

Assessment of Adequacy and Availability of Human and Material Resources for the Implementation of the Nigeria New Senior Secondary School Mathematics Curriculum

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Abstract

In this study the authors examined the level of adequacy and availability of human and material resources for the implementation of the Nigeria newly introduced Mathematics Curriculum. The study was based on the premise that successful implementation of the curriculum depends on availability and adequacy of human and material resources. This is because if well qualified mathematics teachers and instructional materials are not available, no matter how well structured and intentioned the new mathematics curriculum may be, its successful implementation may not be achieved. The sample consisted of 110 senior secondary school mathematics teachers. They were randomly selected from Abakaliki and Ebonyi local Government Areas, Ebonyi State, Nigeria. One reliable and valid instrument titled "Mathematics Teachers Questionnaire" was used. Results show that there are not enough of qualified mathematics teachers in the schools. A sizeable numbers of the teachers sampled did not read mathematics and some of those who read mathematics did not have requisite teaching qualification. Majority of the teachers did not belong to either of the science and mathematics teacher professional bodies in Nigeria such as Science Teachers Association of Nigeria and Mathematical Association of Nigeria. Many schools do not have instructional facilities and equipment. The author recommends that teachers should be encouraged to become members of professional bodies and teachers without professional qualification advised to do professional courses in education.

Keywords: Human resources, Material resources, Mathematics, Mathematics Curriculum, Mathematics Teacher

Introduction

Prior to the advent of the Christian Missionaries and subsequent introduction of Western-style of education to Sub-Saharan Africa, each ethnic group in Africa used elaborate counting systems. For example, among the Yoruba people of Southwest, Nigeria, cowry shells, stones, sticks and other concrete objects as well folklores and market days were used for counting in economic and social activities. To preserve this counting system, the Yoruba people taught their young ones though in informal ways.

According to Taiwo (1968)

“The Yoruba have developed a system of counting and have used a variety of human experience to promote practice and dexterity in enumeration. The Yoruba child is introduced early in life to counting by means of concrete objects, counting rhymes, folklore, plays, and games at home and on the field” p.10

Other ethnic groups such as the Hausa, Igbo, Fulani and Ijaw had similar activities for their counting system and parents used various informal ways to teach their young ones.

Formal education was introduced in Nigeria at about 1842. Since then teaching of subjects that borders on numeracy and computation such as arithmetic, algebra and geometry has been part and parcel of the school’s curriculum. At a time in the history of Mathematics teaching in Nigeria schools both at the primary and post-primary school levels, each of arithmetic, algebra and geometry was taught as a separate subject and each had different periods on the school timetable. However, at present, these branches of Mathematics have been fused into a single subject called Mathematics on the schools’ timetable.

The teaching of Mathematics in Nigeria and indeed in most countries in the sub-Saharan Africa has gone through several stages of development. Indeed, several reforms had taken place in mathematics teaching and learning, in the Sub-Saharan Africa. There have been series of seminars, conferences; and several projects had been undertaken all in an effort to improve teaching and learning of mathematics. A typical example of such projects was the African Mathematics Project (AMP) which took place in Entebbe, Uganda in 1962. A major outcome of the African Mathematics Project (AMP) was the pilot study of teaching and learning of Modern Mathematics in Nigeria schools. The Pilot study was domiciled in Lagos under the Directorship of Professor Grace Alele Williams in 1964 (Awofala, 2012).

In Nigeria, the first home-based and indigenous-initiated reform in Mathematics education was in 1969. According to Awofala (2012), this was when the then Federal Military Government of Nigeria charged the newly established the Nigerian Educational Research Council (NERC) with the responsibility of formulating the National Policy on Education

(NPE); and promoting the work of modernization of school curricula in various subjects (including Mathematics) at primary, post primary and post secondary school levels. Specifically in the area of Mathematics education, the NERC organized conferences, and workshops to familiarise primary and post primary school teachers with the content and teaching techniques for the implementation of modern Mathematics programme. As part of its mandate the NERC set up a national task force in 1976 to examine the suitability or otherwise of the modern Mathematics curriculum which was in use. This was apparently in response to criticisms against the teaching and learning of Modern Mathematics in Nigeria schools.

According to Awofala (2012), although the report of the Lagos pilot study on modern Mathematics conducted, in the Western state of Nigeria, between 1964 and 1968 indicated a huge success of the curriculum, it could not be said for other states in Nigeria especially in the Eastern and the Northern parts of Nigeria. Major criticisms against modern Mathematics included acute shortage of qualified modern Mathematics teachers and lack of adequate textbooks. Eventually in 1977 the teaching and learning of modern Mathematics in Nigeria primary and post primary schools was abolished.

Arising from the conferences, seminars and workshops, the NERC developed another Mathematics curriculum for use in primary schools. In 1977, the National Council on Education (NCE) approved and adopted the primary school syllabus and curriculum. However, the official implementation of the primary school Mathematics curriculum did not take effect until 1979. As part of the effort of Nigeria to improve the quality of teaching and learning of school subjects, the Nigerian Educational Research and Development Council (NERDC) was established by Decree 58 (now Act) of 1988. The NERDC was formed from four major parastatals of the Federal Government of Nigeria viz: Nigerian Educational Research Council (NERC), the Comparative Education Study and Adaptation Center (CESAC), the Nigeria Book Development Council (NBDC) and Nigerian Language Development Center (NLDC). The major function of NERDC is to conduct, promote and coordinate educational research and development programmes at all levels of education in Nigeria.

In the reforms in the Mathematics education that had taken place in Nigeria, the efforts of the Comparative Education Study and Adaptation Center (CESAC) of the University of Lagos should be noted. The CESAC was established at the University of Lagos in 1967 through the Ford Foundation grant. In 1976, the CESAC held series of conferences and workshops with the aim of developing a new syllabus for secondary school Mathematics. The National Council of Education (NCE) directed the CESAC to split secondary school Mathematics into two viz: Junior

Secondary school syllabus and senior secondary school syllabus respectively. This was to be in line with the 6-3-3-4 system of education as contained in the Nigeria National Policy of Education of the Federal Government of Nigeria. In 1978 the NCE finally approved and adopted the secondary school syllabus and curriculum developed by the NERC. However, the official implementation of junior school Mathematics curriculum took effect in 1982, while that of senior secondary school was in 1985.

In 2007, the NERDC revised the old Mathematics curriculum with the intention of producing a crop of well educated Nigerians who will be adequately equipped to function effectively in the present world of globalization. The decision for the revision of the curriculum was dictated by the desire of Federal Government of Nigeria to (a) attain the goal number two of the Millennium Development Goals (that is achieving the universal basic education by 2015), (b) attain the targets of the National Economic and Development Strategies (NEEDS) and (c) produce better informed Information and Communication Technology (ICT) compliant citizens of high ethical and educational standards. The revised curriculum called the “New Senior Secondary School Mathematics Curriculum” was approved by NCE in December, 2007 but its implementation started in 2011.

The unique features of the content areas of this new curriculum according to NERDC, (2012) are that;

1. The new senior secondary school Mathematics curriculum has been infused with modern topics which are relevant to the global world and meet up the challenges of the Millennium Development Goals (MDGs). Obsolete techniques in the old curriculum such as the use of slide rules have been dropped, while the logarithm table as calculating aid is de-emphasized with the hope of totally replacing it with scientific calculators and other calculating devices and computer-assisted instructional materials like semi-programmable calculators.
2. The revised senior secondary school Mathematics curriculum includes some topics in logic, calculus (differential and integral equations); matrices, modular arithmetic and mapping, which in the old curriculum were restricted to *Further/Additional Mathematics*. These topics are believed to have capacity to enhance the competence of students in the various vocations they will pursue at tertiary level. The new curriculum accommodates the needs of students in the commercial and technical subject areas by including such content areas as annuities, amortization and sinking funds.
3. The new curriculum reflects continuity with those used in Universities, Polytechnics, Colleges of Education and Colleges of

Science and Technology. In general, the curriculum aims at linking the knowledge of Mathematics to the industry. Hence, applications of Mathematics to health, finance, population, capital market and commercial activities are included in the curriculum.

4. Although both the old and the new revised Mathematics curricula are thematic, in the revised curriculum the themes have been rearranged into four instead of the six themes in the old curriculum. In the new curriculum, plane geometry, trigonometry, and mensuration have been merged to form Geometry; and Probability is now contained in Statistics. The new four themes are, number and numeration, algebraic process, geometry and statistics.
5. In the revised curriculum structure, Teachers Activities have been separated from students' activities while evaluation guide has been provided for the teachers. Teacher and student activities are also separated from materials. Hints are also provided for teachers in each case.
6. There are many revised content areas infused in the new curriculum to address the defects and inadequacies of the old curriculum. These are summarized in themes.

The NERDC (2012) also stated in specific terms the general objectives of the new senior secondary school Mathematics Curriculum. These include:

1. To achieve the National and Global reforms such as National Economic Empowerment and Development Strategies (NEEDS) in 2009, Millennium Development Goals (MDGs), September, 2000 and Education for All (EFA) in the year 2009.

Note: The MDG goal two aims at meeting the learning needs of all children, youth and adults by 2015 – This implies that the new mathematics curriculum aims at improving the knowledge base of learners so that they can transfer such knowledge to solve problems and even generate some wealth.

2. To ensure smooth transition from secondary level to tertiary level of the Mathematics curriculum. This curriculum has bridged the transition gap between Senior Secondary School Mathematics and Tertiary Mathematics curriculum.

Note: New topics such as differential and integral equations, matrices and determinants were introduced into the new Mathematics curriculum that will help candidates pass Unified Tertiary Matriculation Examination easily and gain admission into tertiary institutions. Moreover, efforts were made to remove the dichotomy between the old senior secondary Mathematics curriculum and the Mathematics curriculum of commercial, technical and vocational schools.

Note: Prior to the new Mathematics curriculum, there were discrepancies in the Mathematics curricula of commercial, technical and vocational schools. The new Mathematics curriculum has taken care of such discrepancies. Presently commercial, technical and vocational schools use the same curriculum.

3. To correct some deficiencies in the contents of the old curriculum e, g. the infusion of logic reasoning to aid the teaching of theorems and their proofs.

Note: Logical reasoning which aids the teaching of mathematical theorems and proofs was not in the old curriculum.

4. To help the development of entrepreneurship skills in the learners. The new curriculum requires that learners should link their knowledge of Mathematics to industry. Hence contents are linked to practical problems of health, finance, population, industry and capital markets.

Note: The new mathematics curriculum emphasized that students should be taught the practical application of Mathematics to real life situation so as to enhance their entrepreneurial skills e. g. With Matrices and Determinants, learners can easily determine the prices of goods and commodity in the market.

According to NERDC (2012), (2013) and Mefun (2015) the success or otherwise of the new mathematics curriculum depends on (a) the quality and quantity of teachers (b) availability of functional textbooks (c) availability and effective use of facilities and instructional materials (d) teachers assessment practices and (d) proper supervision and monitoring by the agencies (Federal and State Ministries of Education [FMoE/SMoE], Local and Zonal Inspectorate of Education [LIE/ZIE], NERDC, and School Principals) which have been mandated by the state to see to the maintenance of standard and quality of teaching and learning in schools.

Past studies such as Ajibola (2008), Yara and Otieno (2010), Obioma (2013) and Ogunyinka, Okeke and Adedoyin (2015) identified lack of qualified teachers as a major challenge facing the effective implementation of the new senior secondary curriculum.

According to Ogunyinka Okeke and Adedoyin (2015):

Many teachers in Nigeria have not measured up to the minimum international standard. This is because a large number of untrained and half-baked personnel are still retained in the system, leading to a scenario in which career in teaching is not yet professionalized. Many unqualified teachers are still in the employment of some States. Teaching Service Boards, while most higher education lecturers are yet to undergo training in education (p.118)

Ajibola (2008) noted that as a result of lack of qualified teachers, some teachers are made to teach subjects that are quite unrelated to their area of specialization. For example, there are instances where teachers who read

chemistry at the University level are made to teach mathematics. More important is the fact that graduates without teaching qualification are employed to teach mathematics at the senior secondary school level (Yara & Otieno, 2010). Though such teachers may have competency in subject matter, but their ability to impart knowledge to students may be questionable because of their lack of training in pedagogy. The issue of inadequacy of trained and qualified mathematics teachers is not peculiar to Nigeria. Research (such as Yara & Otieno, 2010; Mbugua, 2011) showed that in Kenya, there was also inadequacy of trained and qualified mathematics teacher. The study of Yara and Otieno (2010) even showed that some teachers after a few years in teaching left for greener pastures in other professions.

Specifically, in her study, Anugwo (2011) examined the relationship between availability of expert teachers and implementation of secondary school curriculum in Nigeria. Results showed that a significant relationship existed between availability of subject teachers and the implementation of skill-based secondary school curriculum. Anugwo (2011) concluded that there was a link between quality and quantity of teachers and successful implementation of curriculum in Nigerian schools.

No doubt, Mathematics teachers are involved in the implementation of the new mathematics curriculum in line with the stated objectives. Research such as Azuka, Jekayinfa, Durojaiye, and Sylvester (2013) has however, shown that, some teachers may face some difficulties in the teaching of some of the new topics introduced in the new curriculum. Examples of such category of teachers include those who did not have prerequisite degree in mathematics and mathematics related subjects at the tertiary level of education. As a result of this their competency in the subject matter maybe somewhat questionable. Among such topics include logical reasoning, geometric construction, financial Mathematics, integral and differential calculus and their applications, bearing and modular arithmetic. According to Azuka et al (2013) the difficulty level of these topics is between 60% and 85%. To ameliorate this, the NERDC has suggested that mathematics teacher should endeavour to participate in in-service professional development programmes such as workshops, seminars and conferences and also belong to professional associations such as the Science Teachers Association of Nigeria and Mathematics Association of Nigeria. The extent to which teachers participate in these programmes was also examined in this study.

In comparison with the biological and physical sciences, Mathematics instruction has suffered in the past from a notable lack of special physical facilities and special instructional devices for giving meaning to various concepts and relations, providing motivation for the students, and increasing the effectiveness of the instruction. This is due in part to a lack

of imagination and aggressiveness on the part of mathematics teachers, but it is due also to the fact that until rather recent years not much experimental work had been done in Mathematics with new media or with non traditional methods of instruction. Traditionally, the equipment available to the Mathematics teacher has been limited pretty much to the textbook and the chalkboard, with perhaps a few models for use in solid geometry and some rulers and protractors for linear and angular measurement and some supplementary textbooks and workbooks. These teaching aids are far from negligible, as anyone who has tried to teach Mathematics in a room without a chalkboard can attest, but with a chalkboard alone it is often hard even for a good teacher to accomplish all that he envisions.

According to Yara and Otieno (2010) the teaching and learning of mathematics in secondary school become more interesting with the use of mathematics kit. With determination and zeal for students' success and mastery of mathematics, schools can readily purchase mathematics kit. The kit usually contains instruments such as inclinometer for measuring angles of depression and elevation; circle theorem kit for determining the constant of a circle and several mathematics geometrical models. All these are multisensory teaching and learning aids.

The use of multisensory aids, when well coordinated with the other classroom learning activities, can serve a double purpose, namely, to stimulate interest and provide a most effective means of clarifying many mathematical concepts and relations through the experience of associating them directly with physical things. Thus it serves as a highly important avenue for organic learning, as well as for motivation. Such practice is often referred to as "laboratory work in Mathematics" such as are done in Physics, Biology or Chemistry classes. It is true that the idea of the Mathematics laboratory has not yet received the same general acceptance as the science laboratory has, but this may well be because Mathematics teachers have not themselves recognized and insisted upon its importance as the science teachers have. Actually, most Mathematics teachers have been too passive in this respect. Teachers of Science, Art, Music, Home Economics, and other subjects do not hesitate to ask for space and equipment for this type of work, and they get it. But most mathematics teachers do not even ask for it, though to do so would be both reasonable and proper.

It appears that the issue of inadequacy of teaching learning materials may not be peculiar to Nigeria as research in other climes such as in Kenya (for example, Bulimo, Odebero & Musasia 2010) and Uganda (for example, Mbugua, 2011) revealed similar trends. According to Mbugua (2011)

*there are insufficient mathematics text books in secondary schools.
Schools have poor chalk boards which affects teaching and learning*

of mathematics. Three dimension models or aids for teaching and learning mathematics are lacking, those that are available are of poor quality, and also teachers do not use them effectively well. The chalk board is in two dimension and drawing a three dimension on it may distort learners thinking; for example angles that are 90° of cuboids appear different on the chalk board (p.114)

The conclusions one can draw from literature is that there appears to be positive relationship between availability of school facilities and successful implementation of school curriculum. That is without the availability of functional infrastructure and instructional materials in schools, the skill-based curriculum no matter how well it was drafted will not be effectively implemented.

To give direction to this study, two research questions were answered. These were:

1. What is the profile of the senior secondary school mathematics teachers with regards to their gender, academic qualification, and years of teaching experience, number of seminars/workshops attended and membership of professional associations?
2. To what extent are facilities and instructional materials available for the successful implementation of the new mathematics curriculum?

Methods

Participants

All public senior secondary school Mathematics Teachers in senior secondary school classes two and three (SSS 2 and SSS 3) in Ebonyi and Abakaliki Local Government Areas, Ebonyi State, Nigeria, was the target population. However, only one hundred and ten senior secondary schools Mathematics Teachers selected from the sampled senior secondary schools participated in the study. The ages of the sampled teachers ranged between 25 and 56 years. Seventy-one percent of them were men, while 29% were women.

Materials

One instrument was used. This was a questionnaire titled “Mathematics Teachers Questionnaire (MTQ)”. It has two sections. Section A and Section B. Section A elicited information about teacher’ gender, qualification, number of years of teaching experience, number of seminars/workshops attended in the last five years and what type of professional association the teacher belongs. Section B sought information about availability and adequacy of equipment and instructional facilities for the teaching and learning of mathematics (See Appendix 1)

Procedures

The second author Mefun Frederick with the assistance of two of his colleagues at NERDC Office (Ebonyi State Office) administered the MTQ to teachers in Ebonyi and Abakaliki Local Government Area, Ebonyi State, Nigeria. In each school sampled, the Mathematics Teachers cooperated very well and the return rate of the questionnaire was about 100%.

Data Analysis

Data gathered were analysed using frequency counts and percentages.

Results

The results are hereby presented in the order in which the research questions have been stated.

Research Question One: What is the profile of the senior secondary school mathematics teachers with regards to their gender, academic qualification, and years of teaching experience, number of seminars/workshops attended and membership of professional associations?

- a. In terms of gender, the ratio was lopsided in favour of men. Out of the 110 teachers sampled, 77 (71%) were men while 33 (29%) were women. Figure 1 gives the graphical picture of the profile of the teachers

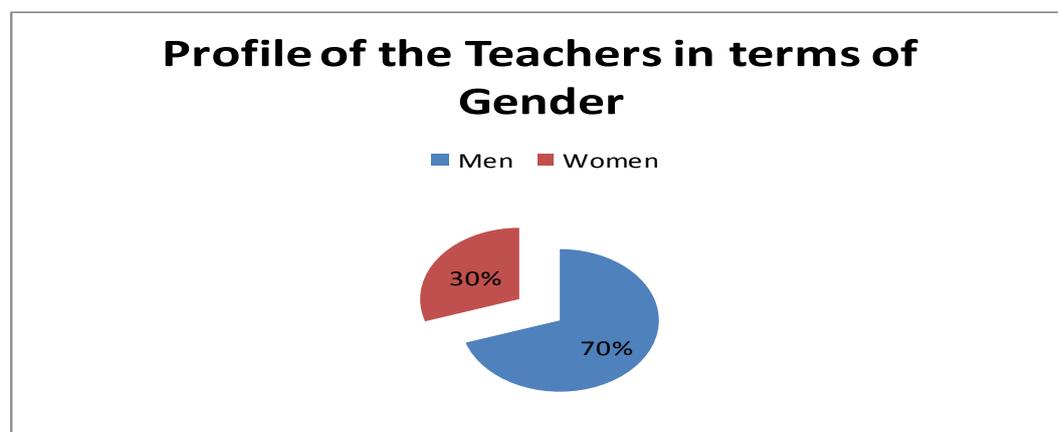


Figure 1: Profile of Mathematics Teacher by Gender

- b. In terms of qualification, table 1 gives the graphic picture

Table 1: Profile of Mathematics Teachers by Qualification

Qualification	Number
1. B.Sc. Education/B.Ed. Mathematics	28 (25.5)
2. B.Sc. Mathematics with PGDE	15 (13.6)
3. B.Sc. Mathematics without PGDE	26 (23.6)
4. Others	41(37.3)

In terms of qualification, table 1 shows that only 43 (39.1%) of the sampled teachers had the prerequisite qualification to teach mathematics at the senior secondary school level. This number included the 28 who had B.Sc./Education and B.Ed. Education in Mathematics as well as 15 teachers who had B.Sc. Mathematics with Postgraduate Diploma in Education (PGDE). The table shows although 26 of the teachers sampled read mathematics at the University level, they do not have requisite teaching qualification to teach mathematics. Moreover, 41 of the teachers sampled did not even read mathematics not to talk of having requisite qualification to teach mathematics

- c. In terms of teaching experience Table 2 gives the graphic representation of the profile of the teachers.

Table 2: Profile of the Teachers in terms of Years of Experience

	Teacher Year of Experience	Number
1.	01 – 05 Years	34 (30.9)
2.	06 – 10 Years	43 (39.1)
3.	11 Years and above	33 (30.0)

In terms of teaching experience about 31% of the sampled teachers had experience of over ten years while 69% are still relative young in the teaching profession. When the average number of years of teaching experience of the sampled teachers was noted, it was found out that it was 7.9 years with standard deviation of 5.3. This means that majority of the teachers were relatively young in the teaching profession

- d. In term of number of seminars/ works attended that the sampled teachers had attended.

It was observed that only 36 (32.7%) of the sampled teachers had attended one seminar or the other in the last five years while 74 (67.3%) of the teachers had not attended any seminar in the last five years.

- e. Membership of Mathematical Association of Nigeria (MAN) /Science Teachers Association of Nigeria (STAN)

Analysis of results show that only 34 (30.9%) of the sampled teachers were members of Mathematical Association while 76 (69.1%) were not. It was also found out that only 18 (16.4%) of the teachers were members of Science Teachers Association of Nigeria, while 92 (83.6%) were not.

Research Question Two: To what extent are facilities and instructional materials available for the successful implementation of the new mathematics curriculum? To answer this question, the responses of the sampled teachers were subjected to frequency counts and percentages. Analysis revealed the following.

Table 3: Availability of Facilities and Instructional Materials

Facilities/Instructional Materials	Available	Not Available
1. Mathematics Laboratory	26 (23.6)	84 (76.4)
2. Math Charts	79 (71.8)	31 (28.2)
3. Math Models	31 (28.2)	79 (71.8)
4. ICT	74 (67.3)	36 (32.7)
5. Math Periodicals in Library	102 (92.7)	8 (7.3)
6. Textbook for Teachers	95 (86.4)	15 (13.6)
7. Math Kit	6 (5.5)	104 (94.5)

Note* Number in parenthesis represents percentages.

Discussion and Recommendations

Results have shown that in terms of quantity of qualified teachers needed for the successful implementation of the new mathematics curriculum, though government is doing its best, not much has been achieved. This is because out of the 110 teachers that were sampled, only 40% had the requisite qualification to teach at the senior secondary school level. This is grossly inadequate if one considers the number of secondary school students that these teachers are supposed to cater for. This view was raised by about 92% of the teachers that were sampled. Earlier researchers in mathematics education (such as Ajibola, 2014; Anugwo, 2011) had raised similar fears about gross inadequacy of teachers in the school system. For example in his study, Ajibola (2008) identified lack of qualified teachers as a major challenge facing the effective implementation of the new senior secondary curriculum. The results of this study therefore corroborate the findings of Ajibola (2008) that there are not enough of qualified mathematics teachers for the implementation of new mathematics curriculum. The results of this study is also in line with that of Anugwo (2011) who concluded that quality and quantity of teachers in Nigerian secondary schools tended to significantly affect the implementation of curriculum in Nigerian schools, especially at the junior and senior secondary level.

The importance of membership in professional associations such as Mathematical Association of Nigeria (MAN) and Science Teachers Association of Nigeria (STAN), the results of this study clearly show that very few teachers belong to these associations. In Nigeria, the MAN and the STAN are the two prominent associations promoting Science and Mathematics Education in Nigeria by developing curriculum materials and teaching resources. Even the STAN has a mathematics section that caters specifically for mathematics education. These professional bodies organize seminars and workshops for their members and use such forum to help members update their knowledge both in the subject matter content and pedagogy. That teachers are not joining these professional bodies can be attributed to lack of enthusiasm on the part of the teachers

themselves and probably lack of encouragement on the part of executives of these professional bodies.

The results of the study also show that some of the teachers sampled did not have requisite qualification to teach mathematics. More important is the fact that though some teachers read mathematics at the University level, they did not have teaching qualification. Such teachers should be encouraged to enroll for professional courses in education such as postgraduate diploma in education.

On the issue of instructional facilities and equipment, the results of this study showed that majority of the schools sampled did not have mathematics laboratory and Mathematics Kit. This result is in line with that of Bulimo, Odebero and Musasia (2010) and Mbugua (2011) who also found that there was inadequate number of teaching learning resources in Kenya. Despite the importance of such instructional facilities and equipment, it is quite disheartening that schools do not have functional mathematics laboratory and mathematics kit. It is important at this juncture to state that a mathematics laboratory may not necessarily mean having a room or a building specifically assigned to mathematics as been done for Physics and Chemistry. Though if such a room or building is available the better. However, a mathematics laboratory can be any place where practical activities in mathematics can take place. There are many theorems and concepts that some mathematics teachers may find difficult to explain, but with practical demonstrations using simple and inexpensive materials, the reality of such theorems and concepts will definitely become obvious to the students.

It is generally believed that mathematics is an abstract subject. Mathematics teachers, therefore, must make use of readily available resources in their immediate environment to simplify and put meaning into these abstract concepts. These teaching resources can be in the form of charts, three dimensional objects (real or improvised) and plane shapes. The results of this study show that some schools have these charts and some schools do not have them. Schools that do not have the real charts and models should be encouraged to improvise such materials. The NERDC (2012) has emphasized the need for teachers to make use of mathematical kits to explain concepts in geometry. Where such kits are not available, NERDC (2012) has encouraged teachers to improvise by cutting of papers, cards, charts and mathematical boards.

It is important to emphasise that there are educational resource centers established by Federal and state governments in various parts of Nigeria. Apart from all these, most Universities have well-established and equipped resource centers where mathematics teachers can borrow some of these materials. Some of the educational resources that can be found and borrowed from these centers include supplementary books, journals

and periodicals. Mathematics teachers should be encouraged to visit such educational resources centers.

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Attachment 1

INSTITUTE OF EDUCATION

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Mathematics Teachers' Questionnaire (MTQ)

This questionnaire has been developed to elicit information on teacher variables like age, academic qualification, and professional qualification. Please, kindly give your honest information on every item. All information will be treated with utmost confidentiality.

Instruction: Please respond to all questions/items

Section A

1. Name of School.....
2. L. G. A
3. School Location Urban..... Rural
4. Sex: Male..... Female.....
5. Age (As at July 1, 2015)
6. How many students are in your class? No of Boys No of Girls.....
7. Academic Qualification Tick as appropriate (√)
 - i. B.Ed./B.Sc.Edu Mathematics ()
 - ii. B.Sc. Mathematics with PGDE ()
 - iii. B. Sc. Mathematics without PGDE ()
 - iv. Others () Please Specify
8. How long have you been teaching mathematics?
9. In the last five years how many seminars/workshops have you attended?.....
10. Are you a member of Mathematical Teachers Association?
Yes () No ()
11. Are you a member of Science Teachers Association of Nigeria?
Yes () No ()

Part One: Availability and Adequacy of Equipment and Facilities

Instruction: Indicate the availability or otherwise of the following equipment and facilities for mathematics teaching in your school. Place a tick in the appropriate column applicable to your school.

S/N	ITEMS	Not Available	Available	Number Available
1.	Mathematics laboratory			
2.	Mathematical set			
3.	Mathematical Charts			
4.	Mathematical Models			
5.	ICT equipment			
6	Library books and Periodicals on Mathematics			
7	Teachers' reference books on Mathematics			
8	New senior secondary school Mathematics curriculum			
9	Recommended Mathematics textbooks for teachers' use			
10	Students' work book / assignment notes			
11.	Scheme of work for Mathematics			
12.	Diaries for Mathematics			
13.	Mathematics Kit			

1. List three (3) problems you encounter in the implementation of the new senior secondary school Mathematics curriculum

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2. Suggest Three (3) ways of improving upon the implementation of the New Senior Secondary School Mathematics Curriculum to make it Achieve its desired goals

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