

Issues in Mathematics Education in Nigeria

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Abstract

The importance of mathematics in the development of any nation cannot be over emphasised. It is in view of this that critical issues in the development of mathematics in Nigeria are presented. These include curriculum reforms, availabilities of competence mathematics teachers, stigmatisation and gender, learners interest, funding and assessment and evaluation in mathematics are well discussed

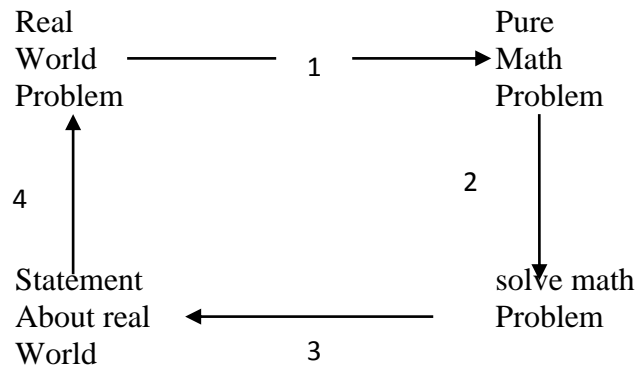
Introduction

Mathematics holds the mirror up to civilization. It is no exaggeration to say that the history of mathematics is the history of civilization. Mathematicians can take pride in the fact that their science, more than any other's is an exact science, and that hardly anything ever done in mathematics has proved to be useless.

Mathematics is the science of measurement, quantity and magnitude. It is also refer to as the abstract science which investigates deductively the conclusions implicit in the elementary conceptions of spatial and numerical relations. It is also defined as the science of number and space. Mathematics is also called science of logical reasoning. **Locke** had said "mathematics is a way to settle in the mind a habit of reasoning". Here the results are developed through a process of reasoning. The reasoning in mathematics is of peculiar kind and possesses a number of characteristics such as simplify, accuracy, certainty of result, originality and verification.

If this is mathematics, then it is critical to view with importance critical issues in mathematics, with a view to addressing them. This presentation discusses weaknesses in current mathematics education system, curriculum reforms in Nigeria, teacher's availability and competence, stigmatization and gender, learners interest, funding and evaluation and assessment, weaknesses in current mathematics education system in the world.

It is believed that much of the current weaknesses in mathematics education system is historical in nature and can be discerned by carefully thinking about the following, real world problem, pure math problem, solved math problem and statement about real world. It is believed that 80-percent of math Mathematics at lower levels of education spent time on solving mathematical problem.



Historically, Maths Education system is concern about helping students to learn to carry out different types of activities of “step 2” using some combination of mental and written knowledge and skills. It takes a typical student many hours of study and practice to develop a reasonable level of speed and accuracy in performing addition, subtraction, multiplication and division on integers, decimal fractions and fractions. Despite the number of years involve only a modest result is often produced. Speed and accuracy decline relatively rapid without continued practice of the skills.

During the past 5,000 years there has been a steady increasing body of knowledge in mathematics, science and engineering. The industrial age and our more recent information age has led to a steady increase in the use of high mathematic study in many different discipline and on the job. The education system has moved toward the idea that the basic computational numeracy described above is insufficient. Students need to know basic algebra, geometry, statistics, probability and other higher mathematics topics.

As these topics began to be introduced into the general curriculum, a gap developed between the maths students were learning in school and the maths that most people used in their everyday lives.

The learner now begins to see mathematics not to have immediate use in their lives and those of their parents.

A pattern of Math Education curriculum develop in which one of the main reason for learning the material in particular course was to be prepared to take the next course. Students developed little skill at transferring their math knowledge.

Issues in Mathematics Curriculum Reforms

Education is concern with effecting our behavioural changes that will synchronize with the social norms for the sake of progress and survival. Curriculum embraces purpose experiences provided and directed by educational institutions to achieve predetermined goals (Onwuka, 1981).

The mathematic curriculum is a set of mathematical content, together with indications of how it should be interpreted. Issues in mathematics curriculum can be considered at three levels (a) Intended curriculum, “intended” to be taught in the school of the education system concerned. However the teacher in the class room may not always follow the specified curriculum very closely; they may for instance adapt it to the need of a given class, or rely on some well know texts books. This is “curriculum implemented”.

(b) The implemented or taught curriculum, differ from the intended one, and also differ from class room to class room in each system. (c) The third level is the “Attained curriculum” they vary not only from the other two levels but even from individual students. Since this deals

with contents, behaviour and attitude the student learned.

During the last sixty years, there have been efforts in curriculum reform in mathematics education in Nigeria (Odili, 2006). This reform in curriculum becomes inevitable due to social change and needs of the society. The question one will always ask is how much effect has these efforts had on the school curriculum? Are the mathematics teachers developing the instructional materials, techniques and organizational patterns that can help improve the curriculum? Over the years different education systems have been adapted and change over time. Ranging from 7 – 5 – 4 system, 6 – 5 – 4 system, 6 – 3 – 3 – 4 system and now 9 – 3 – 4 system. Quite tremendous efforts have been made in the area of curriculum development, but I am not sure that the needs of the society have been met. This is because what is studied in school mathematics has not manifested in the daily life of the society. A situation where student applied what is learnt in school mathematics as part of their daily life activities. Although the area of over load of curriculum has be addressed since the improvement on the compartmentalization in mathematics curriculum, one issue that still remain is the issue of inability of mathematics teachers to cover what is planned for the term, or week before going into a new concept. Since the curriculum is planned to connect from successful completion of one topic before the next one. Another area is the area of mathematics teacher not being able to link mathematics topic to other discipline to show the viability of the course, mathematics.

Availability and Competence of Mathematics Teachers

As in the case of other subject teachers, many things are expected of the mathematics teacher. His responsibilities are not only confined to the classroom but extend in many other directions. The teacher's first obligation is to teach his subject (mathematics) effectively. No teacher can do a thoroughly good job of teaching mathematics unless he is willing to make a careful analysis of his job and to be grinded by that analysis Kulbir (2006).

There are two equally important aspect of any true profession, that is, significant knowledge and effective technique (Kulbir 2006). A teacher will not be efficiently professional if there is serious weakness in any of the two. There is no nation that can grow above the level of his teachers. Mathematics is the springboard for technological development of any nations, (Obodo, 2006). Despite these important roles of mathematics teachers, the government policy in area of employment and incentives to mathematics teachers has not addressed it.

The quality and quantity of mathematics teachers has affected a great deal in students achievement in mathematics. Most mathematics teachers do not have the pre-requisite certificate and knowledge to teach the course. It is also stated that some secondary school science teachers do not have the basic training in pedagogy which inevitably has given birth to the phrase teachers of science instead of science teachers (Eniayeju and Tanko 2012). This situation is same for mathematics. Because of shortage in mathematics teachers, many social science and Engineering teachers have been made to teach mathematics in secondary school. Even the trained mathematics teacher finds it difficult to teach mathematics in the perspective of meaningful teaching and learning this sometimes are attributed to large class size or poor incentives that do not allowed the teacher to engage in development of resources material that can improve his head aching students learning process.

Mastery of the subject is an absolute necessity for effective teaching. The mathematics teacher must possess qualification in the subject. Not only should he/she have a certificate but his aptitude in the subject also must have been distinctly testified by his employer. He should prepare himself professionally not only by a scholarship in mathematics, but having background courses in other field as well, Such as physical and biological science, social

sciences etc.

Successful teaching experience prior to professional training is also a valuable asset. This will make the teacher efficient, interest arousing, command of instructional material and ability to face the class with confidence.

In-service training is always recommended for teachers who lack such ability.

Issue of Stigmatization and Gender to Mathematics

The African society right from onset distinguishes children responsibility in terms of their sex. The female were made to concentrate on domestic job and less strenuous activities. The male are made to work on the field (farm) where most of their activities are strenuous in nature. The females grow to understand that they are weaker sex given their kind of restricted jobs compared to those of their male counter parts.

Mathematics was also stigmatized to be the male equal in brain task. This is because of the rigors involves in the logical reasoning. Mathematics was also believed to be abstract in nature and it is only understood by people with higher intelligent or some kind of persons with spiritual gift. This probably informed the number of female in the field of sciences. Women constitute about fifty percent of the country (Nigeria) population and yet their participation in field of science and technology, philosophical, social and economic implications (Kujayat, 2000).

Equality: This is the state of being equal between two or more entities especially in status and right.

This has being a prominent issue when we mention gender. Women suffer so much of this concept in placement of responsibility, be it politically or administratively. The boy is usually favoured since they traditionally believe that he is the one that will sustain the family name and continue the lineage. All believed that the girl will be married out of the family. The works of professor Alele-Williams; Osibodu and co have indicated that gender inequality exists in the Nigerian Science, technology and Mathematics education but has received little attention. It was discovered that, there is low enrolment of female in science technology and mathematics at the secondary school and higher education levels. Literature abounds on the factors militating against equality in education in Nigeria (Eniayeju & Tanko 2012). Forum for African Women Education identified in 1999 some constraints to equality in science education to include family, socio-cultural, schools based and policy based factors.

Issues of the Learners Interest

Learners or students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge. Effective learning of mathematics requires a total concentration and logical reasoning of the state of the mind. The students must be seen to be interested in the subject, participating in the activity of the learning processes of the subject, mathematics.

There are different teaching techniques today that mathematics teachers' employ to make teaching meaningful. Techniques like problem solving, laboratory method, Heuristic methods and the host of other. These techniques will not yield positive result of student's achievement in mathematics, if the student is not interested and not willing to learn. This confirms to Thorndike theory of learning. Thorndike made experiment with hungry rat in a puzzle and used latch to trap it, then he kept fish outside the puzzle where the rat can smell and see the fish. He discovers that the hungry rat struggle and later got the puzzle open. Then he propounded the;

1. Law of readiness – the individual must be ready and interested in the exercise if not

the learning will not take place. The rat was ready to learn so it got its food after some effort.

2. Law of exercise, he opined that for effective learning the learner must participate in the exercise or activity before him else there will be no meaningful learning because the rat has to engage in the exercise in other to latch the puzzle else there would have been no food for it. And
3. Law of effect: Thorndike believed that for the rat to make effort again and again, there should be a form of reward for its participation. So it got fish to eat and satisfied its hunger. This will mean that there should be a form of reward or incentives to mathematics student in other to sustain their interest and participation in mathematics teaching and learning activities.

Issues of Funding

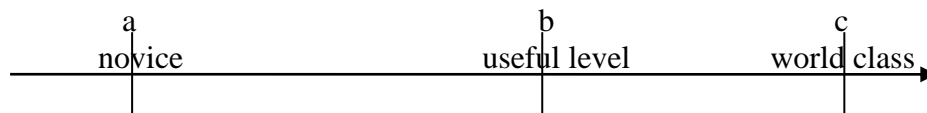
Fund refers to monetary provision set aside for the running of school system. According to Eniayeju & Tanko (2012), Funds refers to budgetary provision or allocations that are made readily available at a given time by government or establishments for the purpose of paying wages, allowances and provision of infrastructure to enhance teaching and learning.

Education in the past has been allowed in the care and funding by the missionaries. About 1843 – 1882 as recall by Eniayeju & Tanko (2012), this was the period that our colonial masters (government) has not taken education as a social responsibility to the natives. Mathematics was only taught and learned by the missionary catechists when the missionaries thought they should have basic arithmetic as a component of reading Bible, (Odili, 2006).

Government has now taken over the task of funding education. Ever since the population of school children increased the funding has gradually increases from 13% allocation in 2008 budget. Though the individual state government today have set aside different budget allocation for education known has met the 26 percent recommended by UNESCO. In Nigeria as it is now, it may not be the budgetary figure that may be wrong or too small, but corruption is the canca-worm that has always eaten up the education budget of the nation, which has cause under development in education sector. The consequence of underfunding in education will bring to bear the mathematics expertise scale.

Mathematics Expertise Scale

For any domain of human endeavour, one can think about levels of performance along an expertise scale.



When a learner first begins informal instruction in given domain, the learner is a novice (a) with training, education, and experience over time, the learner moves up to scale (b) This point differ from learner to learner with time. Example at the current time a mathematics teacher with knowledge and skill of teaching that where standard in 1900 would not currently be considered to have a useful level of competence in teaching techniques now.

Presumably the combination of these levels of expertise is adequate to meet contemporary standard for being a mathematics teacher, unfortunately, for many mathematics teachers, this is not the case. More over mathematics teacher is faced with difficulties such as;

1. Contemporary stand increase with time

2. A teacher's knowledge and skill within a domain tends to decrease over time if they are not frequently used.
3. Information and communication technology (ICT) and Brain science are rapidly expanding domains of knowledge and skills that are important in each of the three mathematics domains that are listed above.

Funding education properly will keep all teachers appropriately and improving in these domains until they achieve world class competence.

Issues of Performance Assessment and Evaluation

Assessment should support the learning of important mathematics and furnish useful information to both teachers and students. For every curriculum reforms, it is followed by useful evaluation techniques that can elicit the effectiveness of the curriculum reforms.

Performance assessment refers to measuring the level of attainment on a course of instruction and comparing such level of achievement to a set standard for proper appraisal (Omole and Musa 2012). In Education, performance on a course can be assessed using different tools. Most prominent among these tools are tests. A test could be grouped in terms of the nature of the test, this can be either objective or subjective/essay/tests, the other basis is who constructs the test, giving raise to teacher-made test and standardized test.

Course evaluation is an instructional package designed to be disseminated with a view of obtaining a remarkable outcome or impact on the benefactor (Omole and Musa 2012).

Formative evaluation means the appraisal that is embedded into the process of implementation/dissemination of the course content with a view of being able to progressively apply the right modification along the building line. Its purpose is to help students become aware of what they are to acquire in classroom and how well they are acquiring.

Also at the end of a long period of teaching and learning it is usual for an assessment to occur which provide a summation of all the learning during the period under review. The task of effective implementation of assessment and evaluation techniques that is free from sentiment and sectionalism remain and issue to address. According to Kyari (2011) confirmed that there is a high negative relationship between continuous assessment (CA) provided to NECO in relation to the students final achievement in SSCE, one reason that was established was that teacher enter CA score for students base on friendship and favouritism. If CA is standard and true then there should be a significant positive relationship between CA scores and SSCE final score (grade) of students.

Conclusion

Mathematics education in Nigeria has received attention over the last 50 years. During this period a lot of reforms have taken place in the mathematics education curriculum. To make a breakthrough in science and technology education this will depend quite well on the level of our mathematics development and achievement in the country

Issues to address in achieving this breakthrough which include weakness in current mathematics teachers, curriculum reforms, mathematics teachers availability and competence, gender and stigmatization in mathematics, learner interest, funding and performance assessment and evaluation. With mathematics education as the spring board for any meaningful development in science and technology any reforms taking place in education must focus mathematics education unit with lots of concern to address most of the bottleneck in this presentation.

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