AN INVESTIGATION INTO MATHEMATICS PERFORMANCE OF SENIOR SECONDARY SCHOOL STUDENTS IN NORTHEAST NIGERIA: IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT

This study investigated the mathematics performance of senior secondary school students in Northeast, Nigeria. From the population of the study which comprised six states of the Northeast geopolitical zone, four of the six states were randomly sampled and from these states, 18 secondary schools were selected. A total sample of 589 students was obtained. The instrument used for data collection was Mathematics Achievement Test (MAT). The instrument was validated through giving it to some test experts for face and content validity. A reliability coefficient of 0.83 was obtained using Cronbach alpha which indicates high reliability. The student t-test statistics was used in testing the hypotheses. The results of the findings revealed that there exists poor mathematics performance among senior secondary school students in Northeast public schools. However, the performance of students from private schools was far greater than those from public schools. Based on the results of the findings, recommendations were made some of which are: teachers of mathematics should avoid the use of the traditional lecture method and use those strategies that encourages full participation of the learners; the various state governments should take the issue of school supervision and provision necessary facilities for the promotion of teaching and learning of mathematics seriously and should employ more competent and qualified teachers of mathematics; and government should train more teachers and give them motivational incentives.

KEYWORDS: Mathematics, Performance, Sustainable Development, Science, Technology

INTRODUCTION

Mathematics is the backbone of science and technology and is indispensable for any national development being it industrial, scientific and technological development. It is for solving diverse problems of life and its concepts are used for organizing facts, logical proofs/determining the truth of ideas, principles and statements. It is in line with this fact that the government of Nigeria made the teaching and learning of mathematics a compulsory at both primary and secondary school levels. As stated by National Policy on Education (FGN, 2004), mathematics will go a long

way to ''equip students to live effectively in our modern age of science and technology''. Therefore, mathematics competence is necessary for the preparation of skilled citizenry so as to fit properly into the modern scientific and technological world.

It is no longer news that the performance of secondary school students in mathematics in Nigeria over the years is below expectations. Despite the importance of mathematics and the prominence accorded to it and is taught every school day in primary and secondary schools, a good number of our secondary school students fear and perform poorly in mathematics. There is that erroneous belief among students about mathematics as being a very difficult subject. Just as pointed by Sherman & Christian (1999), many students are not confident about their mathematical ability to solve problems. Though the low performance is a general phenomenon, the case of Northeast zone in particular is very worrisome because it is among the most educational backward geo-political zones of the country.

From experience as a mathematics teacher in secondary schools for some years back, a good number of students (both male and female) dislike mathematics and run away from the lessons. Some of the students disappear from the classroom the moment it is the period

of mathematics and even to the extent that some jump out through the window just on seeing their mathematics teacher coming into their class. Despite the fact that education is free at the primary school level and almost free at the secondary school level in the North, and the various state Governments are doing their best in terms of paying the fees for their external examinations like WAEC and NECO in most of the states, the problem of low performance still persists in external examinations. This is evident by previous research reports (Kolawole, 1999; 190Galadima, Yusa'u, 2007) and WAEC and NECO chief examiners' report over the years (from 2000 to 2013).

In any Nigerian university today be it public or private, state or federal, a credit in Ordinary Level (O/Level) mathematics among other subjects is a prerequisite for admission into any science based courses and at least a pass in it for the non science courses. Research has revealed that most students lack basic concepts, knowledge and skills of mathematics needed for university level. It is therefore not surprising to find a lot of examination malpractices among our secondary school students across the country during senior secondary school certificate examinations (SSCE) or any other external examinations in the quest of obtaining credit in mathematics and

other subjects to meet up with the requirements. This is an unhealthy situation and is a bad omen for the country and coupled with yearly poor performances in most subjects at SSCE, it has attracted a lot of criticisms to our educational system by different concerned citizens.

Development of a nation depends largely on the number of its skilled and competent citizens in all fields of endeavor. The desired skills and competence are mostly expected to be in areas of science, mathematics and technology and these are acquired in schools beginning from primary to secondary school levels. Mathematics is the bedrock of science and technology and students at all levels have to acquire adequate knowledge of mathematics and skills. However, there has being persistent poor performance in mathematics among secondary school students in both internal and external examinations like West Africa Examination Council (WAEC) and National Examination Council (NECO) in Nigeria. Students have been reported to show negative attitude towards mathematics in schools (Lassa, 1984; Galadima and Yushu'u, 2007; Kojigili, 2008 a, b). This issue of poor performance has even reached a stage that the various stakeholders in the North East, parents, some concerned citizens and even teachers themselves begin to worry and many questions as to the 'what', 'why' and 'how' of the problems always arises. Poor mathematics performance can constitute a problem to the attainment of the nation's desired goals and sustainable development if it is not addressed holistically.

This study aims at investigating the current nature of mathematics performance of senior secondary school students who are yet to sit for external examinations in mathematics (e.g. WAEC and NECO) in the states of northeast geopolitical zone of Nigeria. It also aims at determining who performs better in mathematics among male and female students in the Northeast.

Research Questions

1. What is the current level of students' mathematics performance at the senior secondary school levels in the states of the Northeast, Nigeria?
2. Is the rate of mathematics performance of the students the same in public and private schools in the Northeast Nigeria?
3. Does the mathematics performance of the students differ with respect to gender in private and public schools?

Research Hypotheses

1. There is no significant difference in the performance between public and private senior secondary school students in mathematics in Northeast zone.

2. There is no significant gender difference in mathematics performance between male and female students of the senior secondary schools in Northeast zone.

Methodology
This study is a descriptive survey by design.

Population and Sample
The population for this study comprised all the senior secondary school students (SS I-III) in Northeast, Nigeria. There are six states in the North East which are Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe States. From the population, purposive sampling technique was used to select 18 schools across four sampled states putting into consideration school location (urban and rural), school type (single sexed-school and coeducational school) and school ownership (State owned public schools, federal government owned schools and private schools). Random sampling technique was used to obtain a sample of 589 students from the schools which comprised 289 males and 237 females.

Instrument
The instrument used for the collection of data for this study was Mathematics Achievement Test (MAT). It was a 50–item mathematics objective test with mid-range difficulty items. Bearing in mind the academic levels of the students, the items were selected from past WAEC questions based on SS1 and II syllabi. Even though the items of the instruments were from past WAEC questions, the instrument was revalidated by subjecting it to experts' judgment for face and content validity where they determined the adequacy, appropriateness and comprehensiveness of the items. Furthermore, a pilot study was carried out on a sample of 100 students who were not part of the targeted sample of the study for test of reliability. A test–retest was conducted within the range of three weeks and the scores were analyzed using Cronbach alpha which yielded a coefficient of 0.83 which is good enough for its reliability.

Data Analysis
The instrument which was personally administered by the researcher and collected on the spot without losing any, were marked out of 100%. The scores were then used for the research analyses. The research questions were answered by descriptive statistics while the hypotheses were tested using t-test statistics.

RESULTS
Research Question One: What is the current level of students'

mathematics performance at the senior secondary school levels in the states of the Northeast, Nigeria?

Table 1: Mean and Standard Deviation of Mathematics Performance of the Students

Students' Performance	N	$\bar{x}$	SD
	589	15.62	7.133

Table 1 shows the mean and standard deviation of the performance of all the students in mathematics. This indicates that the mean performance is just 15.62 which project a low performance rate.

Research Question Two: Is the rate of mathematics performance of the students the same in public and private schools in the Northeast Nigeria?

Table 2: Percentages of Students' Performance in Mathematics Achievement Test

Variables	N	% passed	% failed
Public Schools	397	22.24	77.76
Private School	192	65.18	34.82
Total	589		

Table 2 indicates the percentage performance on mathematics achievement test by students from public and private secondary schools. **Hypotheses One**: There is no significant difference in performance between students attending public and private secondary school students in mathematics in Northeast zone.

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Table 3: Summary of t-test Analysis of Students' Mathematics Performance in Public and Private Schools

Variables	N	$\bar{x}$	df	t	Sig. (2-tailed)
Public Schools	397	19.79			
Private Schools	192	24.93	587	8.521	0.000

P < 0.05

Table 3 indicates that the t-value is 8.521 and df = 587; P < 0.05. Therefore, we reject the null hypothesis.

Hypothesis Two: There is no significant difference between the mathematics performance of male and female students the senior secondary school levels in Northeast, Nigeria.

Table 4: Summary of t-test Analysis of Mathematics Performance of Male and Female students

Variables	N	$\bar{x}$	SD	df	t	Sig. (2-tailed)
Male	304	15.90	7.63			
Female	285	15.31	6.56	587	1.006	0.315

P > 0.05

Table 4 indicates that the t-value is 1.006 and df = 587; P > 0.05. Hence, we fail to reject the null hypothesis.

DISCUSSION

The result in Table 1 indicates that the general performance of students in mathematics in the Northeast geopolitical zone is not encouraging as the mean is just 15.62. From Table 2, out of the total number of 397 students of public secondary schools, only 22.24 % passed the mathematics test while 77.76 % of them failed. On the other hand, out of the 192 private secondary school students that sat for the test, 65.18% of them passed it and only 34.82% failed it. This can be said that those students in private schools had better performance than those in the public schools. In addition, the result of the analysis on Table 3 indicates that there was significant difference in mathematics performance between public and private senior secondary school students. This is similar to the findings of Kolawole (1999) that the performance of students in mathematics in private schools was relatively better than those from public secondary schools Ekiti State. Furthermore, this result is in line with the findings of Mburu (2013) which showed students differences in their mathematics performance based on the type of school they attended in Kenya.

Furthermore, the result of the analysis in Table 4 showed that the value of t is 1.006 and df = 587; P > 0.05. This implies that there is no significant difference in mathematics performance between male and female students at the senior secondary school level in the Northeast. This lack of difference in performance could be attributed to the fact that most of the students' mathematics performance has been poor over the years irrespective of gender. This finding is different from the previous findings which reported differences in male and female students' performances in mathematics in most parts of the world Nigeria inclusive (Bandele, 1988; Hyde, Fennema and Lamon, 1990). Therefore, this research finding only identified that of the Northeast region of Nigeria and does not in any way mean that gender differences does not exist in the secondary schools of the country as a whole.

Implication for Sustainable Development

The poor students' performance in mathematics in Nigerian public secondary schools especially Northeast region has a lot of implications on the national development. The importance of mathematics in all spheres of development, scientific and technological goal attainment have been stressed in various forms by previous researchers. It therefore means that where there is no

mathematical knowledge; science and technology suffers setback, hence, no modern and sustainable development attainment of any national development goal ought to go with a holistic approach to education starting from the primary and secondary school levels and particularly with mathematics education. Despite various reforms in education with mathematics curriculum reformed severally, there seem to be no much improvement in students' mathematics performance at the secondary school levels in most parts of Nigeria. Even though WAEC has reported some improvement in the performance of students in recent times as compared to the previous ones, there is still much to be desired in mathematics performance.

CONCLUSION

This study investigated secondary school students' mathematics performance in Northeast Nigeria. Generally, the result of the findings of this study indicates that public school students' performance irrespective of gender and school type is poor and below those of the private school students. With the increasing demand for the knowledge of mathematics in all fields of endeavour, its teaching and learning in schools is a task that must be carried out adequately, skillfully and seriously. This study was limited only to senior secondary school students in Northeast, Nigeria. Future

research could involve very large number of schools including the junior secondary school students and can be in other aspects as behavioural traits.

RECOMMENDATIONS

Based on the results of this study, the following recommendations are made:

1. It has been revealed by lots of research that among other factors that contributes to poor mathematics performance among secondary school students is the teachers' method of teaching. Teachers of mathematics should stop the use of the traditional lecture method in their classroom pedagogy to those strategies that encourages full participation of the learners.
2. The various state governments should take the issue of school supervision and provision necessary facilities for the promotion of teaching and learning of mathematics seriously.
3. The various state governments should employ more competent and qualified teachers of mathematics, train more teachers and give them motivational incentives.
4. Students should be encouraged to create love for mathematics and teachers should be innovative enough to make its learning

fascinating, pleasurable and fun.

REFERENCES

Bandele, S. O. (1988). A Comparative Investigation of the Christ's Boys and Girls School, Ado-Ekiti on standardized Mathematics Achievement Tests. *Journal of Ondo State branch of Mathematical Association of Nigeria (MAN),* 1(1), 16-19.

Galadima, I. and Yusha'u, M. A. (2007). An Investigation into Mathematics Performance of Senior Secondary School Students in Sokoto, *Abacus: The Journal of Mathematical Association of Nigeria (MAN),* 32(1), 24 – 33

Hyde, J. S.; Fennema, E. F. and Lamon, S. J. (1990). Gender Differences in Mathematics Performance: A Meta – analysis. *Psychological Bulletin,* 107, 139 – 155.

Federal Republic of Nigeria (2004), *National Policy on Education.* Lagos: NERDC Press.

Kolawole, E. B.(1999). Cognitive Relationship between Academic Performance of SSCE Students in Mathematics and Chemistry in Ekiti State. *Journal of Educational Research and Evaluation, Nigeria,* 45, 214 – 217.

Kojigili, S. T. (2008a). Statistical Analysis of Gender Inequalities in Attitude and Performance of Students in Mathematics at the Junior Secondary Schools in Adamawa State. *International Journal of Numerical Mathematics, (IJNM)*, Nigeria, 3 (1), 119-129.

Kojigili, S. T. (2008b). Gender Differences in Mathematics Performance of Adamawa State University Students. *FCT Education Secretariat Journal of Curriculum and Instruction (F-JOCI).* Abuja, Nigeria, 1(1), 63 – 68.

Mburu, D. N. P. (2013). Effects of the Type of School attended on Studets' Academic Performance in Kericho and Kipkelio District, Kenya. *International Journal of Human and Social Science,* 3(4), 79 – 90.