X	SD	t	p-level
Male	559	18.34	6.32	6.110	.001
Female	441	16.11	5.22		
Total	1000	17.36	6.79		

*Significant at 0.05 level of significance

The result of the analysis (t=6.110; p=0.001) as presented in Table 3 indicated that there is a significant influence of gender on attitude toward Mathematics. With this result, the null hypothesis was rejected at 0.05 level of significance and alternative hypothesis was accepted. The result also shows that male students with mean score of 18.34 showed more positive attitude to Mathematics than their female counterpart with mean score 16.11.

DISCUSSION

The result of the first hypothesis revealed that birth order has a significant influence on student's attitude toward Mathematics. This finding agrees with those of many researchers who have reported studies that tended to support Adler's prediction on the dominance of the firstborn in diverse sphere of life. Ekpo (2006) examined the influence of family socio –economic status, birth order on attitude toward learning among senior secondary school students in Calabar Metropolis, Cross River state Nigeria and found that birth order significantly influence students' attitude toward learning with first-borns as the top achievers. Many other Studies have shown that firstborns scored higher than later-born siblings in different academic achievement tests which include such subjects as English, mathematics, verbal skills, and verbal reasoning (Eysenk & Cookson, 1969; Kellaghan & McNamara, 1972; Paulhus & Shaffer, 1981). The studies by Saraglou and Fiasse, (2003); Healy and Ellis, (2007); Conley, Pfeiffer, and Velez (2007) showed that the oldest child in a family had the

highest IQ score, and the scores declined with each successive younger sibling. According to Asikhia, (2010) on average, firstborn children achieve higher education more frequently and spend more years in schools.

There have been similar studies that did not support the findings discussed above (Guo & VanWey, 1999; Retherford & Sewell, 1991). There have also been many studies that did not confirm Alder's predictions about the influence of birth order on academic performance or perception of academic effectiveness. Tobias, (2003) in a study of the Influence of Birth Order and Other Variables on Student Perceptions of School Effectiveness showed no significant difference in student perceptions on any of the seven dimensions of school effectiveness studies based on birth order, the only exception being firstborn African American females who had significantly higher mean scores than their lastborn counterparts. Also, the results of a study of 120 firstborns, middle children, last borns and only children in Malaysia with a mean age of 20.0 years indicated that participants of different birth positions did not differ significantly in terms of personality and academic performance (Ha & Tam, 2011).

The result of the second hypothesis revealed that gender has significant influence on students' attitude toward Mathematics. Gender differences in studying Mathematics continue to be a focus of interest and the majority of the studies leaning towards the communal belief that males are better in Mathematics. According to Asikhia, (2010) among the variables that influence senior

secondary school students' attitude toward science, gender has generally been shown to have a consistent influence. Male students consistently had positive attitude toward science than their female counterpart. Girls who saw themselves as less capable than the boys in mathematics and science may not be motivated sufficiently for the learning process. They tend to withdraw their interest, effort and concentration from studying Mathematics which may hinder their achievement in studying Mathematics.

Gender differences in secondary mathematics remains an unresolved research question as with differences in conclusions of several studies that examined the role of gender in mathematics achievement. The literature has not come to a clear consensus; some studies have shown girls outperforming boys (e.g., Stevens, Wang, Olivarez, & Hamman, 2007), while others find boys outperforming girls (e.g., Preckel, Goetz, Pekrun, & Kleine, 2012). That our study found boys to show more positive attitude to mathematics than girls may be seen in a global sense to have contributed to this controversy. However, in our national context where several indices of access to education and social welfare suggest that female children are disadvantaged, our results raise pertinent question on gender equity in education. For instance, the net attendance ratio for secondary school among children age 13-18 year in Nigeria was 11% and 17% respectively in girls and boys from the lowest wealth quintile (i.e. poorest households) in Nigeria but the attendance ratio for children from the 4th wealth quintile (fairly wealthy households) was 68% and 73% for girls and boys respectively (NPC Nigeria & ICF. 2019, p. 19). This is one of several examples where gender inequity is worsened by poor socioeconomic status. Our finding that female students had poorer attitude towards mathematics should be the subject of more research to elicit the root causes with a view to apply suitably tailored solutions.

CONCLUSION

A positive attitude towards mathematics reflects a positive emotional disposition in relation to the subject and, in a similar way, a negative attitude towards mathematics relates to a negative emotional disposition. These emotional dispositions have an impact on an individual's behavior, as one is likely to achieve better in a subject that one enjoys, has confidence in or finds useful. Therefore, birth order and gender are very important factors and should be

considered when trying to promote positive attitude toward Mathematics among the students. On the basis of findings of the study the following recommendations were made: (a) Since birth order differences exist in students' attitude toward Mathematics, parents and teachers should be giving equal care and attention to children irrespective of their birth order and by so doing motivate and encourage them to develop positive attitude towards Mathematics. (b) Since gender differences exist in student's attitude toward Mathematics, Mathematics teaching and evaluation strategies should be free of gender bias. This will make males and females to see themselves as equal, capable of competing and collaborating in school activities.

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MANAGING NONTEACHING STAFF FOR INSTITUTIONAL BEST PRACTICES AND GOAL ACHIEVEMENT IN PUBLIC SECONDARY SCHOOLS IN BENUE STATE, NIGERIA

FANAN ABIGAIL GIRE, ATEGWU, PATRICK OGAR AND EKPO ALICE N

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ABSTRACT

Educational institutions target academic excellence through teaching and learning; to attain this, institutions employ best practices in handling teaching and nonteaching staff towards achievement of educational goals been teaching and learning. This study examines the extent of influence managing nonteaching staff in public secondary schools have on institutional best practices and goal achievement in boarding schools in the era of Covid 19. Specifically, the extent of influence of managing boarding master/mistress and cleaners has on institutional best practices and goal achievement. Two research questions and two hypotheses guided the study. The population of the study comprised 1,054 secondary school teachers drawn from 302 public secondary schools in Benue State. Out of which 350 teachers were randomly sampled. A self-structured questionnaire titled "Nonteaching staff and Best practices for Goal achievement Rating Scale (NBGRS)" was used to collect data for the study. Data collected was analysed using descriptive statistics of mean and standard deviation to answer the research questions while, Chi-square test of goodness of fit was used in testing the hypotheses at 0.05 alpha level of significance. Findings of the study revealed that managing boarding master/mistress and cleaners significantly influences institutional best practices and goal achievement in secondary schools. Recommendations were that; school administrators should build capacity through training and retraining of nonteaching staff in all aspects of Covid 19; for institutional best practices to be upheld for overall goal achievement in secondary schools.

KEYWORDS: Managing Nonteaching Staff, Institutional Best Practices and Goal Achievement

INTRODUCTION

Educational institutions target academic excellence through teaching and learning; to attain this, institutions employ best practices in handling teaching and nonteaching staff towards achievement of educational goals been teaching and learning. Nonteaching staff such as;

boarding master/mistress, cleaners, security personnel, cooks and maintenance officers among others, constitutes the human resource in various institutions to perform various tasks towards enhancing best practices and goal achievement of teaching and learning. According to Wachira (2016) nonteaching staff is a category of personnel employed by a school but not

Fanan Abigail Gire, Department of Educational Foundations, Faculty of Education, Benue State University, Makurdi.,

Ategwu, Patrick Ogar, Department of Educational Management University of Calabar, Calabar, Nigeria

EKPO ALICE N, Department of Educational Management University of Calabar, Calabar, Nigeria

relating to or engaged in teaching, curriculum planning, academic counseling, and other nonteaching duties assigned to teachers whom to the research include; boarding master/mistress and cleaners. This study examines the extent of influence managing nonteaching staff in public secondary schools has on institutional best practices and goal achievement in boarding schools in the era of Post COVID 19.

Managing in schools according to Gire (2016) concerns itself with creating, maintaining, stimulating, unifying formally and informally organised human and material energies of the school so as to accomplish predetermined educational goals. It is a process of deciding what to do in school and then getting it done through effective use of available resources. The task of managing is a kind of work a manager performs to enable people to work most effectively together towards the actualisation of the overall goals of an organisation. Managing as applied in this research depicts the leadership role of school administrators in educational institutions towards judicious application of the human, material, financial and time resources targeted at capacity building through training and retraining of nonteaching staff for enhanced best practices and goal achievement in schools. Human resource considered in the research is the boarding master/mistress and cleaners.

(Stewart, 2019) likens boarding master/mistress as “dorm supervisor” who holds the responsibility of running the dorm efficiently and keeping it a safe and healthy place for the resident learners. The position of a boarding master/mistress demands a high level knowledge on how to; instruct and supervise activities of learners in the dormitory to ensure adherence to Post COVID 19 protocols; maintains boarding rules and regulations as an aspect of best practice; assign schedule to dormitory attendants where applicable, and ensure that they are on-duty through their shift; The boarding master/mistress is also responsible to re-train dormitory staff for their job in-line with Covid guidelines among others. The task of a boarding master/mistress in this era of Post COVID 19 and resumption of schools in Nigeria cannot be overemphasised. To ensure safety of learners in boarding schools places the boarding masters/mistresses at an engaging task that requires the assistance of cleaners who have pertinent role in existence of a healthy school environment.

Managing cleaners is a vital aspect towards institutional best practices and goal achievement in schools. Progressive Cleaning (2020)

observes that, aside quality education, health and security of the learners are of the top concerns of nearly every parent. Germs and bacteria are everywhere in a school; classrooms, cafeteria, toiletries, library, playground, walkways and other areas; thus, constantly cleaning is required to create a healthy environment for successful teaching and learning. Cleaners are thus personnel that are employed in the school to clean up the school environment more than ever in this Post COVID 19 period. There is need to provide leadership to cleaners to enable them perform the task of; handling cleaning materials properly such as; constant supply of water for hand washing, availing hand sanitisers, sanitizing equipments before and after use; carrying out regular and deep cleaning in and around the school.

This research investigates the extent of influence managing nonteaching staff have on institutional best practices which are those aspects of testing; acceleration; compacting; ability grouping; enrichment; differentiated curriculums and adding value to human life as well as supporting the main cause of an institution culminating in goal achievement, which is teaching and learning that can only be possible in a healthy learning environment. To enhance a healthy school environment, advice for school boarding premises should among others include; guidance on transmission reduction strategies for students and staff as well as guidance on facility management; School boarding premises must also follow Post COVID 19 protocols and as well undertake continuous review of a specific systematic risk assessment and mitigation process to manage the risk specific to boarders and staff handling them; create individual action plans for each student and staff member in attendance and outline steps to be taken if there are suspected or confirmed cases of COVID-19 (State Government of Victoria, Australia, 2019). These strategies pointed out can be applied in the area of study; however, it must be sequel to the leadership role in place. The role of boarding master/mistress and cleaners in this present Post COVID 19 era is thus enormous.

(Stewart, 2019) likens boarding masters/mistress as “dorm supervisors” who holds the responsibility of running the dorm efficiently and keeping it a safe and healthy place for the resident learners. The position of a boarding master/mistress demands a high level of maturity from the individual; who must be able to connect with the younger generation and possess a personality that inspires trust and respect for him

by the learners. Strong personal integrity, leadership abilities and the ability not to buckle even under extreme stress are crucial.

The boarding master/mistress is relevant in school administration when it is a boarding school. (Stewart, 2019:11) outlined duties of a boarding master/mistress to include:

i. **Overseeing learners in the boarding:** The boarding master/mistress is responsible for learners in his care to: supervise their activities in the dormitory; address learners' problems and grievances and actively participate in devising learners' development programs such as counseling and extracurricular activities. As the personnel in-charge of the dormitory, the boarding master/mistress should be up-to-date about the whereabouts of learners within the dormitory and other areas where learners are likely to be, such as libraries, gyms or play courts. The boarding master/mistress should not leave the dormitory and its premises unsupervised at any time. In case of unavailability, he/she should assign his/her responsibilities to another supervisor or notify his reporting authority of his absence to enable prompt action. To ensure that learners in boarding secondary schools adhere to Post COVID 19 protocols, the boarding master/mistress has to keep close watch on the learners.

ii. **Ensure Maintenance of boarding Rules and Regulations:** The boarding master/mistress enforces dormitory rules and policies as stipulated by the school authority. The boarding master/mistress reports to school authorities of any suspicions and unlawful activities in the dormitory including; student harassment, weapon possession and alcohol or drug use. This indicates that the boarding master/mistress can as well report any noticeable symptom of Post COVID 19 among learners to relevant authorities.

iii. **Staff Supervision:** A boarding master/mistress oversees the job activities of the dormitory staff to ensure that the facility is maintained safe for learners and in accordance with school policies. The boarding master/mistress is also responsible to train dormitory staff for their job, which involves now ensuring adherence of learners to Post COVID 19 protocol.

iv. **Clearance to parents on visiting days:** The boarding master/mistress uses available records of learners to ascertain the right parent or caregiver that visits learners in the dormitory. He/she undertakes clearance to parents or caregivers who come to visit with items deemed

acceptable by the school authority and avoid access to contra banned items. This clearance is done for the security and safety of learners and the school. Parents/caregivers coming around the boarding house must adhere to Post COVID 19 protocols before they are cleared for visits. This can be strengthened with relevant knowledge of boarding master/mistress on terms of clearance as well as backup of leadership.

v. **Availability of information of the dormitory and learners:** The boarding master/mistress maintains information related to the dormitory and the learners therein accurately and offers information as required to school staff. Information pertaining to: Learners' presence/absence; health, education levels, parents/caregivers as well as information regarding the space in dormitory, beds, cleaning roster, devotion roster and others are kept by the boarding master/mistress. This information will aid in applying social distance during the Post COVID 19 era.

vii. **Budget preparation:** The boarding master/mistress prepares the budget for the dormitory maintenance and activities which is presented to the relevant authority. Without adequate knowledge and guidance on Post COVID 19 protocols, the boarding master/mistress will be handicap in budgeting for items that are needed to ensure compliance to Post COVID 19 protocols.

A school is a special environment that exists to improve the learning process of children. On this note, aside from quality education, health and security of the learners is one of the top concerns of nearly every parent. Germs and bacteria are everywhere in a school; classrooms, cafeteria, toiletries, library, playground, walkways and other areas; thus, constantly cleaning is required to create a healthy environment for successful teaching and learning. Cleaners are thus personnel that are employed in the school to clean up the school environment to ensure adequate sanitation of boarding houses to prevent Post COVID 19 transmissions among learners and/or staff.

A clean and healthy environment is important in boarding schools now that schools have reopened in the midst of the Post COVID 19 pandemic. A clean environment gives parents an assurance that their children stand fewer chances of getting sick, learners and other staff in the school, can improve their school performance as sickness is one of the main factors of absenteeism of learners and teachers in the school which counters institutional best practices. Understanding the importance of the

school clean and healthy environment is essential to having a secured learning atmosphere free of health issues, no matter the type of school or level of education, cleaners are needed to facilitate clean and healthy environment. A school administrator should work closely to motivate and supervise cleaners to obtain better school environment that facilitate school goal achievement. In as much as boarding master/mistress and cleaners are initially hired to provide services they are conversant with; Post COVID 19 situation beholds on then to expand their routine task to ensure compliance to Post COVID 19 protocols. Leadership in the Post COVID 19 Era should bring the ideas of contingency theory to bear in managing boarding masters/mistress and cleaners in the schools for institutional best practices and goal achievement in secondary schools in the area of study.

A contingency theory is an organisational theory that claims, there is no best way to organize a corporation, to lead a company, or to make decisions. Instead, the optimal course of action is contingent (dependent) upon the internal and external situation. It specifically holds that:

1. The appropriate leadership style depends on situational contingencies
2. Appropriate leadership style depends upon the nature of the task to be done

A contingency approach to management holds that; the way an institution is managed should change depending on the circumstances. The researcher in line with the views of the contingency theory posits that; leadership of boarding secondary schools “over steps its boundaries” of hinging more attention to the academic staff as the means of attaining institutional best practices and goal achievement in schools; to the task of managing non academic staff who have direct link with the learners who are the reason for the existence schools. As the contingency opines; leaders in schools “even though they are not health workers” should acquire and share relevant knowledge of Post COVID 19 to boarding masters/mistress and cleaners.

The (United Nations, 2020) rightly points that the Post COVID 19 pandemic has caused the largest disruption of education in history, having already had a near universal impact on learners and teachers around the world, from pre-primary to secondary schools, technical and vocational education and training institutions, universities, adult learning, and skills development establishments. However, the research is more interested in boarding secondary schools, which

constitute youths who are more on their own in the hostels and are not easy to be controlled by school administrators and academic staff. The non-academic staff as observed in this research is a group of personnel who are least considered by the learners in secondary schools, especially when there is no noticeable capacity and guidelines to build their confidence in performance of their duties.

Akinloye, Adu and Odu (2017) points out that effective leadership causes individuals to meet challenges, take responsibility and become involved in what they are doing. It involves doing careful planning, organising, controlling and staffing the organisational structure with people who are as competent as possible. It also borders on the ability to in-spire others to bring out the best in them with the main aim of achieving a set goal. This view indicates that when there is collective ability of leadership to detect and cope with changes in the external environment posed by Post COVID 19; by way of building capacity of the nonacademic staff and provision of supportive supervision for them to contribute their quarter in management of educational institutions such as boarding secondary schools in line with Post COVID 19 guidelines; it may influence maintenance of institutional best practices as well as goal achievement among boarding students in public secondary schools in the area of study.

Purpose of Study

The purpose of this study was to investigate the extent of influence managing nonacademic staff has on institutional best practices and goal achievement among public secondary schools in Benue State, Nigeria

Specifically, the study sought to:

1. Ascertain the extent to which managing boarding masters/mistress would enhance institutional best practices and goal achievement in the area of study.
2. Ascertain the extent to which managing cleaners would enhance institutional best practices and goal achievement in the area of study.

Research Questions

The study was guided by the research questions below:

1. To what extent does managing boarding master/mistress influence institutional best practices and goal achievement in the area of study?
2. To what extent does managing cleaners influence institutional best practices and goal achievement in the area of study?

Research Hypotheses

Two hypotheses were formulated and tested at 0.05 level of significance:

1. Managing boarding masters/mistress has no significant influence on institutional best practices and goal achievement in the area of study?
2. Managing boarding cleaners has no significant influence on institutional best practices and goal achievement in the area of study?

Research Methods

The research design for the study was survey design. The design was chosen because it seeks to find out factors that are associated with certain occurrences, outcome, conditions or already existing conditions (Emaikwu, 2015). The population of the study comprised 1,054 secondary school teachers from 302 public secondary schools in Benue State, Nigeria (TSB, Makurdi, 2019). Out of this population, three hundred and fifty or 7% of the public secondary school teachers from thirty-five or 5% of the

public secondary schools in Benue State were sampled. A self-structured questionnaire titled “Nonteaching Staff and Best practices for Goal Achievement Rating Scale (NBGRS)” was used to collect data for the study. Data was obtained through direct contact with the respondents in the public secondary schools (boarding) in the area of study with the aid of two research assistants. Data was analysed using descriptive statistics of mean and standard deviation to answer the research questions while, Chi-square test of goodness of fit was used in testing the hypothesis at 0.05 alpha level of significance.

Results and Findings

RESULTS

The results of the statistical analysis of the data are presented as follows;

Research Question 1: To what extent does managing boarding masters/mistress influence institutional best practices and goal achievement in the area of study?

Table 1: Mean and Standard Deviation of respondents on the extent of influence managing boarding masters/mistress has on institutional best practices and goal achievement

Item No.	Item Description	VHE	HE	LE	VLE	\bar{X}	Std. Dev.
1	Checking learners in hostels during Post COVID 19 by trained boarding master/mistress will ensure compliance of learners.	142	130	42	39	3.06	0.98
2	Boarding master/mistress who is properly given leadership on Post COVID 19 protocols will manage learners’ information	138	137	43	35	3.07	0.95
3	Boarding master/mistress are properly given leadership on Post COVID 19 protocols will be effective in space administration in hostels	118	111	79	45	2.86	1.03
4	Boarding masters/mistress who are properly given leadership on Post COVID 19 protocols will observe and report symptoms of learners to leadership	106	122	83	42	2.83	1.00
5	Boarding masters/mistress who are properly given leadership on Post COVID 19 protocols will monitor availability and proper use of Post COVID 19 in hostels	151	127	39	36	3.11	0.97
Cluster Mean and Standard Deviation						2.99	0.99

Source: (Field work, 2022).

Table 1 showed that the mean ratings of respondents for items 1, 2, 3, 4, and 5 were 3.06, 3.07, 2.86, 2.83 and 3.11 with their corresponding standard deviation of 0.98, 0.95, 1.03, 1.00 and 0.97 respectively. With the cluster mean of 2.99, standard deviation 0.99 which is above the cut-off point of 2.50 which means acceptance, the respondents have agreed with the views that: Checking learners in hostels during Post COVID 19 by trained boarding masters/mistress will ensure compliance of learners; Boarding masters/mistress who are properly given leadership on Post COVID 19 protocols will manage learners information; Boarding masters/mistress who are properly given leadership on Post COVID 19 protocols will be effective in space administration in hostels;

Boarding masters/mistress who are properly given leadership on Post COVID 19 protocols will observe and report symptoms of learners to leadership; Boarding masters/mistress who are properly given leadership on Post COVID 19 protocols will monitor availability and proper use of Post COVID 19 in hostels. The cluster mean of 2.99 with the corresponding standard deviation of 0.99 was above the cut-off point of 2.50. This implied that managing boarding masters/mistress influence institutional best practices and goal achievement in the area of study?

Research Question 2: To what extent does managing cleaners influence institutional best practices and goal achievement in the area of study?

Table 2: Mean and Standard Deviation of respondents on extent of influence of managing cleaners on institutional best practices and goal achievement in the area of study?

Item No.	Item Description	VHE	HE	LE	VLE	X	Std. Dev.
6	Cleaners who are knowledgeable on Post COVID 19 protocols will identify the right items to use for clean-up in schools	126	121	63	43	2.93	1.01
7	Cleaners who are knowledgeable on Post COVID 19 protocols will sanitise cleaning equipment before and after use	186	137	22	8	3.42	0.71
8	Cleaners who are supervised by school administrators supply Post COVID 19 items at the right places in the school	132	155	33	33	3.09	0.91
9	Cleaners who are knowledgeable on Post COVID 19 protocols will place timely order for cleaning materials	174	154	17	8	3.40	0.69
10	When leadership ensures adequate clean-up of school environment, institutional best practices are attained	88	96	112	57	2.61	1.03
Cluster Mean and Standard Deviation				3.09	0.87		

Source: (Field work, 2022).

Table 2 showed that the mean ratings of respondents for items 6, 7, 8, 9 and 10 were 2.93, 3.42, 3.09, 3.40 and 2.61 with their corresponding standard deviation of 1.01, 0.71, 0.91, 0.69 and 1.03 respectively. Based on the cut-off point of 2.50 which means acceptance, the respondents have agreed with the views that: Cleaners who are knowledgeable on Post COVID 19 protocols will identify the right items to use for clean-up in schools; Cleaners who are knowledgeable on Post COVID 19 protocols will sanitise cleaning equipment before and after use; Cleaners who are supervised by school administrators will supply Post COVID 19 items at the right places in the school; Cleaners who

are knowledgeable on Post COVID 19 protocols will place timely order for cleaning materials; When leadership ensures adequate clean-up of school environment, institutional best practices will be attained. The cluster mean of 3.09 with the corresponding standard deviation of 0.87 was above the cut-off point of 2.50. This implied that managing cleaners will influence institutional best practices and goal achievement in the area of study.

Hypotheses Testing

The hypotheses for this study were tested using chi-square test of goodness of fit at 0.05 level of significance and the results are presented on Tables 3 and 4.

Hypothesis 1:

Managing boarding masters/mistress has no significant influence on institutional best practices and goal achievement in the area of study?

Table 3: Chi-Square value of the influence of managing boarding masters/mistress on institutional best practices and goal achievement

Response	F _o	F _e	df	Level of sig	X ² _{cal}	X ² _{crit}	Decision
Very High Extent	118(33.4)	83.3	3	0.05	38.06	7.82	Rejected
High Extent	111(31.4)	83.3					
Low Extent	79(22.4)	83.3					
Very Low Extent	45 (12.7)	83.3					
Total	353(100)	353					

Source: (Field work, 2022), (Values in parentheses are percentages)

Table 3 showed that 229(65%) respondents, positively affirmed that; managing boarding master/mistress, significantly influence institutional best practices and goal achievement in the area of study; while 124 (35%) respondents negatively affirmed of the significant influence of managing boarding masters/mistress on institutional best practices and goal achievement in secondary. Table 3 further showed that chi square cal value of 38.06 was greater than crit. value 7.82 checked at alpha-value of 0.05 level of significance. Therefore, the

null hypothesis which states that managing boarding masters/mistress has no significant influence on institutional best practices and goal achievement was rejected. This means managing boarding masters/mistress significantly influence institutional best practices and goal achievement in secondary schools.

Hypothesis 2: Managing cleaners has no significant influence on institutional best practices and goal achievement in the area of study?

Table 4: Chi-Square value of the influence of Managing cleaners on institutional best practices and goal achievement in the area of study?

Response	F _o	F _e	Df	Level of sig	X ² _{cal}	X ² _{crit}	Decision
Very High Extent	88 (24.9)	83.3	3	0.05	18.14	7.82	Rejected
High Extent	96 (27.2)	83.3					
Low Extent	112(31.7)	83.3					
Very Low Extent	57 (16.1)	83.3					
Total	353 (100)	353					

Source: (Field work, 2022), (Values in parentheses are percentages)

Table 4 indicated that 184 (52%) respondents positively indicated that managing cleaners significantly influence institutional best practices and goal achievement in secondary schools; while 169 (48%) respondents indicated that there is no significant influence of managing cleaners on institutional best practices and goal achievement in secondary schools. Available evidence in Table 4 shows that chi square $\chi^2=18.14$ was greater than $\text{crit. } =7.82$ checked at alpha-value of 0.05 level of significance. Therefore, the null hypothesis which states managing cleaners has no significant influence on institutional best practices and goal achievement was rejected. This implied that managing cleaners significantly influence institutional best practices and goal achievement in secondary schools.

DISCUSSION OF FINDINGS

Findings of the study revealed that managing nonteaching staff significantly influences institutional best practices and goal achievement in secondary schools. This finding is in agreement with that of World Health Organisation (WHO) (2020) which attests that, the burden of bridging the gaps in understanding Post COVID 19 with its protocols, falls on the shoulders of decision makers, health care workers, first responders, epidemiologists, community workers and all players involved in delivering health care and essential services to ensure they can learn, adapt, connect and succeed in delivering the response needed to save lives. It's a race against time. At the school level, the burden lies on administrators to provide meaningful leadership to nonteaching staff on issues surrounding Post COVID 19, to enhance institutional best practices and goal achievement in secondary schools.

Findings also agrees with Stewart (2019) who posits that; boarding masters/mistress who act as "dorm supervisors" hold the responsibility of running the dorm efficiently and keeping it a safe and healthy place for the resident learners. The position of a boarding master/mistress therefore, demands a high-level knowledge on how to; instruct and supervise activities of learners in the dormitory to ensure adherence to Post COVID 19 protocols; maintains boarding rules and regulations as an aspect of best practice among others.

The study further agrees with that of Progressive Cleaning (2020) which observes that, aside from quality education, health and security of the learners are one of the top concerns of nearly every parent as such; constant cleaning of

schools is required to create a healthy environment for successful teaching and learning. To this end; there is need to provide leadership to cleaners to enable them perform the task of; handling cleaning materials properly such as; constant supply of water for hand washing, availing hand sanitisers, sanitizing equipments before and after use; carrying out regular and deep cleaning in and around the school.

Hall and Hord (2011) in the same vein describes the implementation of change as a process through which people and organizations move as they gradually come to understand, and become skilled and competent in the use of new ways, indicating that leadership of secondary schools in cognizance of the current COVID-19 pandemic has the task of implementing changes in schools in line with Post COVID 19 protocols at the same time ensure institutional best practices and goal achievement in secondary schools.

CONCLUSION

Based on the results of the study, conclusions were that managing nonteaching staff significantly influences institutional best practices and goal achievement in secondary schools.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made:

1. School administrators should build capacity of nonteaching staff in all aspects of Post COVID 19 and institutional best practices to be upheld for overall goal achievement in secondary schools.
2. Government should with all sense of commitment look into regular training and retraining of nonteaching staff in secondary schools for optimum job performance, especially during the Post COVID 19 epidemic.

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COMPETENCE EVALUATION BY PUBLIC SECONDARY SCHOOL TEACHERS: A PANACEA FOR STUDENTS IMPROVED PERFORMANCE IN CALABAR ZONE, NIGERIA

OKON, ABIGAIL EDEM AND OKON, CELESTINA EDEM

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ABSTRACT

The study examined teachers' competence in evaluating students' learning outputs. It was a descriptive survey design whose area of coverage was 2021/2022 school year in public secondary schools across Calabar Education Zone of Cross River State, Nigeria. Four out of seven Local Government Areas, 20 out of 100 secondary schools and 496 out of 1,502 teachers (evaluators) formed the sample of the study. Each teacher had one student to examine on; punctuality, obedience, self-control and honesty (Affective Domains); the evaluation methods considered were formative and summative evaluation. The sampling methods adopted were purposive, simple random and systematic sampling methods. Two sets of questionnaire were used for data collection in addition to students' result sheets (first term junior secondary school two (JSS 2) and teaching staff disposition (teachers' register). The two sets of questionnaire were Teachers' Competence Evaluation Questionnaire (TCEQ) and Teachers' Score on Students' Affective Domain Questionnaire (TSSADQ). The questionnaire instruments were validated by experts in different areas of research affected. The results obtained from the test-retest pilot study were correlated using Pearson Product Moment Correlation to obtain the internal consistency of the measures whose coefficient was 0.76. Data collected were analyzed using contingency chi-square technique to test the formulated null hypotheses. It was found that evaluation methods influence students' learning outputs and that the quality of teacher competence evaluation also influence students' affective domain. It was recommended that teachers should intermittently evaluate students learning in the course of instruction and not forgetting the final evaluation. Also, teachers should improve their evaluation strategies by making learning a life-long affair.

KEYWORDS: Competence, Evaluation, Formative, and Summative evaluation, Affective Domain

INTRODUCTION

The importance of evaluation in the teaching and learning process cannot be over-emphasized. Evaluation of a learner plays a vital role in the decision that will be made about the progress, promotion, potentials as well as the degree to which the learner is benefiting from learning.

It is quite crucial that evaluation should be thorough and should take into account all the domains of behaviours of the learners (Asuru & Ogidi; 2014; Okpala & Onucha; 2001; Prescott, 2022). Evaluation provides essential information on students' program and for helping students to structure their learning. This can be possible where teachers utilize quality evaluation methods

Okon, Abigail Edem, Department of Educational Foundations University of Calabar, Calabar, Nigeria
Okon, Celestina Edem, Department of Special Education University of Calabar, Calabar, Nigeria

in their classrooms interactions (Asuru & Ogidi, 2011).

Education is an indispensable asset through which a nation can effectively realize its goals and objectives in national development. This fundamental role of education in national development is affirmed in the National Policy on Education of the Federal Republic of Nigeria (NPE, 2018) in such assertion that “education is an instrument for national development” (p. 6). Similarly, the teachers’ role in any education system is a critical one as they constitute a resource for effective implementation and realization of educational policy as contained in the school curriculum. It therefore behooves the teachers to be competent in performing their primary role of helping students to acquire the necessary knowledge and skills for their life-long endeavours and nation building.

Teaching is the most important singular activity in the school. It is on effective teaching that all other activities must rely if learning by the students must take place (NERDC, 2016; 2018). A major component of the Basic Education Programme is to ensure quality of the teaching and learning process, and that one way to achieve this is through systematic capacity building for teachers. It is a general view expressed in many quarters that teachers must be empowered to teach with confidence and competence. Put in another way, teachers must be assisted to identify “Best Practice in Teaching and Learning” and to apply them in their everyday teaching (NERDC, 2018). Some of the selected Best Practices that are appropriate at the secondary education curricula in the classroom are that; teachers should be able to:

- Identify and use appropriate teaching methods.
- Plan to teach using a note of lesson.
- Plan, conduct and evaluate activity-based teaching.

In a school setting, evaluation is the systematic process of collecting, analyzing and interpreting information to determine the degree to which students are achieving learning objectives. According to Gronlund in Ukpor (2014), evaluation is the systematic process of judging the worth, desirability or effectiveness of something according to laid-down rules and purposes. The information so obtained could be quantitative or qualitative for use in judging the worth of something and taking decisions or making value judgement on the information (Gronlund in Joshua, 2005, Asuru & Ogidi, 2014).

Evaluation is an essential component of teaching. Without evaluation teaching is incomplete. Some countries have professional requirements for students’ evaluation. For example, in England the Teacher Development Agency (TDA) requires that those awarded Qualified Teacher Status can:

- Make effective use of a range of evaluation and recording strategies.
- Evaluate the learning needs of those they teach in order to set challenging learning objectives.
- Provide timely, accurate and constructive feedback on learners’ attainment, progress and areas for development.
- “Support and guide learners to reflect on their learning, identify their emerging learning needs” (Pollard, 2010 p. 391).

When teachers evaluate students’ attainment of knowledge and skills for the purpose of making decision about their teaching, or learning progress of the students, they are engaging in formative evaluation, which is also called Evaluation for Learning. When they use the evaluation to determine grades or scores at the end of a unit, a term or a year and to decide whether the students are ready to proceed to the next level of their education, they are engaging in Summative Evaluation also called Evaluation of Learning (Pollard, 2010). Learning is of different categories, so is evaluation (Gronlund in Joshua, 2005). Where the evaluation results come from achievement test, aptitude test, ability or intelligence test etc, these areas are considered as cognitive domain, that is, the development of the brain. The next category of learning is the psychomotor domain which considers the development of the limbs and the third category of learning is the Affective domain, which is the development of the heart. They include punctuality; an activity of doing things at the arranged or correct time, example class attendance, obedience, the willingness to do something you are directed to do. Example obeying school rules and regulations, self-control, the ability of one to remain calm and not to show excitement or emotions; and honesty; the quality of being truthful, not telling lies, not cheating and so on.

It is apt at this point to state that where the process of collecting and analyzing the information from students are faulty or incomplete, then the decisions emanating from the information would definitely be faulty, inaccurate and of little or no value to the end users such as students, schools, parents,

governments and other stakeholders. The obvious concern expressed in the preceding explanations leads to the necessity of having competence evaluation in the school. Competence is the ability of an individual or a group to do a job properly and effectively. The term competence first appeared in an article written by R. W. White in 1959 as a concept for performance motivation (Nwaco, 2015) competence is seen by some authors as a combination of practical and theoretical knowledge, cognitive skill, behaviour, and value used to improve performance or as the quality of being adequate or very qualified. It could be viewed as a group of related abilities, commitment, knowledge and skills that enable an individual or an organization act effectively and efficiently in a situation or in a job (Dreyfus, 2013). Lumen (2018) defines competence as a measurable pattern of knowledge, skills, abilities, behaviours and other characteristics that an individual needs to perform activities. It is the ability to do things successfully or efficiently.

One of the influential and commonly discussed models in the literature of teacher preparation which is considered in this paper is competence-based model, otherwise called performance-based model. This model, competence-based, is founded on the behaviourist theory and so depends on the identification of specific behavioural and psychological routines as the target of training interventions. Its focus is on skill training (Omojuwa, 2007; Univent; Slavanger, 2020).

Competence evaluation is the process of looking into the current skill levels of employees and the potential competences they could acquire or enhance. If it is done for a group and against a specific standard, it reveals the skills gap that need to be filled, if the organization wants to reach its strategic goals (Skiller, 2022). Competence based evaluations are an extremely powerful method used by researchers to evaluate strengths and weaknesses on per-employee and team level. Competence based evaluation in education typically begins with a self-evaluation where students and or teachers reflect on their abilities and goals. Wing Institute (2021), has four groupings of competencies that can help teachers to master what they need to maximize their performance. They are (1) classroom management (2) instructional delivery (3) formative evaluation, and (4) personal competencies.

STATEMENT OF THE PROBLEM

One feature of global reforms in education which brought about the Millennium Development Goals (MDGs), now Sustainable Development Goal, the Goals of Education for All (EFA) as well as the back-to-bases movements as contained in the New Basic Education Curriculum, has been an emphasis on students' evaluation. The failure of many students to master even the most basic cognitive and non-cognitive skills needed for productive employment, social development and other inter-personal activities, has prompted states and even the federal governments to demand proof that students are meeting minimum standards necessary for the award of certificate. As a result of this many states and even the federal governments now employ statewide evaluation of students at one or more stages in the educational process, with high emphasis on continuous evaluation. This brings to the fore, the question as to whether teachers' competence evaluation relates with students' learning outputs?

The purpose of the study was to examine the relationship between teachers' competence evaluation and students' outputs in school. Specifically, the study:

- i) Examine the influence of teachers' competence in evaluating students' grades of pass,
- ii) Determine the influence of teachers' competence in evaluating students' affective domains performance scores.

To guide the direction of study two research questions were posed:

- i. What influence has teachers' methods of evaluation on students' performance grades?
- ii. What influence has teachers' evaluation quality on students' affective domain scores?

Null hypotheses:

- i. Teachers' methods of evaluation has no significant influence on students' performance grades.
- ii. Teachers' evaluation quality has no significant influence on students' affective domain scores.

METHODOLOGY

The study is a descriptive survey research. It was designed to investigate whether teachers' competence in evaluation influence students' output performance. The design was appropriate for the study because it describes the state of affairs as it exists at present. The target population was the teachers in public secondary school within Calabar Education Zone during the

2021/2022 school session. The zone consists of seven (7) Local Government Areas (LGAs) with 99 post-primary schools under the state government and one (1) under the federal government. The sample was 496 teachers out of 1,502 teachers from 20 schools and four (4) LGAs.

The four LGAs were purposively selected to cover two urban and two rural areas. Simple random sampling technique was adopted to select the schools, specifically, the hat and draw method of random sampling was used. The researchers write all the names of the schools on pieces of papers and folded them. The papers were mixed and put in a hat and a neutral person was asked to pick 20 schools, one at a time. Systematic sampling method was used to choose the teachers. In each school visited, 33 percent of the teachers was picked from the staff register (teaching staff disposition) as listed, and one teacher after every five was picked. The systematic sampling method was also used to select 496 Junior Secondary School two (JSS 2) students. This class was selected because the study emphasis was on Upper Basic 9 section. Each teacher in the sample was assigned one JSS 2 student for observation of his/her affective characteristics.

First term 2021/2022 result sheets containing the Continuous Assessment (CA) and Terminal Scores of each student were used. To obtain teachers' data or their level of competence evaluation (high, moderate and low) of students, Teacher Competence Evaluation Questionnaire (TCEQ) was given to the Heads of Departments (HODs) to score and grade the teachers. It was the feelings of the researchers that if teachers were given the questionnaire to fill by

themselves, not many would score themselves low, which implies that a false data might be collected. The second set of teachers' questionnaire called Teachers' Score for Students Affective Domain (TSSADQ) was used to examine teacher level of competence evaluation and its influence on students' Affective Domain (punctuality, obedience, self-control and honesty).

The two sets of questionnaire were constructed by the researchers and given to three independent assessors (experts) to scrutinize in view of the purpose, research questions and hypotheses of the study. To ascertain the content validity of the instruments, professional guidance counsellors, psychologists and psychometricians were consulted. Their comments and suggestions were used to bring the instruments to the final stage before administration. The reliability of the instruments was ascertained by testing the internal consistency using test-retest method through a pilot survey. The results of the two sets of scores were correlated using the Pearson Product Moment Correlation and the coefficient of reliability obtained was 0.76.

From the students' result sheet, the Formative Evaluation (1st, 2nd and 3rd assessments) and the Summative Evaluation (Terminal exams score) were obtained and the two forming separate scores of 100 percent each and different grades assigned. As stated earlier, every teacher has one student to study/examine under: punctuality, obedience, self-control and honesty) and score them, an exercise that tested for one month. The data collected were analyzed using chi-square technique.

RESULTS

Null hypothesis (Ho₁)

Teachers' methods of competence evaluation has no significant influence on students' performance grades.

Table 1: Chi-square analysis of the influence of teachers' competence evaluation methods on students' performance grades

Evaluation methods	Performance Grades										Total
	A		B		C		D		F		
Formative evaluation	o	(e)	o	(e)	O	(e)	o	(e)	O	(e)	
	62	(51.45)	86	(83.02)	91	(94.72)	39	(40.93)	12	(19.88)	290
Summative evaluation	26	(36.55)	56	(58.97)	71	(67.28)	31	(29.07)	22	(14.12)	206
Total	88		142		162		70		34		496

Calculated $X^2 = 2.16 + 0.11 + 0.15 + 0.09 + 3.12 + 3.04 + 0.15 + 0.21 + 0.13 + 4.40 = 13.56$

df = 5; @P < 0.05 for a non-directional H_1 , $X^2 = 11.07$

O = Observed value, e = expected value in bracket

The result shows that the null hypothesis is rejected leading to the conclusion that teacher's methods of evaluation significantly influence students' performance (grades). The calculated value of X^2 , is greater than the table value which leads to be rejection of the null hypothesis.

Null hypothesis (H_2^1)

Teachers' competence evaluation quality has no significant influence on students' affective domain scores.

Table 2: Chi-square analysis of the influence of teachers' competence evaluation quality on students' affective domain

Competence evaluation quality	Affective Domain								Total
	Punctuality		Obedience		Self-control		Honesty		
High	o	(e)	o	(e)	O	(e)	O	(e)	
	86	(92.54)	80	(83.29)	76	(71.56)	64	(58.61)	306
Moderate	45	(30.24)	20	(27.22)	20	(23.39)	15	(19.15)	100
Low	19	(27.22)	35	(24.50)	20	(21.05)	16	(17.24)	90
Total	166		135		111		90		496

Calculated $X^2 = 0.00 + 0.00 + 0.13 + 0.27 + 0.00 + 7.20 + 1.91 + 0.49 + 0.90 + 2.48 + 4.50 + 0.05 + 0.09 = 18.02$

df = 6, 0.05 sign-level; 2 tail test = Table $X^2 = 12.59$

O = Observed value, e = expected where

From the result in Table 2, the calculated $X^2 = (18.02)$ is greater than the critical $X^2 (12.59)$, the null hypothesis that stated that there is no significant influence of teacher quality of competence evaluation on students' affective domain is therefore rejected. The result reveals that teachers' quality of competence evaluation influence some characteristics of affective domain of students.

DISCUSSION

The major findings that emerge from the analyses of data are:

- i. Teachers' evaluation methods has a significant influence on students performance in school.
- ii. The quality of teachers' evaluation of students has a significant influence on the students' performance in their affective domain.

A close look at the report in Table 1 revealed that students made better results by being evaluated with formative evaluation than students who received immediate feedback and correction of inadequacies in their learning, ended up doing better than those who received their corrections only at the end of term. The finding conforms with NERDC (2018) and Pollard that formative provides corrective measures for learner's evaluation and the end they achieve good results. Pollard (2010); Prescott (2022), described formative evaluation as evaluation for learning, which occurs frequently throughout instruction while summative evaluation as a evaluation of learning which occurs after the instruction is complete. Although both methods are good, competence evaluators know when, how and for what purpose each should be applied.

The result in Table 2 revealed that students who were evaluated by teachers considered to be high competent evaluators received higher scores than the other two categories. Perhaps, the highly competent evaluators, might have adopted encouraging strategies that influence the students' psyche positively. The probability expressed here is in tandem with the England Teacher Development Agency (TDA) requirements for the award of Qualified Teacher Status: That teachers should be able to "make effective use of a range of evaluation and recording strategies" (Pollard, 2010 p. 391), to improve the learning of their students. The highly competent teachers are more informed and skillful than the less competent ones.

In conclusion, it is clear that evaluation methods influence students' learning and performance. Specifically, formative evaluation, that is, evaluation for learning provides teachers and learners with timely reflection on their teaching and learning activities respectively. It was also established in this study that the quality of teachers' competence evaluation influences students' learning outputs. The highly competent evaluators (teachers) provide better learning strategies than their lowly competent colleagues in improving learning in all the domains, (cognitive and non-cognitive). In all cases teaching and learning process is not complete without evaluation, and competent one at that.

RECOMMENDATIONS

- Continuous evaluation in the course of instruction should be encouraged and enforced by monitoring teaching especially of the less competent ones.
- There should be adoption of improved evaluation strategies by all teachers. This could be enhanced by constant training and retraining of teachers.

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HYBRID LEARNING ENVIRONMENTS FOR PROFESSIONAL DEVELOPMENT IN TEACHER EDUCATION: UNIVERSITY OF CALABAR, NIGERIA AS A CASE STUDY

ABIGAIL E. OKON

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ABSTRACT

The influence of hybrid learning environments on professional development in teacher education was the focus of this paper. It also examined how professionalism in teaching relates with reflective teaching. In this paper, hybrid learning environments was defined as educational model that utilizes the benefits of both on-line and on-campus learning. All the lecturers (742) and students (2,046) of the three Faculties of Education, University of Calabar constituted the population of the study (2,788) from where a sample size of 500 (140 lecturers and 360 students) was selected. Multiple sampling methods were adopted in selecting the sample, including stratified, simple random and purposive sampling methods. A 15-item researcher made questionnaire was used to elicit data from respondents. It was a survey research study and descriptive statistics (frequency counts, weighted means, standard deviation and percentages were adopted for data analysis. A mean score of 2.00 formed the significant/acceptance level. It was found that hybrid learning environments are models of professional development in teacher education especially in the post COVID-19 pandemic. It also found that professionalism in teaching relates positively with reflective teaching. It was recommended that more learning and teaching opportunities should be created by universities and colleges for flexibility in instructional options and that continual deepening of knowledge and skills should be encouraged.

KEYWORDS: Professionalism, Hybrid learning environments, Reflective teaching, Internet, Teacher education.

INTRODUCTION

Professional development is a lifelong process through which any teacher, at any stage of development, has room for improvement. Indeed, "the continual deepening of knowledge and skills is an integral part of any profession and teaching is no exception' (Garet, Poster, Desimone, Birman and Yoon, 2001, p. 916). Whether you are preparing to teach, experiencing your first time in teaching, or a veteran

professional, professional development is critical to your success in teaching. In addition to face-to-face interacting in a traditional classroom, the internet provides a rich array of technology resources for teachers' and students' learning (Ornstein and Levine, 2006; UNESCO, 2020).

The quality of teachers in any nation has a lot in common with the standard of education, and the standard of education shares a lot with the available learning opportunities for

Okon, Abigail Edem, Department of Educational Foundations University of Calabar, Calabar, Nigeria

professional development. The emphasis on teachers' professionalism is affirmed by the National Planning Commission (NPC), (2004) that at least 80 percent of teachers at all levels of education in Nigeria should be professionals (Mohammed, 2014, Ukpor, Ashibi, Akpan, & Okon, 2014; Okon & Ubi, 2021; Okon, Owan, & Owan, (2022), Obot, Apebende, Okon & Bekomson, 2020). The Teachers' Registration Council of Nigeria (TRCN) which was established by ACT 31 of 1993 now CAP T. 3 of 2004, in fulfillment of the quest for the professionalization of teaching has a vision of making teachers' quality match with international standards.

Professional commitment and responsibility of teachers behoove them to be reflective practitioners. Reflective teachers are those teachers who frequently observe and think about the results of their teaching and adjust their methods accordingly. Professional teachers think of multiple instructional strategies to encourage students' development of critical thinking and problem solving as well as alternative ways of learning (Owen, 2012; Omori, Okon & Etan, (2022), Doran (2017). Anike (2018), Obioma, Apeji, Omole & Lawani (2014), identified the synonyms of professionalism to include: Competent, skillful and dedicated, and contextualized its usage to mean working to a high standard, being consistent in attitude (not allowing emotions or personalities to influence you). They see professionalism in teaching as a value-led activity in which the commitments of a teacher become entwined with his/her professional role. DFEE (2001, 2007) noted that high quality professional development activities do enable teachers to build higher levels of expertise, which is worthwhile in itself. Both professional development and expertise are products of enquiry, training and study (Pollard, 2010).

In a study on what makes professional development effect. Garet et al, (2001) identified a variety of sources for professional development to include:

- "Self-assessment for professional growth.
- Teacher workshops
- Teacher centres
- Professional development schools
- Supervision and mentoring of student teachers,
- Graduate study; and
- The internet".

The internet, a component of Information and Communication Technology (ICT) has turned the world into a global village and opened learning opportunities to knowledge seekers (Samson, Victoria and Daniel in Omede, 2014; Ojerinde, Ariyo & Akintunde, 2014). There have been drastic changes in instructional delivery in the educational system in the 21st Century that have created many opportunities for people to excel professionally. Essien, Akpan and Essien in Essien and Anthony (2018) reported that the internet gives educators ample opportunities to widen their scope, experience, information accessibility and to communicate within and outside any academic environment. Indeed, the internet is an indispensable tool used for expertise development in recent time (Parkay & Stanford, 2004; Doran, 2017, Day, Stober, Sammons, Kington & Gu, 2007).

Internet facilities have made the use of online learning a possibility, a situation where learners can receive instructions from the comfort of their homes. A combination of online learning with face-to-face classroom activities is referred to as hybrid learning. In the simplest of terms, hybrid learning can be defined as instructors taking both on-line and off-line classes simultaneously for the students. The term hybrid means 'mixture'. The Oxford Advanced Learners' Dictionary explains hybrid to mean something that is the product of mixing two or more different things. On-line learning has changed the way that people can earn academic qualifications in significant ways. In hybrid learning educational model, some students attend class in-person, while others join the class virtually from home or office (Owlabs, 2021).

The new phrase that is commonly referenced when discussing on-line learning is a hybrid learning environment. Typically, when we hear the phrase hybrid learning environment, what is being referenced is a combination of some on-line course-work and some traditional (on campus) course-work. UNESCO (2020), asserts that in hybrid learning environment students will complete a large amount of course work through an online site developed specifically for their course. In addition, they will complete a portion of work in a more traditional face-to-face setting. In this type of learning, while time spent in the classroom decreases, the amount of time working autonomously increases. The goal is for students to have flexibility of completing their work on their own schedule while also receiving the benefit of learning in a more hands-on setting. In a hybrid learning system, students are

receiving the best of both worlds (Ratkovitch, 2019). Many colleges and universities are now offering students additional on-line support services like online library access, online academic advising, on-line tutoring and on-line bookstores.

The goal of on-line facilities is to minimize how much time a student must spend on campus. This was common especially during the peak period of COVID-19 Pandemic (Ratkovitch, 2019). Other reasons why hybrid learning environment is a good option are as follows:

First is that some students like the combination of flexibility as well as some face-to-face contact. While on-line flexibility is wonderful, some students still like the option of having the on-campus experience.

Second reason why a hybrid option is an excellent choice is that it allows students the opportunity for hands on experiences. The best way to learn experientially is to have opportunities to work directly with the faculty as well as your peers.

Third reason is that some learner prefer a hybrid environment simply because some schools are not operating fully on-line at this point (Owllabs, 2021).

As more and more universities are moving to a fully on-line learning system, some are opting to promote a hybrid approach, Gayar (2021) advised that when you are considering which programme will work best for you it is important to find out whether the expected professional degree is fully on-line, fully on-campus or a hybrid of the two. The question is, do hybrid learning environments improve professionalism in teacher education?

Professional development in teacher education can only be fully realized in a school context with favourable learning culture (Pollard, 2010; DFES, 2006).

Statement of the Problem

Professional development in teacher education has been viewed as necessary endeavour to enhance expertise in teaching. Some practitioners in the field of teaching have made series of efforts in exploring new models of encouraging intending teachers, student teachers, practicing teachers as well as veteran teachers to improve their teaching expertise. The adoption of hybrid learning environments was perceived by some educators (Owllabs, 2020; Gayer, 2021; OECD, 2022), as effective model

for professional development in teacher education.

This study was therefore designed to examine the influence of hybrid learning environments in improving professional expertise in teaching using University of Calabar as a case in point.

Purpose of the Study

The study was aimed at finding out the influence of hybrid learning environments on professional development in teacher education. Specifically, the study:

- i. examined the extent to which hybrid learning is practiced in University of Calabar.
- ii. The influence of hybrid learning environments on professional development in the University of Calabar.
- iii. The relationship between professional development in teaching and teachers reflective teaching.

Research questions

The study was guided by the following research questions:

- i. To what extent is hybrid learning environment practiced in University of Calabar?
- ii. How does hybrid learning environment influence professional development in teacher education?
- iii. How does professional development in teaching relate with reflective teaching?

METHODOLOGY

The study adopted survey research method. The University of Calabar, Calabar in Nigeria was the study area, specifically data were collected from the Faculty of Education of the University. The target population was all the 742 lecturers and the 2,046 students of the Faculties including graduate students. Multiple sampling techniques were adopted to select a total sample size of 500 (360 students: third year, fourth year and graduate students and 140 lecturers). To select the students, the three groups of students as stated above were purposively chosen. This means that the students as stated above were stratified on the basis of their year of study. In each stratum 120 students were selected using simple random sampling method. This was done during the general meetings of each group. One hundred and twenty pieces of papers were written "YES" and others were written "NO" and folded and shuffled into a container from where all those who blindly picked "YES" were considered selected. To select the lecturers, the

four departments were wholly chosen to include the researchers' departments. At their different staff meetings, simple random sampling method was adopted in selecting 35 lecturers per department, giving rise to 140 lecturers.

Fifteen structured questionnaires were used to elicit information from the 500 respondents. The questionnaires were trial tested in Institute of Education of same University. The reliability of the items was tested using the Cronbach's Coefficient Alpha reliability measure and an estimate of 0.70 was obtained. A four-point rating scale was adopted: True (T), Some What True (SWT), Some What False (SWF) and False (F), and Strongly Agree (SA),

Agree (A), Disagree (D) and Strongly Disagree (SD). A total of 498 questionnaires were appropriately filled and returned, about 99.6 percent retrieval rate.

The test statistics adopted for data analyses were descriptive statistical tools which were Frequency Counts (F), Weighted Mean Scores (\bar{X}), Standard Deviation (SD) for Table 1 and 2, while Table 3. Frequency counts and percentages (%) were used. A mean score of 2.00 was used for decision making, and a score of 2.00 and above was acceptance level while any score below 2.00 was not accepted for items in Tables 1 and 2.

RESULTS AND DISCUSSION

Research Question 1: To what extent is hybrid learning environments practiced in University of Calabar?

Table 1

Frequency counts (F), Weighted mean scores (\bar{X}) and Standard Deviation (SD) to items on whether or not hybrid learning environments is in full practice (N = 498)

S/n	Statement	T	SWT	SWF	F	\bar{X}	SD	Decision
1.	Hybrid Learning is Practiced in My School because During course registration students have the options of on-campus course work or off-campus course work..	1	15	184	298	1.43	.49	Not accepted
2.	Students have no options to select mode of learning: part on campus, part off-campus or hybrid of both.	284	186	20	8	3.51	.51	Accepted
3.	During COVID-19 pandemic era some theses supervision were done on-line.	264	104	90	40	3.19	.91	Accepted
4.	Post COVID-19 pandemic era witnessed mass registration of off-campus course-work.	1	21	188	288	1.27	.98	Not accepted
5.	Students' awareness of hybrid model learning is not high.	244	120	101	33	3.15	.82	Accepted

The analyses in Table 1 show that the mean scores (\bar{X}) of the items range from 1.27 to 3.51 and their standard deviations range from 0.43 to 0.99. Items 1 ($\bar{X} = 1.43$ and $SD = .49$) was not accepted, meaning that the school has no provision for hybrid learning. The result in item 4 ($\bar{X} = 1.27$ and $SD = .98$) was equally not accepted, that even after COVID-19 era hybrid learning was not in practice in the University. Results 2 ($\bar{X} = 3.51$, $SD = .51$), 3 ($\bar{X} = 3.19$, $SD = .91$) and 5 ($\bar{X} = 3.15$, $SD = .82$) were accepted.

Items 2 is in confirmation with item 1 that there is no hybrid learning environment in the University. Item 3 appears unique that some student's theses were supervised on-line during COVID-19 era. This result on project supervision is not enough reason that hybrid learning is practiced in the school. More so, item 5 reveals that many of the respondents did not have high awareness about hybrid learning environments.

Since all the conditions that qualify a hybrid learning environments are not fully met in

the University at the time of this study, it is therefore concluded that the school does not practise hybrid learning. This finding confirms with the observations by Owillabs (2021), and Gayar (2021) that not all schools practise hybrid learning environments. Students who are interested in this model of learning need to look elsewhere for now.

Research questions 2

How does hybrid learning environments influence professional development in teacher education?

Table 2

Frequency counts (F), Weighted mean scores (\bar{X}) and Standard Deviation (SD) of participants opinion on influence of hybrid learning environments professional development in teaching (N = 498)

S/n	Statement	T	SWT	SWF	F	\bar{X}	SD	Decision
1.	Taking on-line courses with some on-campus courses provides steady growth in knowledge.	230	146	86	36	3.14	.91	Accepted
2.	On-line support services e.g. on-line library, on-line book stores, etc. encourage continual learning.	216	134	92	66	3.04	0.86	Accepted
3.	Decreasing time of on-campus classroom course work and increasing time of off-campus course work widens learners' scope of skill development.	181	211	96	10	3.13	.85	Accepted
4.	Hybrid learning is highly self-motivating.	119	190	100	89	2.66	.46	Accepted
5.	Flexibility in completing course work on one's own schedule is excellent for professional development	182	213	86	17	3.12	.78	Accepted

The summary statistics for all the 5 calibrated items about influence of hybrid learning environments on professional development indicated a positive link between them. All the items show a mean score (\bar{X}) of 2.00 and above and a range of standard deviation (SD) = .46 to .91 as shown in Table 2.

A close look at Table 2 reveals that items 1, 2, 3, 4 and 5 bear the following mean scores (\bar{X}) and standard deviations (SD): 3.14, 0.91, 3.04, 0.86, 3.13, 0.85, 2.66, 0.46, and 3.12, 0.78 respectively. This means that hybrid learning

environments influence professional development.

Opinions expressed by respondents show that hybrid learning where fully practiced promotes professional development in teacher education. This finding corroborates the assertion of Pollard (2010) and DFES (2006), that professional development in teacher education only be fully realized in a school context with favourable learning environments.

Research question 3

How does professional development in teaching relate with reflective teaching?

Table 3

Frequency counts (F) and percentages (%) of participants opinions on the relationship between professional development in teaching and reflective teaching (N = 498)

S/n	Statement	F %	SA	A	D	SD
	As a professional teacher:					
1.	I always think of inventing new method.	F	178	186	90	4.4
		%	35.7	37.3	18.1	8.8
2.	I see a student difficulty in learning not as a defect in the student but a defect in my own instruction	F	172	188	84	54
		%	34.5	37.8	16.9	10.8
3.	I do not need to continually examine my experiences to improve practice.	F	54	90	196	158
		%	10.8	18.1	39.4	31.7
4.	I seriously think about how to teach effectively.	F	168	184	90	56
		%	33.7	36.9	18.1	11.2
5.	I do not need to adjust methods of teaching irrespective of situations.	F	38	100	178	182
		%	7.6	20.1	35.7	36.5

From Table 3, item 1, out of 498 respondents, 364 (73%) agreed that they always think of inventing new methods of teaching, 134 (26.9%) disagree in their opinions. Item 2, 360 participants about 72.3%, agreed that they see students' difficulty in learning as their own teaching defect, while 138 (27.7%) disagree. Item 3, 144 (28.9%) agree that they do not need to examine their experiences in order to improve practice while 360 (72.3%) who disagree with the item are those who continually examine their experiences to improve practice. Item 4, 352 (70.6%) agreed that they seriously think about how to teach effectively whereas 146 (29.3%) disagree with the item. In item 5; 360 (72.3%) have need to adjust their methods of teaching depending on situations while 138 (27.7%) agree that they do not have the need of varying their methods of teaching.

The general opinion as depicted by participants reveal that professional development in teacher education improves teachers reflective teaching, an ideal quality of teaching. Owen (2012), Parkay and Stanford (2014), Doran (2017) Essien and Anthony (2018) are exponents of this school of thought which is concurred by this study finding.

CONCLUSION

Hybrid learning environments as a model of receiving instructions in some higher institutions is not fully a practice in the University of Calabar. The practice of hybrid learning promotes professional development in teacher education, besides, it reduces students'

congestion on campus. Hybrid learning is a worth-while programme of receiving instructions from colleges and universities. Professional development in teacher education in turn improves teaching reflection.

RECOMMENDATIONS

The following recommendations are made based on the findings: University of Calabar should improve on its learning opportunities by including hybrid learning environments fully. Intending and practicing teachers should be encouraged to continually deepening their knowledge and skills to make them experts or remain experts in teaching.

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EFFECTIVENESS OF GEOGEBRA APPLICATION ON GEOMETRICAL MATHEMATICS AMONG SECONDARY SCHOOLS STUDENTS IN DELTA STATE

EKWUE, N. L., AJAEGBA, N. M., UMUKORO, P., OKEKE, M., AND AMOS-EMEASO, C. P.

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ABSTRACT

This study investigates the effectiveness of GeoGebra application on geometrical mathematics among secondary school students in Delta state. Dynamic mathematics software (GeoGebra) is a freely available interactive dynamic software for the teaching and learning of mathematics that combines geometry and algebra into a single package. A descriptive survey and quasi-experimental design was used, specifically, the pretest-posttest non-equivalent control group. The population consists of all the SS 2 students and mathematics teachers in all the public and private schools in Delta State. Fifteen mathematics teachers participated in the online workshop and that form the sample size of the teachers and 600 students were sampled, but 516 scripts were returned. Three (3) research questions guide the study. Two instruments were developed for the study; Mathematics Ability Test (MAT) and a Questionnaire on Mathematics Teacher's Attitudes toward GeoGebra Software (QMTAGS) were used for data collection. MAT was administered as a pre-test and post-test to the experimental and control groups which have 15 objective questions, while QMTAGS was administered to teachers after the workshop exercise on the GeoGebra software which contained 14 multiple-choice items. The data obtained were subjected to mean and standard deviation. The result of the findings showed that GeoGebra makes the teaching and learning of mathematics fun and enjoyable and factors responsible for mathematics teachers' non-access to digital teaching of mathematics are lack of computer-literate skills, non-availability of computer lab software, lack of power supply, and lack of professional development. Male students performed better than their female counterparts; private schools also performed better than public school students. It was recommended that GeoGebra should be fully integrated into Nigeria's education curriculum.

KEYWORDS: Geogebra, geometrical mathematics, teachers attitude.

INTRODUCTION

Technology integration in the classroom become an essential aspect of successful teaching.

It has activated many researchers to investigate different aspects of such integration. (Kotrlík & Redmann, 2005). This is because it allows students to learn more in less time and

Ekwue, N. L., Federal College of Education (Technical), Asaba, Delta State

Ajaegba, N. M., Federal College of Education (Technical), Asaba, Delta State

Umukoro, P., Federal College of Education (Technical), Asaba, Delta State

Okeke, M., Federal College of Education (Technical), Asaba, Delta State

Amos-Emeaso, C. P., Federal College of Education (Technical), Asaba, Delta State

allows schools to focus on global learning environments if used correctly. As a result of technology dominating our lives and society becoming immersed in a digital world, a new paradigm has evolved in education, changing how teaching is delivered and how learning is processed. Teaching and learning are no longer confined to the physical school structure or the classroom but can take place anytime and anywhere, such as in computer laboratories, via the radio, television, and the internet. Technology, therefore, includes all the tools we use to search, sort, create and report information in our own unique sociocultural context.

Geometry is an aspect of mathematics that deals with measurement like distance, angle, shapes (2-dimensional & 3-dimensional). Geometry can be grouped into three phases; plane geometry-these deals with flat shapes e.g circle, triangle, polygons; solid geometry – this are three-dimensional objects e.g prisms, spheres, cylinders, cubes; spherical geometry – that are objects like spherical triangle & spherical polygon. Knowledge gained in the study of geometry helps to build thinking skill and problem-solving techniques that can be applied in real life situation. However, geometry can be linked to other field of study such as engineering, architecture, robotics, construction, astronomy, and many others. Some of the tools used in the study of geometry include a compass, protractor, calculator, ruler and GeoGebra.

According to Ajaegba and Ekwueme (2018) see the word Geogebra as the combination of Geometry “Geo” and „Gebra” derived from Algebra (Geometry + Algebra = GeoGebra). It is a free, open-source program that can be downloaded from (<http://www.geogebra.org>). This dynamic and interactive mathematics software program was created by Markus Hohenwater in 2001, for the teaching and learning of mathematics. The use of GeoGebra empower teachers and students in manipulating the tools that helps to gain better understanding of geometrical concepts. Tools like, point, line, perpendicular line, polygon, circle, ellipse, angle and reflect about line. Shaughnessy (2011) says if Algebra is the only language of mathematics, then, geometry is the glue that connect them. This implies that, Algebraic expression cannot stand alone without connecting to Geometry. As such, it makes geometry an essential branch of mathematics.

Learning geometry with GeoGebra allow students to manipulate and drag with a cursor from points A, B, and C to change the triangle and obtain the

coordinate of precise point, in the algebra view. It will measure the exact angle with given size, distance or length, area, and slope. This brings out the beauty of mathematics and make the learning of geometry much more meaningful and fun. Integrating GeoGebra in mathematics classrooms can be a way of providing opportunities for mathematical investigation and teamwork which enables students gain better understanding of mathematics and improve their mathematical reasoning skills (Bhagat and Chang, 2015)

However, with the application of GeoGebra, students should be able to develop their potential to elevate their conceptual and procedural knowledge which depends on the teacher’s attitude. The National Council of Accreditation of Teacher Education (2001) sees teachers’ characteristics as attitudes, values, and beliefs established through covert and overt behavior toward students, colleagues, and communities. However, this positive behavior establishes a teacher’s professionalism and promotes student learning and development. On this ground, the study tends to investigate the effectiveness of GeoGebra application on geometrical mathematics among secondary school students in Delta State.

STATEMENT OF PROBLEM

In recent times, the spread of COVID-19, a disease caused by a highly infectious virus, has instigated educational systems all over the globe to adjust by immediately shifting the traditional face-to-face teaching and learning process to virtual learning. Technology has become one of the significant determinants of quality education in our society. As such, it leads to effective teaching and learning by providing a medium for teachers and students to be continuously involved in the

Process, regardless of their levels.

The negligent attitude of not adopting an activity-oriented method of teaching and learning in our schools today has led to the abstraction of mathematics which makes students less active and more prone to rote learning. On this ground, a new learning environment for effective teaching and learning is proposed by introducing Dynamic mathematics software known as “GeoGebra”.

Purpose of the Study

1. To explore teachers’ attitude towards the use of GeoGebra application.
2. To examine factors responsible for mathematics teachers not to have access to digital teaching of mathematics.

3. To what extent does Geogebra application affect the performance of students with respect to ;

- a) male and female students
- b) private and public school students

Research Questions

1. What are teachers' attitude towards the use of GeoGebra software?

2. What are the factors responsible for mathematics teachers' non-access to digital teaching of mathematics?

3. To what extent does Geogebra application affect the performance of students with respect all ;

- a) male and female students
- b) private and public-school students

Research Methodology

A descriptive survey and quasi-experimental design was used, specifically, the pretest-posttest non-equivalent control group. The population consists of all the SS 2 students and

mathematics teachers in all the public and private schools in Delta State with a population of. Fifteen mathematics teachers participated in the online workshop and that form sample size of teachers, and 600 students were sampled but 516 scripts were returned. Three (3) research questions guide the study. Two instruments were developed for the study; Mathematics Ability Test (MAT) and Questionnaire on Mathematics Teachers Attitude toward GeoGebra Software (QMTAGS) were used for data collection. MAT was administered as a pre-test and post-test to the experimental and control groups which have 15 objective questions while QMTAGS was administered to teachers via online after the workshop exercise on the use of GeoGebra software which contained 14 multiple-choice items. The data collected were analyzed using descriptive mean and standard deviation through Statistical Packages for Social Sciences version 24 (SPSS 24).

DATA PRESENTATION

Research Question 1: What are teachers' attitude towards the use of GeoGebra software

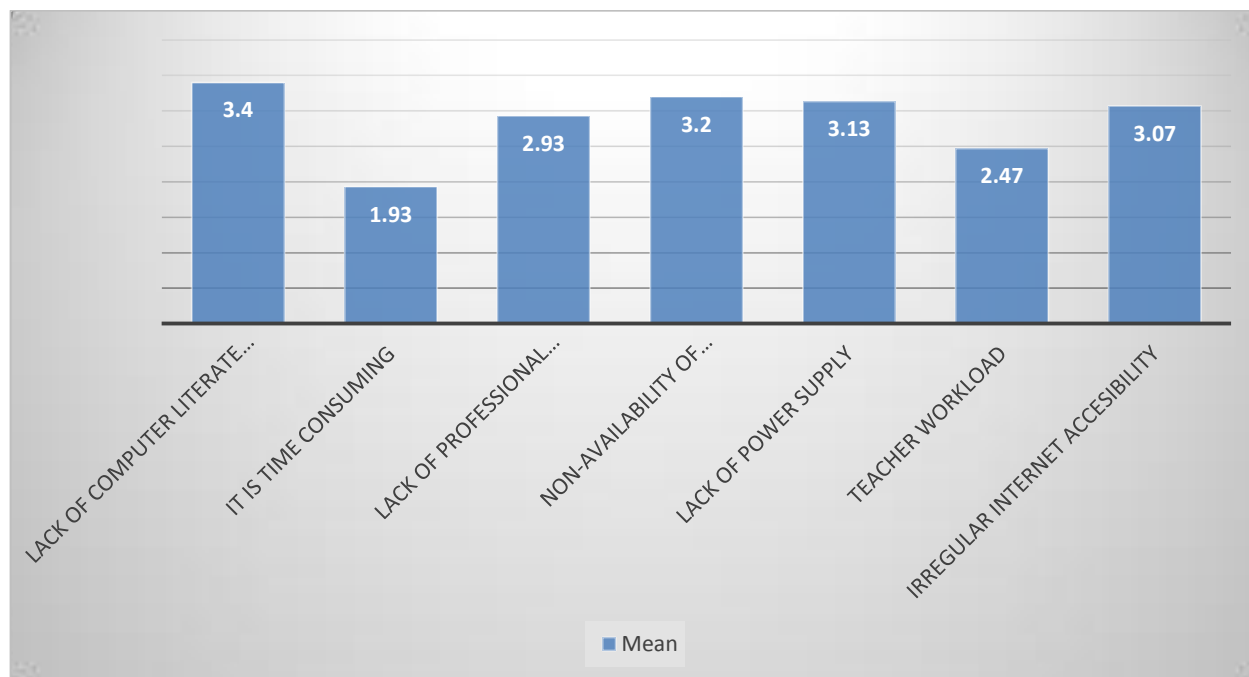
Table 1: Mean and Standard deviation of teachers attitude towards the use of Geogebra software

S/N	Statement	Mean	S.D	Decision
1	I enjoy Geogebra software	3.20	1.014	Agree
2	Geogebra make the teaching and learning of mathematics fun and enjoyable.	3.53	.640	Agree
3	Geogebra makes the teaching and learning of mathematics less abstract.	3.20	.561	Agree
4	Geogebra will make the student to be lazy	2.00	.535	Disagree
5	This strategy of teaching and learning incorporate the three domains (cognitive, affective and psychomotor)	3.13	.834	Agree
6	This strategy enables the learners to learn at their own pace.	3.20	.676	Agree
7	i feel like new kind of mathematics is being taught..	2.73	.961	Agree
	Grand Mean	2.99		Agree

Table 1 above shows items 1, 2, 3, 5,6, &7 had mean score values of 3.20, 3.53, 3.20, 3.13, 3.20 & 2.73 respectively which are above the cut-off point of 2.50. The standard deviation is 1.014, 0.640, 0.561, 0.834, 0.676, and 0.961 respectively. While item 4 had a mean score of 2.00 which is below the cut-off point of 2.50 and

the standard deviation is 0.535. The grand mean of 2.99 shows that mathematics teachers have a positive attitude towards Geogebra software.

Research Question 2: What are the factors responsible for mathematics teachers non-access to digital teaching of mathematics?

Table 2: Bar chart on the factors responsible for mathematics teachers non-access to digital teaching of mathematics

The above bar chart showed that all the factors listed were of high extent except the mean of 1.93 and 2.47; it is time-consuming and teacher workload was not a factor responsible for mathematics teachers' non-access to digital teaching of mathematics.

Research question 3: what extend does Geogebra application affect the performance of students with respect to:

- i) male and female students?
- ii) Public and private schools?

Table 3: Mean and Standard deviation of male and female students

Gender	Pre-test			Post-test		Mean gain	Mean Difference
	N	X	S.D	X	S.D		
Male	268	30.71	15.01	33.15	14.23	2.44	
Female	248	30.31	12.51	32.23	12.48	1.92	0.52
	516						

Table 3, reveals that male students had a pre-test mean score of 30.71. and standard deviation of 15.01 while female students had a mean score of 30.31 and a standard deviation of 12.51. For the post-test mean score, male students obtain a mean of 33.15 and a standard deviation of 14.23, while female students obtain a mean score of

32.23 and a standard deviation of 12.48. The mean gain scores for the two groups were 2.44 for male and 1.92 for female students respectively. The difference in the mean gain scores was established at 0.52, which is in favour of the male students. This implies that male students outperformed their female counterparts.

Table 4: Mean and Standard deviation mean scores of private and public school students

School type	N	Pre-test		Post-test		Mean gain	Mean Difference
		X	S.D	X	S.D		
Public	276	30.90	12.85	32.85	12.67	1.95	
Private	240	33.03	13.59	35.04	13.87	2.01	0.06
	516						

Table 4, reveals that public school students had a pre-test mean score of 30.90 and a standard deviation of 12.85 while the private school students had a mean score of 33.03 and a standard deviation of 13.59 respectively. For the post-test mean score, public school students obtain a mean of 32.85 and a standard deviation of 12.67, while private school students obtain a mean score of 35.04 and a standard deviation of 13.87. The mean gain scores for the two groups were 1.95 for public school students and 2.01 for private school students respectively. The difference in the mean gain scores was established at 0.06, which is in favour of the private school students. This implies that private school students performed better than public school students.

DISCUSSION OF FINDINGS

The findings in Table 1 showed that that mathematics teachers have a positive attitude towards using Geogebra software in the teaching and learning of mathematics. This agrees with the work of Kadel (2005) who noted that regardless of the quantity and quality of technology available in classroom, the key to how ICTs are used is the teacher. Therefore, teachers must have the competence and right attitude towards technology.

The result in Table 2 showed the factors responsible for mathematics teachers' non-access to digital teaching of mathematics. This study concurs with Ertmer, Ottenbreit-Leftwich, Sadik, Sendururm and Sendururet (2012), that lack of technology implementation in the classroom is related to lack of professional development and training. That is, teachers need to gain new skills to enhance their teaching profession. However, lack of computer literate skills has the highest mean of 3.4. This indicates that majority of mathematics teachers are unable to perform simple digital function such as compose email, log into online platforms, and even save work to an external device (Gibbs, 2018).

In terms of students performance scores in mathematics with respect to gender, table 3, revealed the mean scores and standard

deviations of male and female students in both group in the pretest and posttest. It was discovered that male students had a higher mean compared to their female counterparts. This study concur with Ajaegba & Ekwueme (2018) whose study indicated that male students slightly outperformed the female in the GeoGebra method. This implies that male students gained better understanding than their female counterparts.

The findings in table 4, revealed that private school students in all the three senatorial districts in Delta State outperform their public counterparts in the performance tests. The study finding is in line with Hahn (2014) which study indicated that the students in private schools have better academic achievement than those in public schools. In related research carried out by Lubienski and Lubienski (2006) compared academic achievement of private and public schools. they found out that student in private schools scores higher than those in public schools. However, this implies that students in private schools are competence and intelligent respectively.

CONCLUSION

Teaching and learning of mathematics through the integration of technology has a significant benefit in eliminate the abstract nature of mathematics. If proper integration is being put into consideration, then, teaching and learning via technology would help students develop positive attitude toward learning of mathematics. As such proper attention should be on the factors listed in the bar chart in Table 2. When teachers are not provided with the necessary tools and professional development, they tend to be discouraged and inefficient in implementing technology into practice.

RECOMMENDATIONS

From the findings of the study, the following recommendations are made:

1. Mathematics teachers should be provided with digital tools for effective teaching and learning.
2. Teachers should be trained regularly.

3. Curriculum planner should integrate into the syllabus GeoGebra software as a tool for teaching and learning of mathematics.
4. Government should equip rural schools with digital tools in other for teachers to digitalize their lesson.

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INFLUENCE OF LOCALLY AVAILABLE INSTRUCTIONAL MATERIALS ON BIOLOGY STUDENTS' ACADEMIC ACHIEVEMENT IN ABAK LOCAL GOVERNMENT AREA OF AKWA IBOM STATE, NIGERIA.

EKON ESTHER ETOP, SAMBO GODSWISDOM IBORO AND ASHIWERE ISAAC OBOGO

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ABSTRACT

This study examined the influence of locally available instructional materials on biology students' academic achievement in Abak Local Government Area of Akwa Ibom State. To guide the study, 2 research questions and 2 research hypotheses were formulated. A pretest, posttest non-equivalent quasi-experimental research design was used in the study. A sample of 75 senior secondary school two (SS 2) biology students from 2 co-educational public secondary schools in intact classes were used for the study. The instrument for data collection was Senior Secondary School Biology Achievement Test (SSSBAT) with reliability index of 0.81. The data collected were analyzed using Analysis of Covariance (ANCOVA) at .05 level of significance to test the hypotheses. The findings revealed that there is a significant influence of locally available instructional materials on biology students' academic achievement. Also, there was no significant influence of gender on the use of locally available instructional materials on biology students' academic achievement. It was recommended amongst other that biology teachers should be encouraged to source for and use locally available instructional materials for effective teaching and learning as it stimulates biology students critical thinking/imaginative skills as well as help in reducing subject abstraction phobia, thus, improving biology students' academic achievement.

KEYWORDS: Biology students, Academic achievement, Locally available instructional materials

INTRODUCTION

Education generally, Science Education in particular is the primary industry for making the needed science professionals such as; technologist, technicians, artisans and craftsmen.

These science professionals are whom the nation's much needed economic growth and diversification is dependent upon for the turnaround of the nation's status from 'consumer dependent country' to 'producer independent country'; from 'developing country' to 'developed

Ekon Esther Etop, Department of Science Education Faculty of Vocational and Science Education University of Calabar, Calabar, Nigeria

Sambo Godswisdom Iboru, Department of Science Education Faculty of Vocational and Science Education University of Calabar, Calabar, Nigeria

Ashiwere Isaac Obogo, Department of Science Education Faculty of Vocational and Science Education University of Calabar, Calabar, Nigeria

country' and from 'third world country' to 'first world country'. To achieve this, effective and efficient teaching-learning is necessary as the learners must be able to interact with people and things (both living and non-living) in the world around them.

Also, for better learning, the learner must be able to lay his/her hands on the environment and manipulate it, at the same time providing access to appropriate learning experience made to enhance ideas, skills and knowledge leading to increased and improved productivity of the learners (Onuh, 2022). The importance of science education cannot be overemphasized as it has been accorded a prime position in the context of worldview and particularly biology education been identified as a pivotal subject in scientific and technological advancement of any nation. The importance of biology in the development of the learner and the nation has made biology to be accorded a core subject in science related courses in Nigeria education system. Biology been a pre-requisite subject for undertaking any science related course(s) (such as Medicine, Pharmacy, Dentistry, Microbiology, Biochemistry, Physiotherapy, etc.) in higher or tertiary institutions calls for an urgent need in teaching it effectively owing to its impact on the learners, environment and society.

Similarly, biology is one of the core Science subjects in Nigerian Secondary Schools and teaching it requires creativity and improvisation (Onuh, 2022). To make biology concepts understandable to biology students, biology teachers must employ creative and innovative teaching approach in explaining biology concepts (Sambo, 2022). Sambo (2022) added that the widespread discouraging academic achievement towards biology from secondary school students can be ascribed to lack of proper teaching approaches. Biology teachers who adopt appropriate locally made instructional materials in teaching biology will likely be more successful in imparting the knowledge of biology to novice biologists in their classes.

Therefore, locally available instructional materials are materials and equipment obtainable from the local environment, or designed by the teacher or with the help of local resource personnel to enhance effective teaching and learning activities. Accordingly, Nweze (2021) asserted that local instructional materials are natural materials that are found in the local place or area which are useful for teaching and learning. Kabesa (2019) defines locally available instructional materials as those persons, places,

things, materials, activities and experiences in the society considered helpful in educating learners. Locally available instructional materials include: ponds, swamps and rivers, pasture and grazing land, cultivated fields, abandoned land, forest areas, creeks, sand pits, playgrounds, swimming pools, nature trails, bird sanctuaries, objects and specimen, markets and health centres, resource persons, zoos and parks, botanical gardens, farmlands, museums, rocks, and wood, etc.

Kabesa (2019) added the following as the importance of locally available instructional materials: it provides a shared memory of the classroom; it improves students knowledge, retention, skill acquisition and preparation for adult life because students are given opportunities to apply learning in real life settings; it assist the teacher and facilitates students creativity thus making teaching-learning more concrete and interesting, thereby improving academic achievement of the students.

According to Effiong and Igiri (2015), instructional materials are print and non-print items that are intended to facilitate the passing of information to students in the educational process. They can be in the form of kits, textbooks, magazines, newspapers, pictures or videos, maps, audio-players or graphs, etc. instructional materials play a very important role in teaching and learning process, they enhance memory level, retention capacity and recall ability of students; facilitates learning of abstract concepts by helping the students to concretize ideas and stimulate students' imagination (Effiong & Igiri, 2015).

Also, Buba, Gana and Bularafa (2019) assessed the influence of instructional materials on academic performance of students in senior secondary schools in Maiduguri Metropolis of Borno State, Nigeria and found that the use of instructional materials enhanced the comprehension of concepts and retention of taught concepts among learners. Effiong and Igiri (2015) study to determine the impacts of instructional materials in teaching and learning of biology by SS 2 students in Yakurr Local Government Area of Cross River State concluded that learners exposed to instructional materials during lesson delivery had a positive significant academic achievement.

Adeyemi and Ajibade (2011) asserted that there seems to be an agreement among most researchers to explain failure from a multi-causal perspective where several variables are involved in students' academic achievement especially in

science subjects, such factors may include; gender, among other factors.

Gender is the range of physical, biological, mental and behavioural characteristics pertaining to and differentiating between the feminine and masculine (male and female) population (Adeyemi and Ajibade, 2011). The need to examine academic achievement in relation to gender is based primarily on the socio-cultural differences between girls and boys. Okereke and Onwukwe (2011) in their study of gender influence discovered that male students performed better than female students. Nweze (2021) concluded that the gender had no significant effect on students' academic achievement. Ekon and Eni (2015) asserted that gender did not significantly influence the acquisition of science process skills. Many researches had been carried out on gender issues with mixed reports in science education.

However, the use of locally available instructional materials makes teaching and learning easier to present and simpler to understand. Owing to dwindling finances from both the government and teachers, provision of adequate and relevant instructional materials to schools so as to meet up with the requirements of effective instructional delivery is becoming a challenge, with this call for an urgent need in the use of locally available instructional materials for effective instructional delivery in biology.

Statement of the Problem

The problem of academic achievement amongst biology students has been a point of concern for parents, schools and governments. In the past years, the percentage of biology students finishing secondary schools with credit pass to qualify for University admission is less than 25% (Adolphus, 2018). As a result of this, numerous researchers (Effiong & Igiri, 2015; Olugbuye, 2017; Buba et al., 2019; Sambo, 2022) have conducted researches into factors responsible for academic achievement of secondary school biology students. Not the less, other previous research has looked at the effects of instructional materials on academic achievement of secondary school students, such studies did not x-ray the adequacy and availability of instructional materials and their effects on academic achievement as well as the perception of students on teaching and learning. It is from the foregoing that this study was carried out with the aim of examining the influence of locally available instructional materials on biology students'

academic achievement in Abak Local Government Area of Akwa Ibom State, Nigeria.

Purpose of the Study

The main purpose of the study was to examine the influence of locally available instructional materials on biology students' academic achievement in Abak Local Government Area of Akwa Ibom State. Specifically, the study sought to determine:

1. The influence of locally available instructional materials on biology students' academic achievement.
2. The influence of gender on the use of locally available instructional materials on biology students' academic achievement.

Research Questions

The following research questions guided the study:

1. How does locally available instructional materials influence biology students' academic achievement?
2. How does gender influence the use of locally available instructional materials on biology students' academic achievement?

Research Hypotheses

The following research hypotheses was formulated for the study:

1. There is no significant influence of locally available instructional materials on biology students' academic achievement.
2. There is no significant influence of gender on the use of locally available instructional materials on biology students' academic achievement.

METHODOLOGY

Quasi-experimental research design was used for this study. Specifically, pretest, post-test non-equivalent control group research design was adopted for this study. This design was chosen because it lacks elements of random assignment to experimental or control group, as such, it allowed intact classes to be used for the study (Nworgu, 2004). Also, senior secondary school three (SS 3) biology students who participated in the study received treatment in their usual classes and were used as control in their classes without re-arranging the class setting.

The total population of this study comprised all thirteen public senior secondary school three (SS 3) biology students in Abak Local Government Area of Akwa Ibom State. Two public senior

secondary schools were purposively selected for the study based on the criteria:

- The school must have registered students for West African Examination (WAEC) and National Examination Council (NECO) for at least 20 years.
- The senior secondary schools must be co-educational.

The sample for the study comprised of 75 SS 2 biology students. Only one arm of intact classes secondary school two (SS 2) students were used for the study. Biology students in one arm of intact classes in one of the senior secondary school was assigned to experimental group, while the control group senior secondary school was assigned to the second school. A pretest was administered first in both experimental and control group schools before treatment (those taught with locally available instructional materials) in the experimental group school while the content group school was taught conventionally and it lasted for a period of 4 weeks. Post-test was administered to both groups (experimental and control) at the end of the 4 weeks. The instrument employed for data collection was Senior Secondary School Biology Achievement Test (SSSBAT). The SSSBAT

consisted of 25 multiple choice questions drawn from past WAEC and NECO past questions selected from 2006-2021. The questions were standardized, self-validated and reliable, being standard questions already used for external examinations. The reliability coefficient of the SSSBAT was determined with the use of Kuder Richardson Formula 21 (KR-21) and the internal consistency index was 0.81.

Procedure for Data Analysis

The data obtained was analyzed using Analysis of Covariance (ANCOVA). The hypotheses were tested at 0.05 level of significance.

Results

The results of the data analysis are presented in the tables below.

Hypothesis 1

There is no significant influence of locally available instructional materials on biology students' academic achievement. To test this hypothesis, Analysis of Covariance (ANCOVA) was used. The result of the analysis is presented in Table 1.

Table 1: Analysis of Covariance (ANCOVA) on the influence of locally available instructional materials on biology students' academic achievement.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected model	1668.398	2	834.199	14.992	.000
Intercept	38969.199	1	38969.199	700.348	.000
Pretest	21.517	1	21.517	.387	.536
Instructional* materials	1512.153	1	1512.153	27.176	.000
Error	4006.266	72	55.643		
Total	508336.000	75			
Corrected total	5674.667	74			

R. Squared = .294 (Adjusted R. Squared = .274) *Significant at $P < .05$

The result of the analysis as presented in Table 1, revealed a significant F-ratio of 27.176 for instructional materials (use of locally available instructional materials and conventional instructional materials at P (.000). Since P (.000) is less than P (.05) with 1 degree of freedom, the null hypothesis is rejected while the alternate hypothesis is accepted which implies that there is a significant influence of locally available

instructional materials on biology students' academic achievement.

Hypothesis 2

There is no significant influence of gender on the use of locally available instructional materials on biology students' academic achievement. To test this hypothesis, Analysis of Covariance (ANCOVA) was used. The result of the analysis is presented in Table 2.

Table 2:Analysis of Covariance (ANCOVA) on the influence of gender on the use of locally available instructional materials on biology students' academic achievement.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected model	1710.048	4	427.512	7.548	.000
Intercept	32570.808	1	32570.808	575.076	.000
Pretest	17.403	1	17.403	.307	.581
Gender	24.581	1	24.581	.434	.512
Instructional materials	951.379	1	951.379	16.798	.000
Gender* Instructional materials	14.202	1	14.202	.251	.618 ^{NS}
Error	3964.619	70	56.637		
Total	508336.000	75			
Corrected total	5674.667	74			

R. Squared = .301 (Adjusted R. Squared = .261) NS = Not Significant at P > .05

The result of the analysis as presented in Table 2, revealed an F-ratio of .251 for gender on instructional materials (use of locally available instructional materials and conventional instructional materials) at P (.618). since P (.618) is greater than P (.05) with 1 degree of freedom, the null hypothesis is retained. Thus, there is no significant influence of gender on the use of locally available instructional materials on biology students' academic achievement.

DISCUSSION OF FINDINGS

The first hypothesis states that there is no significant influence of locally available instructional materials on biology students' academic achievement. The null hypothesis was rejected on the basis that the F-ratio (27.176) at P (.000) is less than P (.05), which implies that there is a significant influence of locally available instructional materials on biology students' academic achievement. This means that teaching and learning carried out with the use of locally

available instructional materials is more effective as well as positively enhancing improved and better academic achievement in biology.

The findings of hypothesis one agrees with earlier findings of Effiong and Igiri (2015) who asserted that Learners exposed to instructional materials during lesson delivery had a positive significant academic achievement. The findings of hypothesis one is also in agreement with Buba et al. (2019) who concluded that the use of instructional materials enhanced the

comprehension of concepts and retention of taught concepts among learners. The findings are in-line with Nanka (2006) who opined that teaching of Science (particularly biology) with innovative approach will further improve the academic achievement of students.

Furthermore, the findings also corroborate with Oladejo et al. (2011) who concluded that instructional materials expose students to range of experiences. The findings support the view of Morontola (2002) who stressed that the teaching of Science (biology in particular) should involve active students' participation to demystify abstract concepts. The findings are in consonance with Kabesa (2019) who maintained that using locally available resources as an instructional aid in secondary schools improves the academic achievement of students positively.

The second hypothesis states that there is no significant influence of gender on the use of locally available instructional materials on biology students' academic achievement. The null hypothesis was retained on the basis that the F-ratio (.251) at P (.618) is greater than P (.05), which implies that there is no significant influence of gender on the use of locally available instructional materials on biology students' academic achievement. The findings of hypothesis two is in consonance with Nweze (2021), who maintained that gender had no significant effect on students' academic achievement.

Furthermore, the findings are in agreement with Oladebo (2011) who found that gender has no significant effect on academic achievement of students. The findings are in-line with Muodumogu and Yisa (2013) who concluded that the use of locally available instructional materials on biology students' academic achievement is not influenced by gender. The findings corroborate with Suraj et al. (2021) who opined that there is no significant effect of gender on students' academic achievement.

CONCLUSION

Based on the result of the findings, it was concluded that academic achievement of senior secondary school (SSS) biology students can be significantly enhanced by the use of locally available instructional materials for improving critical thinking/imaginative skills as well as reducing subject-abstraction phobia.

SUGGESTIONS/RECOMMENDATIONS

In line with the findings of this study and conclusions made herein, the following recommendations were made;

1. Biology teachers should be encouraged to source for and use locally available instructional materials for effective instructional delivery.
2. Education policy makers, curriculum planners as well as Ministry of Education should popularize the relevance of locally available instructional materials in biology curriculum, concept by concept.
3. Professional bodies like Science Teachers Association of Nigeria (STAN) and Teachers Registration Council of Nigeria (TRCN) should help to disseminate the use of local materials for teaching-learning process.
4. There should be training and retraining of biology teachers through seminars, symposiums and workshops on the need to utilize locally available instructional materials for effective teaching/learning.

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IMPACT EVALUATION OF UNIVERSAL BASIC EDUCATION COMMISSION CAPACITY BUILDING PROGRAM ON MATHEMATICS TEACHER TESTING SKILLS IN AKWA IBOM STATE, NIGERIA

EKIM, ROSELINE E. DICK AND DADA, OLUSEYI AKINTUNDE

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ABSTRACT

This study evaluated the impact of the in-service training program offered by the Universal Basic Education Commission (UBEC) in Nigeria on the testing skill of Mathematics teachers in Akwa Ibom State, Nigeria. The study adopted the expo facto research design research. A two-stage sampling involving simple random and stratified techniques were employed to select 134 from the 530 Mathematics teachers in the public secondary schools in Akwa Ibom State, Nigeria. The instrument used for the data collection was, Teacher Testing Skills Assessment Scale (TTSAS) developed by the researchers based on the objective of the study. The instrument was validated by three measurement experts and trial tested. The reliability coefficient of .77 was obtained from the inter-rater method of reliability estimate. The data collected was analyzed using mean, standard deviation and independent sample t-test. The results of the analysis revealed that the UBEC in-service training program has significant positive impact on Mathematics teachers' testing skills. It was concluded that the UBEC teachers' capacity development program is a profitable venture with promising national gains. It was recommended that government should continue with her support for the UBEC in sustaining regular in-service training program for teachers in secondary schools across the nation.

KEYWORDS: Mathematics Teacher, Mathematics Testing Skill, Capacity Building, Universal Basic Education

INTRODUCTION

Testing skill is a necessary attribute of a good teacher that is appropriate for holistic and effective classroom instructional process. It is a skill that is needed by teachers to evaluate, monitor and helps to make better decision on the cognitive, social, psychological and physical development of the learners.

According to Ubi and Ibe (2020), being fully grounded with testing skills, as it is expected, teachers are to determine what to be learned and then define same so precisely that test item constructed by them should show the desired performance and serve useful purposes. Testing skill of mathematics teachers is of particular importance to monitor the progress of the learners in mathematics. The mathematics

Ekim, Roseline E. Dick, Department of Psychological Foundations of Education,
Faculty of Education, University of Uyo, Uyo, Nigeria

Dada, Oluseyi Akintunde, Department of Special Education, Faculty of Educational Foundation
Studies, University of Calabar, Nigeria

teachers after giving their best in teaching mathematics, it is also imperative to assess the learners appropriately to provide accurate feedback on the teaching and learning effectiveness. Mathematics teachers' testing skill is expected to help in monitoring the learner's understanding of the mathematical language, concepts, application of the mathematical rules and formula. Appropriate testing is capable of helping teachers, learners and even the parents in knowing the strength and weakness of the learners and the teaching-learning process in a school.

An effective testing skill in mathematics reflect on the teachers' ability to developed measurable mathematics lesson objectives, develop assessment blueprint with adequate content coverage based on the stated mathematics objectives and construction of error free question items that is consistent with the learning goals and objectives and as specified in the assessment blueprint. Other requisite abilities that should be observed in a mathematics teacher with effective testing skill is the validation of the constructed items, and determination of other psychometric properties of the test items such as reliability of the test, item difficulties and discriminating facilities (). Since testing also include appropriate administration of the tests, scoring, grading and interpretation, mathematics teachers are highly expected to demonstrate these abilities particularly with their new in-service training experience.

Reflecting from the Bloom's taxonomy, a teacher should be capable of designing his curriculum objectives and the corresponding assessment of the objectives. An appropriate test must reflect the three domains of learning; cognitive, affective and psychomotor for all learners in respective of their ability or disabilities (Dada & Fagbemi, 2014; Chandio, Pandhiani & Iqbal, 2016). This means that, Mathematics test items must be logically developed in order to help develop the students' calculation ability, have positive attitude and interest in mathematics and be capable of using their psychomotor abilities in areas such as drawing, graphing, and use of construction materials (Dada & Dada, 2014). All these abilities are gradually developed in learners as they experience them in both summative and formative testing. It therefore behooves all teachers and especially mathematics teachers to deploy their testing skills effectively for a holistic development and motivation of their student towards mathematics (Kuiper, Nieveen & Berkvens, 2013).

The universal basic education commission (UBEC) has considered mathematics as a core basic subject for all children and has regularly supported mathematics teachers within their authority to develop appropriate capacity in mathematics. According to Akwa Ibom State school board (ASSB,2021), more than 60% of mathematics teachers in the state have enjoy UBEC in-service training. This is a welcome development and is appreciated. The capacity building of the mathematics teachers is expected to help in strengthening the skills and job motivation of the mathematics teachers in achieving high standard and better performance in mathematics particularly for students under the UBE schools. Meanwhile, there seems to be no better change in the performance and attitude of the students toward mathematics. The performance of the students has been consistently dwindling over the years.

The unstable performance in mathematics calls for concern among professionals as it is expected that by now the UBEC in-service training should have helped to improve the mathematics performance of the students. The poor performance of the students in the recent mathematics result indicates that the highest performance in the last three years was about 39% credit pass in mathematics in NECO for BECE in Akwa Ibom state (ASSB, 2021). This is highly questionable considering the effort of the UBEC on the mathematics teachers in providing in-service training in the state. This was the motivation for the researcher to investigate the impact of the UBEC training on the teachers' effectiveness in their classroom instructional materials and curriculum delivery. It was found that the UBEC in-service training for the mathematics teachers was very effective in developing teachers' use of instructional materials and curriculum delivery (Ekim, Akpan & Dada, 2022).

The curiosity of knowing where the problem of poor performance of the students in BECE lied in Akwa Ibom State warranted further investigation by the researchers. It was therefore found that there is variance in the standard of question set by the mathematics teachers in UBE schools and the expected standard of the external examination body (Anagbogu, Dada, Petters & Owo 2022). This has significant effect on the level of preparation of the students in mathematics and consequently their consistent poor performance in Mathematics. It is against the backdrop that this study was motivated to evaluate the impact of UBEC capacity building

program on mathematics teachers' testing skill in Akwa Ibom State.

According to the United Nations Office for Disaster Risk Reduction (UNDRR, 2016), capacity building is a process which enables people, organizations and society to systematically stimulate and develop their capability over time in order to achieve specific goals, including through improvement of knowledge, skills, systems, and institutions within a wider social and cultural enabling environment. In the educational system, capacity building is not taken for granted as it is considered helpful in strengthening the skills, knowledge, motivation, attitude and behavior of teachers and students.

Mathematics teachers is expected to have acquired the basic knowledge in teaching and testing skills in Mathematics. They should be capable of changing the learners' behavior, skills and attitudes toward mathematics. But becoming a better and effective mathematics teacher, demands regular in-service experiences to be abreast of professional career. So, the need for the capacity development. As viewed by Ukonze and Olaitan (2009), capacity building of Mathematics teachers should reflect on appropriate Mathematics teaching competency, and testing skills with right attitudes towards the subject and the students so as to help achieve the set goals and objectives. Therefore, for better achievement in mathematics, building Mathematics teachers' testing skills cannot be overemphasized.

The Universal Basic Education Commission (UBEC, 2004) objectives of teacher in-service training program include:

1. Improve the overall quality of teaching and learning at the classroom level with the specific objectives to update subject scope
2. Sharpen the teachers' skills and methodology
3. Improve the teachers' instructional skills and practices
4. Empower the teachers to have a more positive impact in the classrooms
5. Encourage the teachers to try new methods and better lesson plan development skill, develop pupil-centered techniques, critical thinking, classroom organization and conducting reliable continuous assessment of pupils' learning.

In support of this, Adebowale and Alao (2010) added that there are some basic principles guiding in-service training programs. These principles include the design of training program to meet the needs identified. For instance, the testing skills of teachers especially in

Mathematics calls for more organized in-service training programs for Mathematics teachers. Thus, Mathematics teachers' effectiveness enhances students' satisfaction and hence, help in building their capacity including Mathematical testing skills.

The impact Evaluation of UBEC capacity building program on mathematics teachers' testing skill is the application of formal enquiry techniques for data collection in order to conceptualize, refine and determine the effectiveness of a program with a view to making a comparative value judgment in order to continue, modify or terminate it. Owing to this background this study evaluates the impact of the UBEC capacity building program on Mathematics teachers' testing skill in Akwa Ibom State.

Research question: How does the UBEC capacity building program impact mathematics teachers' testing skills?

Hypothesis: There is no significant impact of UBEC capacity building program on Mathematics teachers' testing skills in Akwa Ibom State.

METHODOLOGY

An expo facto research design was employed in the study. The target population of the study was 530 upper basic Mathematics teachers from 25 Local Education Committees (LECs) present in Akwa Ibom State. A sample size of 134 Mathematics teachers was drawn from 18 LECs. The sample was selected using two-stage sampling (simple random and stratified random) techniques. The researchers first used simple random technique to select 18 LECs out of the 25 presents. The teachers were stratified into those who are part of the capacity building program and those who are not. This was followed by simple random sampling technique to select 134 Mathematics teachers from each stratum. The instrument employed by the researchers to collect data for this study was "Teacher Testing Skills Assessment Scale" (TTSAS). This instrument was in two sections; A and B. Section A focused on the personal data of the Upper Basic Mathematics teacher such as Mathematics Teacher's sex, age, teaching experience; qualification while section B was used to assess Upper Basic teachers on capacity building in terms of Mathematic teachers' testing skills. The scale responses were scaled as 4-very good, 3-good, 2-fair and 1-poor based on the observation and document content assessment. The instrument was content validated by two experts in Educational Measurement and Evaluation using inter-rater method. The reliability, obtained

gave coefficient of 0.77 which indicated that the instrument is reliable.

The researcher visited the school during the second term examination period to observe the participants. The participants testing skills were rated including their test development blueprint, items construction, administration, and scoring and item analysis. The participants were objectively rated according to the guidelines of the research instrument. Since the study is concern to find out if the training has good impact on the teachers, the data from those participants that were involve in the training was used in answering the research question. The participants who are beneficiaries of the UBEC capacity building program were considered as

experimental group while the non-beneficiaries were considered as the control group. The data collected was analyzed using descriptive statistics of mean and standard deviation to answer the research question while the stated null hypothesis was tested using the independent sample t-test.

RESULTS

Research question: How does the UBEC capacity building program impact on the mathematics teachers' testing skills?

The mean and standard deviation were used to answer the research question as reported in Table 1.

Table 1: Mean and standard deviation of mathematics teachers' testing skills in Akwa Ibom State, Nigeria

S/N	Variable	Non- Beneficiaries of UBEC capacity building program (n = 47)		Beneficiaries of UBEC capacity building program (n =87)	
		\bar{X}	SD	\bar{X}	SD
1.	Test objectives skill	1.64	.49	3.04	.20
2.	Test blueprint design skill	1,34	.56	3.17	.81
3.	Test construction skill	1,75	.44	3.30	.46
4.	Test administration skill	2.31	.74	3.44	.72
5.	Test scoring skill	1.43	.50	3.39	.49
6.	Test analysis skill	1.80	.85	3.28	.45
	Weighted mean	1.72		3.27	

From table 1, it is observed that the mean ratings of each element of the testing skills of the teachers were higher than the expected mean rating of 2.5 for the teachers who are beneficiaries of the UBEC capacity building program but lower than 2.5 for the non-beneficiaries. The weighted mean of the testing skills of the participants who are beneficiaries of the UBEC capacity building program was 3.27 while that of the non-beneficiaries was 1.72. This

implies that the UBEC capacity building has to a very large extent a positive impact on mathematics teachers testing skills in Akwa Ibom State, Nigeria. Therefore, in response to the research question, there is a very good impact of the UBEC capacity building program for the mathematics teachers in Akwa Ibom State.

Ho: There is no significant impact of UBEC capacity building program on Mathematics teachers' testing skills in Akwa Ibom State.

Table 2: Independent t-test showing the difference in the testing skills between beneficiary and non-beneficiary of UBEC capacity building program for mathematics teachers

Variable	Group	N	Mean	Std. Deviation	Std. Error Mean	t-value	p-value
Test objectives skill	Non-beneficiary	47	1.74	.607	.089	-17.52	.000
	Beneficiary	87	3.03	.239	.026		
Test blueprint design skill	Non-beneficiary	47	1.51	.831	.121	-10.88	.000
	Beneficiary	87	3.14	.824	.088		
Test construction skill	Non-beneficiary	47	1.85	.551	.080	-15.72	.000
	Beneficiary	87	3.30	.485	.052		
Test administration skill	Non-beneficiary	47	2.38	.768	.112	-7.93	.000
	Beneficiary	87	3.45	.728	.078		
Test scoring skill	Non-beneficiary	47	1.62	.768	.112	-15.15	.000
	Beneficiary	87	3.36	.549	.059		
Test analysis skill	Non-beneficiary	47	1.94	.919	.134	-10.68	.000
	Beneficiary	87	3.25	.511	.055		
	Non-beneficiary	11.0426	3.02135	.44071	.44071		
	Beneficiary	19.5287	1.40464	.15059	.15059		

Table 2 reveals that the pretest is significantly different between mathematics teachers who are beneficiaries and non-beneficiaries of the UBEC capacity building program. In all the sub-skills and the overall testing skills, there are significant difference between the beneficiaries and non-beneficiaries of the program with the beneficiaries showing better skills than the non-beneficiaries. This implies that the UBEC capacity building program is significantly impactful on the mathematics teachers in Akwa Ibom State of Nigeria.

DISCUSSION OF FINDING

The result of research question revealed that Universal Basic Education Mathematics capacity building program has significantly developed teachers' capacity building in relation to their teaching and testing skills in Akwa Ibom State to a high extent. This result is in line with the assertion of Alkaria, & Alhassan (2017), that capacity building of computer science teachers in scratch language using an electronic learning platform influences the acquisition of skills and attitudes towards teaching programming, also that teachers that were exposed to extra training after they were employed significantly demonstrated skills and better attitude than teachers who were not exposed to any form of capacity building. They viewed that capacity building makes up for the inadequacies of the teachers as they are particularly trained to be better in all the areas of their job. They observed that, a teacher who is expected to teach Mathematics may not have sufficient

skills/concept to teach all the topics in the mathematics syllabus, but the capacity building will be a cure.

The result also conforms to the findings of Levy-Keren (2014) that, at the end of the first year of the capacity building program the participants demonstrated a slight improvement in perceiving their capabilities of understanding Mathematics and skill for teaching it. In the second year there was significant improvement. Levy-Keren stated that beneficiaries of a detailed, long time in-service program have more influence on developing teachers' Mathematical skills and concepts while any capacity building program that is short and narrow do not have significant influence on teachers.

Although, the result of this study contradicts Shrike and Patkin (2016), statement who said that, the capacity building and other forms of training had no influence on participants of such training since they did not perform above their average daily outputs. The possible explanation why this present study contradicts the study of Shrinke and Patkin could be that, their study exposed its participant to a very short program regimen which is not sufficient to cause a significant change.

The result also conforms with the findings of Mapolelo and Akinsola (2015), that capacity building program can influence teachers' performance, their findings also revealed that teacher participation in induction program, ICT training and seminar/workshop significantly related to quality Universal Basic Education in Lagos State. In- service training acts as a

catalyst for teacher's development in mathematical skills and concept. Base on this, the result corroborates Levenberg and Patkin (2014) in their study made a supportive statement that the teaching profession is a continuous learning process for those who practice it. No wonder Ball (2011), dealt with a question of knowing Mathematics well to teach it. As a result of these three questions were raised: How much Mathematics do teachers need to know? What Mathematics do teachers need to know and why? What Mathematical knowledge and skills are involved in teaching? In addition to this, Guberman & Gover (2012) optioned three important components: the component of Mathematics knowledge, Mathematical pedagogical knowledge and the component of knowledge about curricula.

Hence, the reason why Bello (2008) in his speech during the enlightenment of Strengthening, Mathematics, and Science Education (SMASE, Nigeria) project explained the need to develop capacity of teachers by shifting teaching paradigm from a chalk and talk/teacher-centered method to an activity-based/student centered approach.

CONCLUSION:

With respect to the findings, in-service training program organized for Upper Basic Mathematics teachers in Akwa Ibom State for Upper Basic Mathematics teachers has significantly developed the mathematics teachers' ability on testing skill.

RECOMMENDATIONS

Base on the positive impact of UBEC capacity building program to Mathematics teachers in Junior Secondary School, it is recommended that government should ensure that the program is made available to all the mathematics teachers..

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PARENTAL INVOLVEMENT AND SCHOOL INDISCIPLINE AMONG SECONDARY SCHOOL STUDENTS IN CALABAR SOUTH LOCAL GOVERNMENT AREA OF CROSS RIVER STATE, NIGERIA.

ACHI NDIFON BEKOMSON, MARGARET E. OYOITA AND DORN CLAIMZ ENAMHE

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ABSTRACT

Indiscipline in secondary school has persisted over the years, taking a new and frightening tone that seems like a bone in the throat. This study investigated the influence of parental involvement in terms of interference with child punishment and confronting teachers openly on school discipline of secondary school students. Two research questions were raised to guide the study. The literature review was done according to the variables under study. The survey design was adopted for the study. The population consists of all parents of Public Secondary Schools. Ninety three (93) parents purposively selected from the Parents Teachers Association of the 7 Public Secondary Schools in Calabar South Local Government Area of Cross River State constituted the sample for the study. A Four (4) point Likert questionnaire titled "Parental Involvement and School Indiscipline Questionnaire"(PIASDQ) was the instrument used for data collection. The validity of the instrument was determined by four (4) experts in Educational Psychology and Measurement and Evaluation units respectively, all from the Department of Educational Foundations. While Cronbach Alpha reliability was used to determine the reliability at .73 level of significance. Data collected were analyzed using descriptive statistics. Based on the findings, it was recommended among others that parents should be encouraged to correct their children's wrongdoings at home as the home is the first school, modalities for effective disciplinary measures should be discussed strongly in PTA meetings to get the views of parents, and also check brutality on the part of the teachers.

KEYWORDS: Parental, Involvement, School and Indiscipline

INTRODUCTION

Basic education is a fundamental requirement for a country's development and a person's assurance of a better life. No country or individual can have a valuable life without quality education.

However, school learning provides the basic education for the all-round development of an individual, to enable him to fit into the ever-changing society. Quality education can only be achieved if students comply or submit to the

Achi Ndifon Bekomson, Department of Educational Foundations, Faculty of Educational Foundations Studies, University of Calabar, Nigeria

Margaret E. Oyoita, Department of Educational Foundations, Faculty of Educational Foundations Studies, University of Calabar, Nigeria

Dorn Claimz Enamhe, Department of Social Work, Faculty of Social Sciences, University of Calabar, Nigeria

obedience that is applicable in the school setting. Students who fall short of school behavioral requirements are often regarded as undisciplined children whose un-governable nature may not allow them to acquire knowledge, values, attitudes, skills and abilities, that will build them up physically, mentally, economically, socially, politically, and otherwise.

Unfortunately, in secondary schools today education stakeholders worry about the high level of indiscipline among school children at different levels of education. Students have been observed to always undermine school rules and regulations. Most students in secondary schools are seen fighting or exchanging words with their teachers, they often engage in unacceptable actions like examination malpractice, bullying, truancy, late coming to school, bringing mobile phones to school, wearing unacceptable haircuts, uniforms, and others as against the schools' laid down rules and regulations, including vandalization of public property (Oba, Ajake & Obindah 2013).

School indiscipline encompasses a wide range of unacceptable conducts that can hinder academic success. School administrators and teachers have cried out loud about the display of indiscipline behaviour among students. In an attempt to remediate the problem of indiscipline in school, professional help and interventions have been considered. Some disciplinary measures have been put in place to checkmate these unwarranted behaviours displayed by students, but it seems the students have a way of scuttling these measures that seem not workable, or perhaps the students have suddenly developed immunity against school discipline.

Most students have been exposed to disciplinary measures as harsh as expulsion, suspension, repeating classes, corporal punishment, manual labour, etc, but all these measures seem to yield little or no results. The dynamic nature of Nigeria's economy, political system, and social structure make the researchers worry more that the display of indiscipline behaviour among students may be a major distraction to their academic pursuit which if not achieved may post serious consequences as they try to fit into the ever-changing society that has become economically turbulent.

Oba, & Ajake, (2014) revealed a high prevalence in truancy, lying, fighting and cheating among secondary school students, and various variables have also been examined as root causes of

these researches, yet school indiscipline remains a major drawback to academic success, which is primarily why school discipline must be enforced. From the aforementioned, the researchers think that since the root cause of school indiscipline is still not unearthed, it is pertinent to examine parental involvement and school discipline among SSI students in Calabar South Local Government Area of Cross River State to ascertain if the problem emanates from the home front. The researchers seek to find out if parental involvement in terms of their interference with child punishment, and confronting teachers openly could be the reason for students' display of indiscipline behaviour, since parents play an important part on the overall development of the students (Oyo-Ita & P. U Bassey).

Discipline is the ability and willingness to do that which is expected of you without any form of coercion. It is an internal desire of a person to always abide by the rules and regulations of the society he finds himself (Abubakar,2000). However, Agueba (2009) referred to Douglas McGregor's theory x which explains discipline as an external control that compels one to abide by laid down rules and regulations against their will, probably because of fear of punishment, superior persons, benefits, or possible penalties. Kola (2017) argued that parental interference can subvert the school authority as he presented a suit by a parent over a confiscated mobile phone. Kola maintained that the imposition of harsh penalties is for a reason which may not be only to punish offenders but to serve as a deterrent to others and stressed that maintaining school discipline is very necessary for upholding sound values, order, and decorum in the learning environment. Abang and Amalu (2018) posits that students' indiscipline involves activities that negate principle of order and decency.

Relatedly, Poach (2011) reported that most parents still undermined the attempt by schools to instill discipline in the classroom. He pointed out that students copy the behaviour parents put up at home which downplays school discipline. This was evident in the widespread students' refusal to stop talking, sit down, or pay attention to the teacher. The prevalence of such indiscipline in school undermines the teachers' effort to maintain order in the classroom. Again, Ouwakemi (2018) reported that a Kenyan parent charged a school and other three teachers for allegedly beating up her child, demanding a public apology and compensation. This action

and many other examples made the Kenyan **PARENTAL INVOLVEMENT AND SCHOOL INDISCIPLINE AMONG SECONDARY SCHOOL STUDENTS** served as one of the most effective disciplinary measures in schools.

In another development, Bell (2021), reported that most parents today decline whenever disciplining their children is discussed by teachers. Their lack of enthusiasm regarding the call for a disciplinary measure to be meted on their children after misbehaving in schools seems rather challenging to the teachers. OECD (2011) stressed that schools and classrooms facing heightened indiscipline problems remain un-conducive for learning activities to thrive since teachers and school administrators will focus more on trying to resolve these challenges. A discipline organization produces discipline members, likewise, a school that fails in instilling discipline in the students will breed indiscipline among them.

The way and manner parents react to discipline can either promote the effectiveness of discipline or be detrimental to the efforts of teachers to put the children on the right path. The ferocity of school indiscipline will adversely or conversely affect learning. A study conducted by Dorner (2006) revealed that when parents teach children gratification, they become accommodative, self-assertive, and obedient to set rules and regulations, while failure to build a sense of social competence in children will cause them to be socially alienated. Clauss – Ehlers (2010) observes that a child's upbringing is far more important for academic success than the school environment. This assertion brings to bear the important role of parents in promoting students' discipline. It is obvious that the attitude of students in school is not determined by the school environment, rather it is predicated on the different levels of interface existing between parents and their children outside the school environment.

Interestingly, the home is an organized institution that should provide a moral compass for students, but that is not the perception of Knight and Roberts (2009) who argued that parents who are aggressive, unruly, and demanding would produce aggressive adolescents. Failure to curb the aggression displayed at home will culminate in public aggression. Okumu (2011), Bekomson, Abang, & Ntamu (2021) supports this claim by adding that aggressive adolescents are prone to involvement in students' unrest as they lack moral value orientation from home and the ability to handle conflicts through dialogue and social responsibility. Hayes, Smart, Toumbourou &

Usanaon Makers, Hale, & Meens Wijsbroek, **PARENTAL INVOLVEMENT AND SCHOOL INDISCIPLINE AMONG SECONDARY SCHOOL STUDENTS** at the attitude of parents towards discipline in school could be the reason for problem behaviour among students.

Quality education is the bedrock of any nation, no nation can rise above the level of education of its citizens, achieving giant educational strides can only be possible in an environment free of disharmony, rebellion, and breakdown of law and order. The display of indiscipline by students is not only dangerous to the students but depicts failure on the part of the family, teachers, school administrators, and the nation at large. Quality education determines the standard, efficiency, proficiency, and quality of service delivery by the educated to be able to achieve the development agenda of a nation.

Okorodudu (2013) affirms that most parents give children money to buy leaked question papers and pay invigilators handsomely to allow their children to cheat in examinations. Oba, Ajake & Obindah(2013) added that most children express their anger at home by vandalizing household furniture. This trend does not create a healthy learning environment as students who enjoy full support from parents are bound to resist any disciplinary measures put in place to check examination malpractice. Sadly, the lack of seriousness on the part of students, and undue emphasis on parents regarding carrier choices and certificate acquisition left most parents with no choice but to encourage examination malpractice (Ukpepi & Ndifon 2012).

The problem of the study

Indiscipline in secondary school has persisted over the years, taking a new and frightening tone that seems exasperating. The researchers who happen to be teachers observed that most students in secondary schools in Calabar South of Cross River State, Nigeria, engage in various forms of indiscipline acts ranging from truancy, absenteeism, lateness to school, refusal to do their homework, stealing of school properties, verbal insults, bullying, disobedience, examination malpractice, fighting, among others. This unhealthy trend seems to have a downward toll on students' attitude towards their teachers and their academic activities. Various attempts by the school administration and teachers to curb this unwholesome trend prove abortive. Various disciplinary measures like corporal punishment, suspension, and expulsion, have been put in place to correct this anomaly to no avail. The above-mentioned has necessitated the investigation of parental involvement and school discipline.

Purpose of the study

The purpose of this study was to investigate parental involvement in terms of:

1. parental interference with school discipline
2. confronting teachers openly;

Research question

1. To what extent do parents interfere with school discipline?
2. To what extent do parents confront teachers openly?

METHODOLOGY

This study adopted the survey research design. The population consists of all 1866 parents of SS1 students from the 7 public secondary schools in Calabar South Local Government of Cross River State. The sample is made up of 93 parents of SSI students from the public secondary schools in the area. The researchers used all the public schools in the population from Calabar South where 13 parents each were picked from the PTA of the schools. A purposive sampling technique was employed to select the schools and the sample. The instrument used for data collection was titled Parental Involvement and School Discipline Questionnaire (PIASDQ) Data collected were analyzed using descriptive statistics.

It was based on a 4-point Likert scale thus: Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). Some examples of the items include: "I don't think any teacher has the right to discipline my child" (negative item); "I like encouraging my children's teachers to discipline them appropriately" (positive item); "I always praise teachers who discipline my children to correct them" (positive item); "I always give a piece of my mind to teachers who discipline my children" (negative item). The positive items were scored 4, 3, 2, and 1 for SA,

The instrument's face validity was determined by two experts each from the fields of Educational Psychology and Test, Measurement, and Evaluation. A trial test was performed to determine the instrument's reliability through the use of the Cronbach Reliability Coefficient method by administering it to 20 parents from two public schools (private and public) - 10 parents from each school. The schools were chosen from the population but were not part of the sample. The reliability coefficient was 0.73

Data obtained were analyzed using descriptive statistics – percentages, mean, and standard deviation.

RESULTS:

Items 1 to 6 in Table 1 measure parental interference with school discipline while items 7 to 12 evaluate parental confrontation of teachers who discipline their wards. The table also shows parents' responses, in percent, to each of the questionnaire items which was based on a 4-point Likert scale. The aggregate decision of the majority of the parents and the attendant inference for each questionnaire item based on their percentage responses are given in the table. When the sum of the percentage responses of Strongly Disagree (SD) and Disagree (D) exceeds the sum of Agree (A) and Strongly Agree (SA) the decision is Disagree and vice versa. Inference as to whether the parent supports discipline is made based on the decision and the wording of the questions. Accordingly, the majority of the parents showed a positive disposition to the disciplining of their wards by teachers (Questions 1 to 6) and preferred not to interfere in the disciplining of their wards. In the same vein, the majority of the parents disagreed with the idea of confronting teachers who discipline their wards (Questions 7 – 12) and chose not to get angry with such teachers.

PARENTAL INVOLVEMENT AND SCHOOL INDISCIPLINE AMONG SECONDARY SCHOOL STUDENTS

TABLE 1

Percentage of Parents' Responses to the Questionnaire Items on School Discipline

S/N	Questionnaire Items	Responses in Percent				Decision	Inference
		SD (%)	D (%)	A (%)	SA (%)		
Parental Interference with School Discipline							
1	I don't think any teacher has the right to discipline my child	32.3	57.0	3.2	7.5	Disagree	Supports discipline
2	Whenever my child goes wrong, I call the teacher to beg on his behalf	46.2	34.4	14.0	5.4	Disagree	Supports discipline
3	I like encouraging my children's teachers to discipline them appropriately	9.7	5.4	48.4	36.5	Agree	Supports discipline
4	I think I am the only one who can best discipline my child	43.0	41.9	8.6	6.5	Disagree	Supports discipline
5	I prefer to know the kind of discipline the teacher wants to give to my child beforehand	35.5	30.1	19.4	15.1	Disagree	Supports discipline
6	I prefer reporting my child's misbehaviour for proper discipline	17.2	19.4	40.9	22.6	Agree	Supports discipline
Parental Confrontation of Teachers							
7	I get angry with teachers who always discipline my child	33.3	43.0	17.2	6.5	Disagree	Supports discipline
8	I always give a piece of my mind to teachers who discipline my children	22.6	30.1	30.1	17.2	Disagree	Supports discipline
9	Any teacher my child reports disciplines him will face the consequence	32.3	53.8	8.6	5.4	Disagree	Supports discipline
10	I feel happy when ever my child is disciplined by his teacher	4.3	7.5	54.8	33.3	Agree	Supports discipline
11	I respect highly disciplined teachers of my children	5.4	14.0	37.6	43.0	Agree	Supports discipline
12	I always praise teachers who discipline my children to correct them	3.2	6.5	32.3	58.1	Agree	Supports discipline

ACHI NDIFON BEKOMSON, MARGARET E. OYOITA AND DORN CLAIMZ ENAMHE

In Table 2, the mean and standard deviation for each response were used to assess parents' interference with school discipline and their tendency to confront teachers who discipline their wards using a criterion mean of 2.5. Therefore, a mean score of 2.5 or higher was considered positive, indicating that respondents supported school discipline and opposed challenging teachers who punish their charges. On the other hand, a mean score of less than 2.5 was seen to

be negative, suggesting that parents may not be in favour of enforcing school rules. A mean score of less than 2.5 also indicates that parents are more likely to challenge teachers who discipline their children. According to the findings, the majority of parents support school discipline and would not interfere with it (Questions 1–6). A resounding majority of parents would also prefer to avoid confronting teachers who reprimand their children

TABLE 2

Mean of Parents' Responses to the Questionnaire Items on School Discipline

S/N	Questionnaire Items	N	Mean	Std. Dev.	Remarks
Parental Interference with School Discipline					
1	I don't think any teacher has the right to discipline my child	93	3.14	.802	Positive
2	Whenever my child goes wrong, I call the teacher to beg on his behalf	93	3.22	.883	Positive
3	I like encouraging my children's teachers to discipline the appropriately	93	3.12	.895	Positive
4	I think I am the only one who can best discipline my child	93	3.22	.858	Positive
5	I prefer to know the kind of discipline the teacher wants to give to my child beforehand	93	2.86	1.069	Positive
6	I prefer reporting my child's misbehaviour for proper discipline	93	2.69	1.011	Positive
Parental Confrontation of Teachers					
7	I get angry with teachers who always discipline my child	93	3.03	.878	Positive
8	I always give a piece of my mind to teachers who discipline my children	93	2.58	1.025	Positive
9	Any teacher my child reports disciplines him will face the consequence	93	3.13	.783	Positive
10	I feel happy when ever my child is disciplined by his teacher	93	3.17	.746	Positive
11	I respect highly disciplined teachers of my children	93	3.18	.872	Positive

PARENTAL INVOLVEMENT AND SCHOOL INDISCIPLINE AMONG SECONDARY SCHOOL STUDENTS

Consequently, the two research questions:

1. To what extent do parents interfere with school discipline?
 2. To what extent do parents confront teachers openly?
- Are answered in the negative which means that the majority of parents do not interfere with school discipline and would not, also, confront teachers openly.

DISCUSSION OF FINDINGS:

The study results revealed that on parental interference, a greater proportion of parents disagreed with interference with school discipline while fewer parents agreed with interference with school discipline. This means that a higher percentage of parents showed a positive disposition to school disciplining their wards without any interference. The results of this study contradict the report of Bell, (2021) which revealed that parents decline when the issue of discipline is discussed in schools.

The report on the parental confrontation of teachers who discipline their wards revealed that a higher percentage of parents disagreed with the parental confrontation of teachers while a lower percentage of parents agreed with parental confrontation. This means that most parents do not confront teachers who discipline their wards with a high percentage involved. This results also contradicts the report of Oluwakemi, (2018) who revealed that Kenyan parents charged a school teacher and other three teachers for allegedly beating up her child.

Another dimension of the results was presented in Table 2, using the mean score of parents to ascertain their interference with discipline and their tendency to confront teachers who discipline their wards. The results revealed a mean score of above 2.5 which revealed a positive disposition of parents towards the disciplining of their wards, and a mean score below 2.5 which shows a negative disposition of parents to interference and confrontation of teachers who discipline their wards.

The results of this study disagree with the report of Oluwakemi, (2018) who reported that parents demanded a public apology as compensation from teachers who beat up their wards. The report of Poach, (2011) also negates the present

findings with the revelation that most parents still undermine the attempt by the school to discipline their students.

The contradiction with the literature review revealed by the results of this study could mean that most parents are more oriented towards values and understand the place of discipline in child upbringing.

CONCLUSION

It was concluded that a greater percentage of parents do not interfere with school discipline, neither do they confront teachers who discipline their children.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made:

1. Parents should be encouraged not to interfere with school discipline, but to allow teachers help them curb their children's misbehaviour.
2. Modalities for effective disciplinary measures should be discussed strongly in PTA meetings to get the views of parents. This will reduce or eliminate the chances of parents confronting teachers.

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MANAGEMENT OF HIGHER INSTITUTION IN THE 21ST CENTURY

**ATEGWU PATRICK OGAR, OKON ROSLYN ASUQUO, AMADI JOHN OYEKACHI
AND CHINYERE NAOMI NWAKPA**

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ABSTRACT

The study was to examine management of higher institution in the 21st century. The study was anchor on the following sub-headings: Higher Education in Nigeria, Administration: Roadmap to Total Quality Management in Universities in Nigeria, Management Styles, Factors mitigating against higher education leadership, Management in Nigerian Polytechnics, Polytechnic/Technical Education – A Panacea to Human Resource Development, Major Challenges and Constrains to Polytechnic/Technical Education in Nigeria, and Management of the Nigerian Colleges of Education was consider in the study. From the qualitative exploration of the study, it was recommended among others that: Federal and State Governments should provide adequate funds that will promote effective management of the higher institutions for sustainability of a better today and tomorrow in Nigeria.

KEYWORDS: Management of higher institution, University, Polytechnic, College of Education.

INTRODUCTION

The aim of the management education programme is to prepare students for entry and advancement in management occupations or in occupations requiring competency in one or more of the management functions. In addition to the already existing educational curricula of various management sciences of the tertiary institutions, curriculum planners in management education should earmark academic programme that will touch the lives of individuals who require management education to improve their skills, engender high standard of living and consequent economic development.

Nigerian Tertiary Institutions must re-assess their role not in terms of metropolitan countries but in terms of their own society. In the metropolitan Western World Institutions of higher learning are instruments of conservation (care and management of the environment) and an instrument of liberalization. The main problem with Nigerian higher institutions is that they are neither training and recruiting for an existing leadership, nor conserving or liberalizing the existing social order. Nigerian higher institutions are caught between the old and the emerging social and economic systems. The answer does not lie in making themselves poor seconds to metropolitan institutions, but in evolving a system

Ategwu Patrick Ogar, Educational Management, University of Calabar
Okon Roslyn Asuquo, Educational Management, University of Calabar
Amadi John Oyekachi, Public Administration, University of Calabar
Chinyere Naomi Nwakpa, Educational Management, University of Calabar

that is uniquely suited to their environment. The higher educational sector should be more involved in government planning and government officials must be equally involved in educational planning, tap from the knowledge and experience of Nigeria professors obsessed with Nigerian environment. This can be achieved by the establishment of a permanent Joint Advisory Committee, whose main function would be to advise both government and various higher institutions on how best to harmonize programmes and maximize the effective use of manpower. The curriculum of higher institutions vice-a-vice marketing education in Nigeria need drastic review and must be Nigeria bias and directed towards nation building.

HIGHER EDUCATION IN NIGERIA

Nigeria as a country is naturally endowed with large population, the vast population require skilled manpower to run the economic need of the country's people, and these skills needed can only be trained by the higher education system of the country, especially the university system (Dauda, 2010; Knowles, Swanson, & Holton III, 2011; Pathik et al., 2012). Therefore, the university systems and higher education systems responsible for providing the manpower need of the country have to have sufficient HR at its disposal in order to be able to meet the HR requirement of the nation in general. This is calls for proper administration and management of university systems and higher education system in realization of the importance of the administration and management in higher education system in Nigeria (Modebelu & Joseph, 2012).

Higher education in Nigeria implies the kind of education offered subsequent to secondary education in dedicated institutions such as universities, colleges of education, polytechnics, monotechnics and other allied and specialized institutions (Halstead, 1974; Modebelu & Joseph, 2012). According to Modebelu and Joseph (2012), they further described higher education in terms of the goals it seek to attain and the function of it in national development. They stated categorically that: "higher education contribute to manpower training, local capacity development, intellectual development, advancement of scholarship and community development and promotion of interaction between national and international understanding" (Modebelu & Joseph, 2012).

From the forgoing, higher education is the kind of education responsible for professional and skilled

development of the population for the purpose of growth and development. Higher education in Nigeria and like any other country is mainly intended for the development of technocrat and the high-manpower that will be responsible for the operations of the wheels and machines of the economy. The wheels of economy of a country refers the production, agriculture, manufacturing, health and service sectors, these are sectors responsible for the continuous advancement of the country and these sectors are people driven. They are sectors that work in rotations with one another to make a possible country hood. The various sectors are operated and driven by people (Castells, 2010). These people are the human resource of country and they are to be trained and developed by the higher education system of the country; and in the long run a significant percentage of these people trained will have to return back to higher education system as human resource inputs for the system (Clancy & Goastellec, 2007; Pathik et al., 2012). On this note, the importance of higher education in a country such as a Nigeria cannot be overemphasized in the light of its vital importance in Human Resource Development (Dauda, 2010; Ekundayo & Ajayi, 2009; Oyewole, 2009).

ADMINISTRATION: ROADMAP TO TOTAL QUALITY MANAGEMENT IN UNIVERSITIES IN NIGERIA

The general body responsible for universities and degree awarding institutions in Nigeria is National Universities Commission (NUC). NUC is a regulatory body and standard setting body for the universities and degree awarding institutions in Nigeria (Okebukola, 2002). Statutorily NUC is formed as a body enabled by the government laws to develop framework and benchmark of quality in process and service; that is in terms of the performance of human resource input in Nigerian universities and degree awarding institutions (Saint, Hartnett, & Strassner, 2003). The role of NUC in Human Resource Development and Situation in Nigerian universities cannot be over emphasized; as NUC attempts to move university education in Nigeria to international standard on continuous basis, through several strategy such as; standard and benchmark setting, regulatory frameworks and accreditations. In this light NUC can be liken to a quality standard body in Total Quality Management Parlance (Akerere, 2012.; Okechukwu & Okechukwu, 2011). This kind of body is necessary for the purpose continuous

quality improvement in operations and services such, International Standard Organization (ISO). In the world of learning today, Universities are mandated by the dynamism of change towards providing cutting edge knowledge in Research and Development (R&D) so that graduates can compete globally. On this note, a body such as NUC in Nigerian university is needed to focus more on pushing for quality assurance in Human Capital Development at both input level and output level of Nigerian universities (Saint et al., 2003).

However, NUC have over the years established a formidable landmark in the university systems in Nigeria, in terms of human capital development through its regulatory framework on the promotions of lecturers in Nigerian universities (Adekola, 2012). In recent years, the push of NUC regulatory frameworks on the promotion of teaching staffs in the university, have seen a good number of increase in the number of staff holding PhD academic qualifications. The NUC regulatory framework on promotion of university academic staff, serves as a push factor, a positive motivation, for the continuous quality improvement, professional and career development of universities lecturers in Nigeria. The implication and summary of these continuous quality improvements, professional and career development, is Human Resource Development of the university academic staff members; and ultimately the effect of human resource development of the academic staff members will transfer to the 'turn outs' from the university systems, the graduates who are going to be manpower thresholds of the national economy (Adedokun-Shittu, Sheikh Ahmad, Othman, Ahmad, & Badariah, 2012; Agarwal, 2009; Kaul, 2010; Pathik et al., 2012; Samoff & Carrol, 2003).

THE REGULATORY ROLES OF THE NATIONAL UNIVERSITIES COMMISSION

The goals of the National Universities Commission (NUC) are:

- Attainment of stable and crisis free university system
- To work with Nigerian Universities to achieve full accreditation status for at least 80% of the academic programmes.
- To initiate and promote proficiency in the use of ICT for service delivery within the Commission and the Nigerian University.
- To match university graduate output with manpower needs and to foster partnership

between the Nigerian University system and the private sector (NUC, 2008).

With the Constitution of the NUC through Degree No 1 of 1974, according to Okojie (2012), the role of NUC shifted from mere ensuring orderly development of University education to an agency which dictates what to teach and the number of students to be admitted into the universities. It advises the Federal government on the financial needs of the universities, channels all external aids to the Universities, receives, allocates Federal Government grants to Federal Universities, lays down minimum academic standards and ensures that quality is maintained in the academic programmes of the universities and carries out the accreditation of the degrees and other academic awards of the universities (Okojie et al., 2010).

In 2005, the Commission introduced new academic curricula for all Nigerian Universities. The aim was to provide a better skilled and entrepreneurial graduates suitable for not only Nigerian labour market but for the global market. The new curricula is aimed at eradicating the outdated curricula and replaced it with the modern ones that are relevant to the needs of the country. The NUC made available material resources to improve communication system. The Commission installed E-mail facilities in some campuses in Federal Universities in the country (NUC Annual Report, 1994).

For better data collection and analysis, the commission introduced the computer based Management Information system (MIS) into Nigerian University system. The Commission (NUC) in 2013/2014 established the carrying capacity of every programme to be offered in Nigerian Universities. Carrying capability is the minimum number of students that the human and material resources available in the university can support for quality delivery of education.

The NUC had been responsible for granting of licences for the establishment of private Universities in Nigeria as at 2000. There were about 129 universities in the country made of public and private universities, while more are yet to be established. This is with the aim of giving access to the training population of youth seeking admission to the Universities. The NUC had also made possible introduction of E-Learning technology in Nigeria Universities. The main aims of E- Learning technology are to improve the quality of learning, to provide learners with skill needed for their professional development, to widen access to education and to reduce cost

and improve cost effectiveness of education. The Commission had also strengthened the National Open University by way of human and material resources to enable it enroll many students as projected in its blueprint.

MANAGEMENT STYLES

Management style describes the behaviour a manager exhibits in the course of directing his subordinate or a group to a common goal. Okorie (2000), opines that management is the process of influencing, directing and coordinating the activities of other people in an organization. The function of organizational management is to influence the group towards the achievement of group goals by planning, organizing, directing and integrating the

University demands and the needs of members in a way that will be both productive and individually fulfilling. Paterson (2005), identified three management styles; they are authoritarian, democratic and laissez-faire.

FACTORS MITIGATING AGAINST HIGHER EDUCATION LEADERSHIP

Ategwu, Okon & Aklah (2022) enumerate and explained the following factors mitigating against higher education leadership:

1. Ethnicity

Over the years, the appointment of higher institution leadership in Nigeria has taken an ethnic dimension. It is no longer lies with the University, Polytechnic, Colleges of Education authority or in the hand of the ministry of Education, rather to ensure their credibility and competency, most times the council and parties involved ended up sacrificing merit and promoting mediocrity through their style of selection as a results of these factors which led to unhealthy ethnic rivalry among the candidate who are vying for the positions in the institutions.

2. Pernicious Prebendalism

This is a harmful political system that the elected government officials feel they have the right to government ownership of revenue; and they use them to benefit from the administration they want to install. In considering leaders of higher institution, governmental authority use this medium to choose or select their own candidate irrespective of the fact that he/she is not qualify but because of the monetary involvement and control of power, they consider their own candidate not minding the implication of what it takes. This factor drastically affects the consideration of higher education leadership

because those chosen are not technocrat not minding the aspect of professionalism.

3. Community Involvement in Appointment

The community where the school is situated sometime affect the appointment of the leadership of higher education, this is a situation whereby the community head will always wants to participate in the appointment of the leaders of that higher institution, they wants to be consulted, they want their indigenes to be considered irrespective of the fact that their candidate is not qualified for the job.

4. Years of experience

Experience matters in good leadership (Brooks, 2018). However, some experiences matter more than the others. The directive identifies leadership and management experience and teaching and research experience as one of the criterion for the selection of leaders. Though it is not unique to this directive, it is not fair to assume years of experience equals doing a great job. Also, there should be a system which helps to understand the achievements of a leader in the years which he/she assumed leadership position; otherwise, even if he/ she did nothing good in those years, he/she could benefit from such criterion. Staying a number of years in leadership position alone cannot make you a good leader.

MANAGEMENT IN NIGERIAN POLYTECHNICS

The polytechnic is a post-secondary technical institution of higher learning created mainly to provide a wide range of intermediate and higher level technology and technologists. Okpeodua (2007) opines that the decision of the Federal Government to get up polytechnic education was predicated in the decision to revolutionize the society technologically. This government's decision copiously spelt out the objectives of Technical and Vocational Education (TVE) in the National Policy on Education (NPE, 2004). These objectives are (i) to provide trained manpower in applied sciences, technology, commerce and industry, and (ii) to provide technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic emancipation and development. Unfortunately, polytechnic in Nigeria have certain problems like misappropriation and misapplication of funds, poor inter-personal relationship, poor supervision and staffing, absence of team work, lack of effective control and co-ordination, poor planning, rigidity in approach to human problems, student unrest, examination malpractices, admission racketeering, strikes, downright stubbornness of some officials, etc. All these problems have

affected the quality of products produced by the polytechnics in Nigeria.

Every polytechnic in Nigeria faces the challenge of improving quality of education. Some of these challenges include: (i) raising student achievement, (ii) respect for admission guidelines and quotas; (iii) improving the quality of teaching, (iv) dwindling national economy, (v) proper definition of technology education, and (vi) apathy towards technical education. Others are: (i) providing adequate resources and utilizing them effectively, (ii) providing learning experience which meet the requirements of all learners, (iii) ensuring that the curriculum and measurements methods are relevant are inclusive; (iv) enabling environment, (v) improving job performance; and (vi) ensuring that management and leadership of polytechnics in Nigeria are strong and effective. The management and leadership of various polytechnics should increase their efforts at improving quality via the above listed areas.

POLYTECHNIC/TECHNICAL EDUCATION – A PANACEA TO HUMAN RESOURCE DEVELOPMENT

Functional Polytechnic/Technical Education could do the magic of liberating the nation from technological backwardness and over dependence on foreign manpower aids. Therefore, efforts to achieve the goal should be directed towards PTE, through the reform of policies, which are conscious efforts and directed toward developing the full potentials and capacities of the human resources to move along with the tide of change across the world (Okoro & Ibiam, 2015).

The Polytechnic/Technical Education (PTE) according to Nigerian Education Research and Development Council (NERDC) (1998) outlined the following as the major aims of PTE education:

- (a) Providing trained manpower in the applied sciences and business, particularly at craft, advanced and technical levels.
- (b) Providing the technical knowledge and vocational skills necessary for agriculture, commercial and economic development.
- (c) Giving the necessary training and imparting skills to individuals who shall become self-reliant.

NERDC posited that in order to achieve unparalleled result in this domain the main features of the curriculum activities of PTE shall be structured in foundation and trade modules and that the curriculum for each trade shall consist of four components namely; General education, theory and related courses; workshop practices, industrial training and small business management and entrepreneurial training.

MAJOR CHALLENGES AND CONSTRAINTS TO POLYTECHNIC/TECHNICAL EDUCATION IN NIGERIA

The challenges and constraints militating against the Polytechnic/Technical Education in Nigeria are many but few of the major ones are highlighted below:

1. **Inadequate supply of technical workshops:** most polytechnics/technical colleges lack functional workshops for effective inculcation of technical skills in students. This affects the effectiveness of PTE.
2. **Lack of sufficient fund:** government funding of polytechnic/technical education programs has not been impressive as this is a reflection of the nonchalant attitude of government towards the program. Most equipment, workshops, necessary technical/engineering books etc are not provided.
3. **Lack of adequate motivation:** PTE teachers are subjected to deplorable working conditions. Offices are not furnished and working environments are not conducive for technical learning situations.
4. **Lack of well-equipped libraries for research work/project:** libraries are not well stocked with up-to-date technical books and periodicals in various areas of specialization.
5. **Failed curriculum:** the current curriculum of the National Board for Technical Education (NBTE) should be a total departure from the former imposed and imported British one which did not tailor Nigerian curriculum towards technical skills acquisition.
6. **Lack of information communication technology equipment:** ICT and technical skills acquisition work simultaneously. Therefore, polytechnic/technical colleges should be equipped with contemporary ICT equipment in order to promote human resource development.

7. Political situation: Polytechnic/technical education has been grossly neglected in Nigeria. Technical educators have the greatest challenges in convincing the law makers on why they should give priority to PTE in allocating resource to it. The government keeps paying lip service towards the proper development of the program in Nigeria.

MANAGEMENT OF THE NIGERIAN COLLEGES OF EDUCATION

The Nigerian colleges of education (COEs) are teacher education institutions that train teachers for the Nigerian schools. They occupy the third cadre in the ladder of tertiary educational provisions in the country. As important citadel of academic learning, they play a pivotal role in producing highly qualitative, motivated, conscientious and efficient classroom teachers for the Nigerian educational system. It is therefore a matter of concern and distress when the (COEs) are no longer meeting up to expectations especially in delivering/rendering quality and efficient services that will lead to the achievement of educational goals. Today many COEs especially those of them in Nigeria, are in deplorable state, facing so much difficulties and challenges, thereby affecting their management. This situation is against one of the goals of Nigerian COEs which states that all teachers shall be professional trained and equipped to become effective in performance of their duties. As important citadel of academic learning, they play a pivotal role in producing highly qualitative, motivated, conscientious and efficient classroom teachers for the Nigerian educational system. The Nigerian COEs are one the higher degree awarding institutions of the Nigeria Certificate in Education (NCE) which offers technical, science and other conventional courses in special education, business, social sciences and humanities in order to meet the needs and interest of various individuals for sustainability in the society. According to the Federal Republic of Nigeria (FRN, 2013), the intent of establishing the COEs was to provide educational institutions where teachers shall be professionally trained, whose programmes shall be structured to equip teachers for effective performance of their duties (FRN, 2013: 43). In this regard, the goals of COEs as teacher education institutions are to produce highly motivated, conscientious and efficient classroom teachers for all levels of the educational system; further encourage the spirit of enquiry and creativity in teachers; help teachers fit into the social life of the community

and the society at large and enhance their commitment to national goals; provide teachers with the intellectual and professional background adequate for their assignment and to make them adequate adaptable to changing situations; and enhance teachers' commitment to the teaching profession. Given the above goals, demands that COEs are meant to be functional and sustainable. Functionality and sustainability of the Nigerian COEs can only be made possible through effective management of these institutions. Management as described within the context of this present study can be viewed as appropriate coordination of activities or programmes of the COEs for achievement of goals. Akpakwu (2012) described management as guiding human and physical resources into dynamic organization units which attain their objectives to the satisfaction of those who served and with a high degree of morale and sense of attainment on the part of those rendering services.

Management as further described by Akpakwu is a social process designed to ensure the cooperation, participation, intervention of a given or predetermined goals or objectives. Management according to Onuka (2006) is the process of forecasting/prediction, planning, budgeting, organization, implementation, monitoring and evaluation, feedback and revision for improvement. The process involves a holistic approach to evolving sustainable programme improvement (Onuka, 2006). Management in education however is concerned with planning and formulation of educational policies and programmes. It involves planning, organizing, controlling, coordinating, leading and evaluating the human, material and time resources towards the achievement of the goals or objectives of educational institutions (Akpakwu, 2012).

CONCLUSION

Higher institution management is seen as a fundamentally optimistic human endeavour characterized by aspirations for progress and betterment of the individual, the University and larger society. It is understood by many to be a means of overcoming handicaps, achieving greater quality and equality, and acquiring wealth and social status. Higher institutions is perceived as a place where citizens can develop according to their unique needs and potential. It is also perceived as one of the best means of achieving greater social equality. The management and organization of dualities in higher institutions is warranted, requiring

reconciliation and/or dynamic balancing in order to achieve organizational effectiveness.

The goals of higher institutions in Nigeria are the development of the individual into a morally sound, patriotic and effective citizen; total integration of the individual into the immediate community, the Nigerian society and the world; provision of equal access to qualitative university opportunities for all citizens at all levels of higher institutions, within and outside the formal school system; inculcation of national consciousness, values and national unity; and the development of appropriate skills, mental, physical and social abilities and the competencies to empower individuals to live in and contribute positively to the society.

RECOMMENDATIONS

1. There should be regular evaluation of policies and these reports should be made public to increase confidence of tertiary education stakeholders.
2. Tertiary Management curricular should be reviewed to reflect the following:
 - (a) Conditions for effective learning of management skills and behaviour must be guaranteed
 - (b) Learning aids (material and human)
 - (c) Operationalization of Problem Based Learning strategies and methodologies
 - (d) The evaluation of the curriculum should be systematic and dynamic.
 - (e) A review of the state of the arts in Nigeria management education and training.

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