

Salient Issues in Students' Poor Performance in Mathematics at Public Examinations in Nigeria: A Case Study of selected secondary schools in Adamawa State

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ABSTRACT

This study on Salient Issues in Students' Poor Performance in Mathematics at Public Examinations in Nigeria aims at investigating the possible and reliable solutions to the problems that are emanating from the "causes of mass failure in mathematics at O-level examination. A case study is drawn selected secondary schools in Adamawa State, Nigeria. The study adopts expository research design. It also investigates the way teachers and students are involved in a day to day process of teaching and learning of mathematics as a subject and as a career. It is observed that the brain behind the whole setbacks centered on the attitude of the students and effectiveness of the tutor in handling the subject (Mathematics). Therefore, it is good that government should propound the means to allocate necessary resources needed for the implementation and development of our educational system; and for the attainments of the whole goals written in the national policy on education.

Keywords: *Students' Poor Performance, Mathematics, Public Examinations*

INTRODUCTION

Mathematics as a subject and as a career course is absolutely indispensable in our everyday's activity and most importantly in the world of science and technology. In Nigeria, government generally adopted certain measures in the national curriculum conference held in 1973 which was established in national policy on education in 1977 to foster social changes and national development. Notably, one of such measures was mathematics, a cosmopolitan rudiment of all science subjects to cater for the development of individual educational standard physically, mentally sound and effective citizen. In the national curriculum, the federal ministry of education had endorsed mathematics in the curriculum as compulsory subject to every student from Nursery, Primary, Junior and Senior Secondary School levels. This suggests the importance attached to mathematics whose knowledge is required by every member of the society in view of its usefulness in a day-to-day activity especially in business transactions, science and technology. Education is the knowledge, skills and moral values gained from experience, inquiring and acquiring from continuous

process of constant study or research. The formulation of mathematics was not discovered by a single individual but rather through a gradual process, by the contribution of great influence of lots of people, language and countries to mention few of them, such as Greeks and Romans. It also came into existence through the contribution of Indians and Chinese. The puzzle will be incomplete without mentioning the immense contribution of Babylonians, Egyptians, Arabs, and Europeans who played a very vital role in reconstructing, reorganizing and building of mathematics systematically.

Howson (1974) defines mathematics as a science of quantity and space which deals with the calculation and numerical part of human life and knowledge. He opts that causes of low performance and failure in mathematics is due to the wrong choice of subject and stressed that students mostly offered the subjects they feel they can do well because they assume mathematics is a very difficult subject. Beside all these, Nigeria made us to fathom clearly that, mathematics is a key to the successful world of science and technological advancement of a country. It is however disheartening to note that student's failure in mathematics at senior secondary school examinations and other public examinations have been in a steady increase and a setback that threatens and is so deplorable to the achievement of natural growth and as such, a national disaster. In the early 60's, Nigerian government has received the highest public criticism about the students mass failure in mathematics. In the light of this and much more, this study's aim is to investigate the possible and reliable solutions to the problems that are emanating from the causes of mass failure in mathematics at O-level examination with a case study of selected secondary schools in Adamawa State, Nigeria.

PARTICIPANTS AND PROCEDURE

This study adopts the expository research design in investigating the possible and reliable solutions to the problems that are emanating from the causes of mass failure in mathematics at O-level examination with a case study drawn from selected secondary schools in Adamawa State, Nigeria. The population of the study comprises all the students in Senior Secondary School II in Adamawa State, Nigeria. Stratified random sampling technique was adopted to select 10 Senior Secondary School II students in a sample from each of the 21 local government areas in Adamawa State. The instrument used for data collection was designed by the researcher and validated by two experts in measurement and evaluation unit of Department of Mathematics, School of Sciences, Federal College of Education, Yola, Adamawa State. The instrument for data collection was structured questionnaire. Two hundred and ten copies of the instrument were administered to the students by the researcher and they were guided on how to fill and return them at the same day. Though 210 copies were administered, yet 200 copies were well filled and return. The data collected through the questionnaire were analyzed using frequency counts and simple percentage.

RESULTS AND DISCUSSION

Table 1 shows that 87% of the students agreed, 10% disagreed, while 3% were undecided to the fact that lack of instructional materials causes failures in mathematics. This shows that lack of instructional materials causes failures in mathematics. Hence, it is not out of place to state that the academic performance of students having adequate instructional materials in mathematics is much better than those who do not have. Table 2 shows that 56% of the students agreed, 38% disagreed, while 6% undecided to the question on their attitudes as well as teachers and methodologies toward teaching the subject. This indicates that students fail mathematics because of the way their mathematics teachers teach in the class; their attitudes and methodologies toward teaching the subject. It is therefore concluded that the attitude and methodologies of mathematics teachers influences on the negative, the academic performance of students in mathematics.

It was deduced from table 3 that 79% of the respondents agreed, 17% disagreed, while 4% were undecided on significant difference in the academic performance of students in mathematics taught by qualified teachers and those taught by unqualified teachers. This shows that unqualified and inexperienced teachers of mathematics cause problems and failures to secondary schools students in the subject. From further analyses, it has been discovered that 82% agreed that, lack of text books and other facilities cause poor performance in mathematics to the students at secondary school levels. This indicates that improvement in facilities means improvement in the level of performance.

In Adamawa State (table 4), records of past West African Examination Certificate result have shown that out of 4,942 candidates that sat for Senior Secondary Certificate Examination in 2000, only 190 (3.9%) scaled through by obtaining a minimum of 5 credits passes (A1 –C6) with Mathematics and English Language inclusive. In 2001, out of 16,879 candidates who sat for the examinations, only 540 (3.19%) scaled through. In 2002, only 3.08% representing 575 candidates made it out of 7,188 candidates. In 2003, 15,991 students took the examinations but 191 (1.19%) recorded success. In 2004, (1.97%) representing 358 candidates were successful out of 18,226 that sat for the examinations. In 2005, 2.58% representing 543 candidates made it out of 21,002 candidates. A total of 318 candidates (1.26%) made it out of 25,252 candidates that sat for the examinations in 2006. A total of 25,197 candidates wrote the examinations in 2007 but only 236 (0.94%) recorded success. In 2009, (1.45%) representing 417 students scaled through, out of 28,697 that wrote the examinations. This perpetual failure is a source of concern to stakeholders in education, examination bodies, mathematics educators, and all lovers of education.

In Ale (1986) study of the relationship between students' attitude and their performance in mathematics in Owo local government area of Ondo State, as reported by First Tutor (2012) finds that 53.47% of the students showed

unfavourable attitudes towards learning mathematics while 46.6% showed favourable attitude to it. Thus, their performances in the subjects were attached to their attitudes in it. It was also noted that the factors that are responsible for the students' negative attitude towards mathematics include; lack of qualified teachers, poor background at the elementary level, lack of encouragement from parents, and misconception of the subject (First Tutor 2012). Empirical evidence was in the study designed to test the relationship between students' attitude and their performance in Mathematics in Ogbomosho South of Oyo State. It was acclaimed that, positive or negative attitude towards Mathematics appears to have a great influence on how much it is learned, remembered and used (Neale, 1989 quoting Mager 1986) reporting in (First Tutor 2012). In a similar study conducted by Ogunleye (1991), in sampled secondary schools in Ikole Local Government Area of Ekiti State, it was established that the attitude of students towards mathematics are conclusively related to their achievement in the subjects.

In all, the arguments suggest that favourable attitude towards Mathematics is the prerequisite for good achievement as it maximizes the possibility that a student will willingly learn more about the subject. The Study therefore recommended that; Government and Secondary school principals should organize workshop to update mathematics teachers and students; provision of adequate teaching materials; scholarship award for best mathematics students in order to encourage others; organizing mathematics competitions among students to bring out their potencies; organizing mathematics programmes in Televisions and Radios in order to gain students interest in the subject.

Adebola , Jaiyeoba and Atanda (2011) conducted a study on School-Based Factors on Students' Achievement in Mathematics in South-West and North-Central, Nigeria and came up with the findings that instructional materials played significant role on students' achievement, in Mathematics. The study suggests that a subject like Mathematics requires real objects to convert imaginary topics to concrete ideas since it makes teaching real and facilitate learners' understanding. Thus, their study validated the work of Talmadge and Eash (1976) who state that instructional materials influence students achievement, make them utilize their skills, and bring out other learning outcomes. In their study on the Reasons for liking or disliking Mathematics, Dvttton and Blum (1968) examined three hundred and forty six (346) secondary school students in Minnesota, USA and submitted that, complex wordy question, too many theorems, rules, formula cramming, and possibility of making calculating error were attributed to students hatred of the subject and a subsequent failure in examinations (First Tutor 2012).

In a recent study of 26 secondary schools in Baringo County in Kenya Mbugua, Kibet, Muthaa and Nkonke (2012), report that understaffing, inadequate teaching/learning materials, lack of motivation and poor attitudes by both teachers and students, poor parental background, method of teaching and retrogressive practices were the factors contributing to students' poor performance in Mathematics

at Kenya certificate of secondary education. McGowen (2007) conducted a study on 101 high schools in Texas on the impact of school facilities on students achievement and came up with the finding that adequate school facilities promote students achievement and increases teachers satisfaction with physical working conditions. In their sampling of 400 students that sat for mathematics in 2002 May/June SSCE from 47 randomly selected schools in Enugu and Cross River States of Nigeria, Ekwueme and Ali (2012) report that students failures were as a result of structural error committed by them. This error has to do with the students' lack of understanding of the basic concepts. The study states further that the students were more interested in getting the answers without any idea of the procedures in working out the answers. This agrees with the previous studies conducted by Ekwueme (1998, 2001) cited in Ekwueme and Ali (2012) who attributed the students failure in mathematics to their quest for right answer syndrome irrespective of the procedure taken to arrive at the answer. Other errors noted in the study was carelessness where many students tend to ignore some aspect of instructions given while solving the problems (arbitrary errors). This goes to say that students who commit arbitrary errors may have acquired the basic knowledge of the concept but they do not carry out the actual operation required, hence ignoring such aspect that will adversely affect their achievement. For instance, undue approximation before the end of a solution especially when such value will be used to solve further problem will affect the result.

In the study conducted recently by O'kwu, Ijenkeli, and Benjamin (2013) on "the Impact of NCE Mathematics Trainee and Graduate Teachers on (JSSII) Students' Achievement in Geometry in Katsina-Ala of Benue State", 320 (JSSII) students from 8 secondary schools were sampled. The study found that students taught by NCE trained teachers achieved higher in Geometry than those taught by NCE trainee. This suggests that qualified mathematics teachers who had already possessed the skill for teaching are likely going to perform better than those who are still on-the-job training. Bojuwoye (2013) conducted a study of School - Related Factors Affecting Nigerian Secondary School Pupils' Academic Performance" and a total of 809 teachers and 1012 students of secondary schools from ten randomly selected states in Nigeria were sampled. The result shows that lack of resource materials for teaching, poor instructional strategies, class size, shortages of teacher and overload of teaching schedule, and teachers' attitude to work were factors affecting students' academic performance in Nigerian secondary schools. The study recommends the provision of adequate resource materials for teaching such as, textbooks, workbooks, and the use of audio-visual materials to build up the "mental library" of the topic discussed.

In a related development, Olatunde (2010) sampled 1750 senior secondary school students and 123 Mathematics teachers selected from 2 secondary schools in each of the Senatorial districts in Southwestern part of Nigeria; the results point that most of the teachers (75%) have a good perception of the need and importance

of mathematics laboratory in the school, while few teachers (25%) do not perceive the need to have a mathematics laboratory in the school. The result also showed that students exposed to the use of mathematics laboratory performed better (65%) than students that were not exposed to (35%). The study therefore, recommends that Mathematics laboratories be established in every school and more teaching aids be provided for effective students learning. Salman, Mohammed, Ogunlade and Ayinla (2012) conducted a study on the Causes of Mass Failure in Senior School Certificate Mathematics Examinations as viewed by Secondary School Teachers and Students in Ondo, Nigeria. The Findings indicate that 98% of teachers and 76% of students viewed laziness on the part of students as a major factor responsible for students' mass failure in SSC Mathematics examinations while 97% of teachers and 79% of students viewed lack of frequent practice by students as another responsible factor for mass failure in Mathematics. The study recommends that the identified causes could be ameliorated through providing teachers with the opportunities for further studies, attending seminars and workshops for update.

James (2012) carried out a study on the "effect of formative testing on students achievement in junior secondary school mathematics". The aim of the study was to find out an instructional strategy that can be used and operated upon in order to improve the quality of secondary school graduates in mathematics. Hence, the study investigated the effect of formative testing on students' achievement in junior secondary school mathematics. The sample consisted of 312 (JSS II) students assigned to three experimental groups and one control group. The results of the study reveals that formative evaluation enhanced performance by providing platform for students' exploration of their problems. This result was in agreement with previous studies conducted by Okey (1977), Godson and Okey (1978), Burrow and Okey (1979), Afemikhe (1985), Erinoshio (1988) and Ajogbeje (2012), which established the effectiveness of formative testing in identifying learners' learning difficulties and improving performance (quoting James 2012).

In the study on "Socio-economic factors and students academic performance in Ido Local Government Area of Oyo State", findings revealed that insufficient parental income, family type, lack of funding by governments and inconsistent nature of policies implementation are factors influencing students' academic performance (FOL, 2007). Daneshamooz, Alamolhodaei and Darvishian (2012), conducted experimental research on the Effect of Mathematics Anxiety and Working Memory Capacity on Students' Mathematical Performance, and sampled 126 students of Azad University of *Neyshabur*, Iran. Three groups of students were given similar mathematical materials to study using three different learning methods. Students in 1st group studied the material cooperatively (cooperative learning method); students in the 2nd group studied the material through e-learning method and students in 3rd group studied the material in traditional class. The results of the study show that students in the cooperative learning groups had higher test scores than students in the other groups. The study revealed further that

the method of learning reduces mathematical anxiety and improves performances. Thus, cooperative learning method controls students' mathematics anxiety. Yahyah (2012) conducted a survey research on "Strategies to Reduce Pathological Fear in Mathematics among Secondary School Students in Adamawa State, Nigeria"; and sampled 250 Senior Secondary (SSII and SSIII) students drawn from 15 selected secondary schools in five educational zones in Adamawa State. The purpose of the study was to determine the causes, and effects of pathological fear in Mathematics among secondary school students; and to formulate the strategies that could be adopted to reduce the problem. The study revealed that causes of the pathological fear in Mathematics are embedded in parental indoctrination that Mathematics is difficult, the Mathematics teachers' factor and the abstract nature of the subjects. The study recommends the use of mathematical games, play acting and visual aids to make the lesson real and interesting; use of heuristic method of teaching and relevant set of induction techniques; cooperative groups learning; reconditioning of unpleasant experience through use of concrete objects, praise or rewards to overcome fears.

Problems Associated with Mass Failure in Mathematics

From the report of the taskforce on the problems of mathematics teaching in schools and colleges, the problems and issues highlighted include:

Curricula Problem: The problem of deciding what to teach and the ways in which mathematics should be taught, Stone (1961) says "like Constance" on which has to split and decorates in order to grow, we must no longer unite to our curriculum need on our condition of life. High failure rate of students at senior schools certificate examination (SSCE) coupled with the annual failure in mathematics in this country.

Population: The problem of increase in students population could trigger and hinder the study of mathematics as teachers will find it difficult to teach to the understanding of an over populated class. The teacher will have many students with different levels of understanding, interest, abilities and environmental background to cater for.

Language Problem: This is a result of inability to express mathematics terms in our Nigerian languages. This contributes to communication barrier between students and teachers even the text books.

Administrative and Management Problem: The taskforce also observed that status of teachers in our society is low; most of the people entering the teaching profession do so as their last resort not for career choice. Hence, they lack necessary motivation for teaching. In noting these problems, the researchers classified the causes of problems encountered in mathematics into areas, and each area has its sub-classification. The factors examined include: the issues about lack of qualified and experienced teachers, teachers salary and teachers attitude e.g. lack of proposed method of teaching, mathematics language and text books.

Isa (1995) suggests that the causes or barrier of communication is a serious problem in teaching and learning mathematics: mathematics symbols have their own meaning and their own significance which the teachers generally fail to bring home to students. The meaning of these symbols and their historical background should be clarified to the students while, practical meaning of these symbols should be made known in a practical manner. Learning is most efficient when motivated or interpreted. Biggs (1967) explains that what is being learnt must be interesting and some forms of good motivation should meet the demand of the children or pupils.

Lack of Qualified and Experienced Teachers: It is a common defect in our education setup that most of the subjects teachers are not adequately equipped in the subject and even there are some, the school administration do delegate or upgrade the gurus to administrative responsibilities. However, those without proper qualification and proper training fail to perform effectively in the teaching of the subject. A brief survey is done consciously to sustain the effort towards its improvement. This appears to have played a less effective role than the natural forces affecting the entire system. Therefore, the results of unqualified and inexperienced teachers lead to lack of good foundation in mathematics.

Lack of Visual Aids: This can be classified as in facilities and equipment because having a well-equipped and organized laboratory are indispensable tools for effective teaching of mathematics and science and technology in general. Therefore, the teaching of mathematics requires the use of teaching aids, so that students will understand whatever concept that is being put across. Learning of mathematics at both secondary and tertiary levels of education system, requires good planning and adequately equipped laboratories. Therefore, lack of basic teaching equipment and laboratories render the objective of teaching unattainable.

Government Policies: Scholars in Nigeria have attributed the general failure of students in mathematics, to government policies and funding which is one of the major contributors to the causes of the failure of students in mathematics. It is believed that government is the role determinant of educational system in any nation. Some of the problems created by the government towards teaching mathematics include; government instability, poor planning etc. Nali (1995) in a one day seminar organized by the Federal Colleges of Education Yola, made it known that the aim of mathematics curriculum planners is almost in a state of controversy, since they do not care which lesson should be taught in a week.

Staff Remuneration: This also can be classified as one of the problems that lead to students' mass failure in mathematics due to the poor working condition of mathematics teachers. The working condition of teachers is very poor in fact the problem affects the whole system of education in Nigeria. When closely examined the working condition of mathematics teachers you will notice that they teach everything on board unlike the teachers of other subjects who give hand out to students. But it is believed that if teachers are well paid and monitored effectively

they will not be reluctant thus, teaching and learning will be effective and efficient.

Lack of Purpose: Some teachers do not know the essence of planning a lesson even if they do they are so reluctant about it. They just walk to the class and start teaching students. Sometimes, they do not recognize the purpose of the students in class. It is teacher's duty to make the lesson meaningful, purposeful and attractive to stimulate the students to work. It is believed that whatsoever a teacher does so do the students; and if the teacher is reluctant or active the students will also be reluctant or active.

Reading Materials: Most often, the quality of mathematics lesson (to a large extend) depends upon the work of text books and some of these text books used are not written by Nigerians and fail to understand problems or meet the interest and demand of the students. For what the student need expected is explain every step in detail and collating step by step one after the other to the final answer. As a matter of fact, the traditional style of syllabus also affects the text books. The authors have not been able to get rid of traditions while the illustrations and problems given or solved in text books are diverse from the actual like. Thus, text books should correspond with abilities of learners with enough examples, mathematically calculated step by step for learners to read and understand.

Teachers Attitude: Some teachers do not have genuine love for the subject or as a born teacher and professional. May be he/she was been forced by circumstances to take as his/her last resort offer been suffered from lack of job opportunities. He remains at the lookout for a better job and always ready to leave the profession as soon as he/she gets the opportunity to do so. He lacks interest in the subject and show that the attitude of teachers is the key to school achievement.

Students Attitude towards Mathematics: Some students have developed the spirit of fear as a result of hatreds towards Mathematics. They rather choose to change Mathematics (as subject) with other subjects; they say it is difficult and thus cause them to have no interest at all. These negative attitudes of students also contribute to the failure in Mathematics due to the lack of student's interest to study Mathematics as a Course.

Table 1: Lack of instructional materials causes failures in mathematics

Option	Number of Respondents	Percentage
Agree	174	87
Disagree	20	10
Undecided	6	3
Total	200	100

Source: Field survey, 2014

Table 2: Students' attitudes as well as teachers and methodologies toward teaching

Option	Number of Respondents	Percentage
Agree	112	56
Disagree	76	38
Undecided	12	6
Total	200	100

Source: Field survey, 2014

Table 3: Lack of Qualified and Experienced Teachers

Option	Number of Respondents	Percentage
Agree	158	79
Disagree	34	17
Undecided	8	4
Total	200	100

Source: Field survey, 2014

Table 4: Student Performance in Mathematics and other Subjects in Adamawa State (2000 - 2009)

2000	4,942	190	(3.9%)
2001	16,879	540	(3.19%)
2002	7,188	575	(3.08%)
2003,	15,991	191	(1.19%)
2004,	18,226	358	(1.97%)
2005,	21,002	543	(2.58%)
2006	25,252	318	(1.26%)
2007	25,197	236	(0.94%)
2008			
2009	28,697	417	(1.45%)

Source: WAEC extracted from FRN 2009

CONCLUSSION AND RECOMMENDATIONS

This research revealed to us some of the impediments that stunt the performance of students in mathematics. More so, we were able to discover some important findings that have been the top most stumbling blocks both in mathematics and educational growth and development. Some of these reasons obtained from the sample of research finding on students opinion during the conduction of the research by some selected senior secondary schools include: lack of qualified teachers, lack of new approaches to the teaching of mathematics subject, poor studying environment; inadequacy of teaching and learning materials, students negative attitude to the subject, and lack of teacher's incentive. Based on the above stated findings, the important role mathematics plays in the entire composition of creation and the universe and that one cannot live without thinking; and that very thinking itself is called mathematics. Therefore, it is good that government should propound the means to allocate necessary resources needed for the implementation and development of our educational system; and for the attainments of the whole goals written in the national policy on education.

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