

OBSTACLES TO EFFECTIVE SECONDARY SCHOOL MATHEMATICS EDUCATION: THE CHALLENGE OF MATHEMATICS EDUCATORS

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Abstract

This paper exposes some numerous problems facing mathematics education which constitutes obstacles to effective teaching and learning of mathematics in Nigerian secondary schools. The paper urges mathematics educators at all levels of education not to fold their hands and watch these problems rather they should see these problems as their own challenge. The paper recommends what mathematics educators should do to alleviate the problems which constitute obstacles to effective mathematics education in our secondary schools.

Introduction

Over the past two and half decades, many changes and series of efforts have been made to the teaching, learning and content of school certificate mathematics. Batiku (1997) exposed that most of these changes were intended to make mathematics motivating, more stimulating, broad based and relevant to the needs in technologically advanced world. According to him, efforts and changes made in this direction include:

- 1) Technical teachers training (TTTP) for serving science and mathematics (STM) teachers.
- 2) Teachers vocation courses (TVC).
- 3) National competition in mathematics by the Mathematics Association of Nigeria.
- 4) National mathematics panel workshop by the Science Teachers Association of Nigeria.

Despite these efforts and others that could not be mentioned in this paper, the performance of students in public examinations in mathematics has been generally poor and more disturbing in recent years (Batiku, 1997). The consistent poor performance of students in public examinations especially in Senior Secondary Certificate Examination is an indication that effective mathematics education in our secondary schools for quite a long time has not been possible.

Literature had exposed that mathematics has a reputation of being difficult to teach and understand. Some factors that can be adduced to such difficulty and understanding can probably be due to method of teaching mathematics and the technical language of mathematics (Munro, 1979).

Nigeria as a nation has an objective of meeting the western world in both economic and technological development among other objectives (FRN, 1981). Unfortunately, mathematics education which is the bedrock to economic and technology development in Nigeria is faced with numerous problems. The alarming poor state of mathematics education in Nigeria's secondary school system which does not need any documentation is as a result of the numerous problems facing mathematics teaching and learning.

All those concerned about the future of Nigeria with regard to economic and technological development should be disturbed concerning the current poor state of mathematics education in the country. They should therefore rise to challenge these obstacles.

These problems are like serious economic disease that requires an equally serious radical and urgent surgical operation. The people that are qualified for successful eradication of these problems are the mathematics educators. Mathematics educators should not continue to fold their hands to watch the deplorable state of mathematics education in our secondary schools in Nigeria. They should therefore arise to challenge the problems that have been identified which had continued to be deterrents to the general scientific and technological development of the nation and also the realization of the nation's economic goals.

The following are therefore the identified problems which constitute obstacles to effective mathematics education.

1) Students' Negative Attitude

Neal (1969) and Alio (1997) exposed that student's attitude towards mathematics as a school subject is

a great obstacle towards effective mathematics education. Students exhibit negative attitude to both teachers of mathematics and the subject.

In our secondary schools, many students do not attend mathematics lessons as a result of such negative attitude.

Alio (1989) and P'ejcmidagba (1987) attributed students' development of negative attitude towards mathematics teachers to what they called the "idiosyncrasy" of mathematics instruction. Sule (1993) traced this idiosyncrasy of mathematics to mathematics teachers' teaching methods. He went further to highlight that the unusual way some mathematics teachers approach the teaching of mathematics contribute to the students' development of negative attitude to the subject and to the mathematics teachers. Effective mathematics education cannot be possible when students' attitude towards the teacher and the subject is negative.

Mathematics educators should rise to challenge this situation which may invariably affect the nation towards achieving their educational goals for science and technology.

2) Inexperienced Teachers of Mathematics

Majority of our secondary school teachers are inexperienced as far as teaching mathematics is concerned. Also majority of our newly employed teachers in our secondary schools in recent years are not competent to teach secondary school mathematics.

Alio (1997) exposed that they lack the content and methodologies required of them as secondary school mathematics educators.

The reason for this incompetence is as a result of their poor background before entering higher institutions of learning and while in institutions of higher learning, many of them bribe their way through institutions only to come out successfully without mastery of the content and methods required of them for the work they were trained for.

Harbor-Peters and Ogomaka (1991) in a survey of mastery level of 700 mathematics teachers confirmed that many teachers of mathematics in our secondary schools lack complete mastery of the curriculum content.

Mathematics educators should rise to challenge this situation which may invariably affect the nation towards achieving her educational goals.

Mathematics educators should from time to time organize refresher courses for secondary school serving teachers of mathematics. This would help to equip them with the mastery of content and methodologies required for the teaching of mathematics.

3) Inadequate Supervision

Alio (2001) noted that teaching of mathematics in Nigeria secondary schools has been consistently going downwards, not only in the number, but also, in quality of what goes for mathematics teaching in our various post primary schools.

Teachers in secondary schools no longer have time to prepare for their lessons as a result of other business they have which occupy most of their time. Some of them have business centres in the towns 'while some have shops and sheds in the market where they sell one thing or the other.

The supervisors are inspectors of schools whose duty is to supervise and inspect the work of the teachers in secondary schools no longer live up to their work. They are more interested in what the school would give them either in cash or in kind for them to write good reports for such schools.

This attitude of both teachers, supervisors and inspectors of schools has an adverse effect towards effective teaching and learning of mathematics and other secondary school subjects.

Mathematics educators in schools, school management boards and ministry should rise up to challenge this ugly situation. They are expected to change their attitude towards the job for which they are paid for. They should not abandon their jobs for their own private business during working hours.

4) Lack of Qualified Mathematics Teachers

Akintola (1977) exposed that mathematics teachers are scarce commodities. The situation is worse in recent time than in the past (Alio, 1996).

Many secondary schools in the rural areas do not have a single qualified mathematics teacher. They employ those who major in other science subjects to handle the teaching of mathematics. Such people are not

qualified to teach mathematics as they did not study mathematics as a course in the tertiary institutions where they were trained. Even in urban towns where we have majority of qualified mathematics teachers teaching mathematics.

In some schools unqualified mathematics teachers handle the teaching of mathematics. This is because those who are qualified to teach mathematics by virtue of their qualifications could not cover the teaching of mathematics in all the classes.

In such situation untrained teachers like engineers and those who specialized in other science subjects are employed to teach mathematics. This is not right because such teachers will not be effective in their work as mathematics teachers.

Mathematics educators should encourage the unqualified mathematics teachers to further their studies in getting them trained and qualified for the job. They should also encourage them by organizing workshops and seminars on the effective ways of teaching mathematics in Nigerian secondary schools.

5) **Students' Poor Background** »

Mathematics is a highly structured subject because whatever is studied in mathematics at a higher level is dependent on what is learned at a lower level.

The mathematics content for primary education is a basis for secondary education mathematics content. This then implies that for a student to understand secondary mathematics content well, he should have a full mastery of the primary content.

Achime (2001) exposed that the reason for this situation is as a result of the spiral nature *of primary and secondary mathematics content. It is quite obvious that students who could not master junior secondary school mathematics could not have a mastery of the senior secondary school mathematics.

Mathematics educators in our secondary schools should take up the challenge of organizing remedial classes for the students identified as "poor background" students in mathematics in their classes.

Headmasters and headmistresses including the principals of post primary schools should encourage their teachers to always endeavour to cover the syllabus of any class they teach since non-Coverage of syllabuses is another reason for the poor students' background in mathematics.

6) **No Incentive for Mathematics Teachers**

Secondary school mathematics teachers are not given any incentive. The science allowance of twenty-five naira (£125.00) per month of which the mathematics teachers benefit from is not given to all mathematics teachers but for those mathematics teachers that carry up to the required number of periods per week. What is twenty-five naira in the present day? What can twenty-five naira buy in our market these days? This allowance have been what it was since early seventy's and has not been reviewed since that time.

Many mathematics educators, including the Mathematical Association of Nigeria have made recommendations towards the review of this amount but to no avail.

Mathematics teachers and other teachers in secondary schools are not approved in-service training with pay as obtained by the civil servants in the state and federal ministries. Effective mathematics education is not possible where there is no incentive for the teachers concerned.

Mathematics educators should rise up to challenge whatever that constitute obstacles to effective mathematics education. They should join hands together to fight for whatever they feel is their right in the society.

7) **Mathemaphobia Among Some Secondary School Students**

Mathemaphobia among some secondary school students implies that the fear of mathematics as a subject exists among many secondary school students.

Existence of mathemaphobia in these students constitutes obstacles to effective teaching and learning of mathematics. This is because the students who are phobic to mathematics would always like to move out of the class before mathematics teachers arrive to teach the class. If he has no opportunity to move away from the class before the lesson begins, he would not show any interest in the lesson. Such students cannot pass any mathematics examination.

The problem of mathemaphobia is one of the greatest obstacles towards effective teaching and learning of mathematics in our secondary schools.

Mathematics educators should rise to the challenge of this obstacle. They should utilize all the necessary avenues to generate and sustain students' interest in their teaching as well as reinforcing and motivating their students while teaching mathematics. They should also endeavour to make their lessons more practical through the use of games, appropriate instructional materials, appropriate set induction for their students at the beginning of any mathematics lesson.

They should identify the students who are phobic to the subject for appropriate counselling. This would help to eliminate mathemaphobia for effective mathematics education.

8) Absence of **Mathematics Laboratory in Our Secondary Schools**

Mathematics laboratory is a special room or space reserved in a school for the purpose of conducting practical tasks in mathematics. These tasks may include, building of blocks, dismantling objects, constructing models, making charts and concrete charts.

Mathematics laboratory provides the student with the experiences that he needs in order to acquire the concepts and generalization required in mathematics learning.

Obioma (1995) exposed that there is no evidence of the existence of mathematics laboratory in our primary and secondary schools. Without mathematics laboratory, effective mathematics education cannot be possible.

Mathematics educators should agitate to those concerned for the provision of mathematics laboratory in the schools. They should educate their principals on the importance of mathematics laboratory and could request for a sizeable room in their schools if no positive response comes through their agitation. They should therefore equip this sizeable room with necessary improvised instructional materials for further experiments in mathematics.

This would help to make for effective mathematics education until the government decides to equip the room which could be used for mathematics laboratory.

Inadequate Time for Teaching Mathematics Content Needed

The time allocated for the teaching and learning of mathematics in our schools is not adequate. Research from variety of countries has shown that the amount of time available for teaching and learning mathematics, and how well that time is used by students and teachers is consistently related to how students learn while they are in school.

Lockheed and Komenan (1989) exposed that in Nigeria, an increase in the amount of instructional time alone increased the amount of mathematics learned. Much of the school time is lost because of unscheduled closings due to industrial actions of the teachers against the government, teachers and students absences and disruptions emanating from emergency meetings in schools and even outside the schools.

Unscheduled visits of supervisors and time allocated to other school events such as sports, seminars and workshops also take mathematics teachers away from their normal school periods. These situation effects the time allocated for the coverage of the syllabus adversely especially in mathematics.

Mathematics teachers should realise the importance of mathematics to the nation as a whole and therefore should see the need for creating extra time for teaching their students outside school hours. This would help to make up for the time lost.

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