ENRICHING THE TEACHING OF MATHEMATICS TOWARDS BETTER PERFORMANCE

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Abstract
In the traditional approach to teaching of Mathematics, most class time is spent by the teacher teaching and the students watching and listening. This paper had focused on the need to shift from this traditional approach to enriching the teaching of Mathematics by considering several approaches that will make the teaching and learning of mathematics more interesting. The purpose of this paper is to enhance the understanding of mathematics concepts, so that the need for enriching the mathematics teaching techniques was discussed. Some of the techniques that will facilitate the understanding of mathematics were suggested. This paper suggested that if mathematics teaching is enriched then mathematics lessons would bring about better students performance in mathematics. Recommendations were made, which if properly applied then mathematics teaching and learning will be enjoyable.

The prosperity of any country depends on the volume and quality of mathematics offered in its school (Awodeyi, 2004). To meet the objectives for scientific and technological advancement by any nation, mathematics is very important (Federal Ministry of Education, 2004). The role of mathematics in all facets of life put Mathematics in a special place in both Primary and Secondary School levels. Despite the place of Mathematics, students still perform poorly in both internal and external examinations (WAEC, 2001). One of the reasons identified in the WAEC Chief Examiner’s Report is poor teaching methodology. Bryk and Renderbush (1992) as cited by Adaramola (2012) stressed the importance of the role played by mathematics in the field of learning and made recommendations about how to improve its quality of teaching and learning.

Many researchers such as (Ekwueme & Nenty, 2001, Simon, 2006, Ekwueme 2006) reported numerous problems that seem to beset mathematics education in Nigeria which have resulted in consistent poor performance in mathematics at primary and junior secondary school levels. Some of these problems among other problems are
adherence to odd/routine teaching method in spite of exposure to more available alternatives, undue emphasis on memorization of formulae instead of proper explanation of procedures and quest for the correct answer on the part of students irrespective of the steps involved (Ekwueme & Nenty, 2001). Both the teaching and learning of mathematics have posed a big challenge on the way forward.

Mathematics should be taught in such a way that the teacher explains the ‘why’ and ‘how’ the rules in mathematics are derived. This is important for understanding and retention. Mathematics at the junior class has been taught as a series of steps to follow in order to get the right answer (Ekwueme, 2006). Students memorize certain algorithm in order to solve problem and while they perform the operations and follow the procedure successfully, substantial evidence and classroom experience indicate that an understanding is lacking. This will be discovered because if the question is twisted, the student fumbles due to lack of conceptual understanding of the problem posed. This therefore suggests that the concept learnt cannot be related to or used to solve societal problems without proper understanding. For students to possess conceptual understanding in different ways, they should know how and when these different representations could be used for different purposes (National Research Council, 2001). Most students solve mathematics problems without knowing the reasons for such procedure.

The main trust of this paper therefore is to discuss on the practical approaches to enrich the teaching of Mathematics, especially in Primary and Secondary Schools with the aim to achieve effective mathematics learning by the students yielding a better performance.

Need For Enriching Teaching Techniques

When a learner forgets whatever he must have been taught, then proper learning has not taken place and the result is poor performance in examinations. So, to effectively address the poor performance of students in mathematics examination, there is every need to enrich the approach in which mathematical concepts are being conveyed to the students. The nature of approach the teacher uses to tech these mathematical concepts will actually contribute to the extent of retention. Retention is the persistence of learned practical over a period of time, which can only be reflected in an individual’s ability to recall or remember (Archie, 2000).

Neglect of practicalising instruction in mathematics works injury to all knowledge. Since he who is ignorant of it cannot know the other sciences on the things of this world, and what is worse, men who are ignorant and unable to perceive their own ignorance and so do not seek a remedy (Kolawole & Igini, 2009). For Mathematics topics to be clearly stated and vigorously pursued by the teachers and students,
laboratory lessons need to be re energized and this would ensure that all topics are simplified and popularized. According to Kolawole and Ogini (2009) “The researchers had worked closely with mathematics’ educators looking into ways in which poor performance of students in mathematics could be minimized, it was observed that theoretical style of imparting mathematics into learners is causing havoc thereby students are passive in learning”. Even teachers in most schools are not aware of laboratory lessons in mathematics. That it is an avenue where independent study could be achieved

The selection of mathematics topics from the syllabus by the teacher, thereby leaving those ones that are practical, has also a detrimental effect on the students, as students may not have a general knowledge of the syllabus. WAEC Chief Examiners Report (2007) gave credence to this, and advised that all mathematics teachers should endeavor to attend workshops and Seminars that would enhance their performance in the teaching of the subject.

Abstractness attached to the teaching of mathematics by some teachers had scared some students who are supposed to be the best students in mathematics. So a practical approach should be a good way out. According to Eze (2001) “Practical approach is a situation where the teacher uses materials that can be seen and touched, that is physical object to teach a concept in mathematics”. This concept can be in any branch of mathematics. According to Abimbade (1999) as cited by Eze (2001) ‘this approach could be used for introducing new skills, developing understanding and sharing/showing the appropriate ways of doing things’. It provides the most effective means by which understanding of Mathematics can develop. It enables the learners to think out mathematical ideas, which are contained within the various activities they undertake at the same time as they are carrying out these activities.

The practical activities range from observing, manipulating and thinking to total result. It takes care of the cognitive, affective and psychomotor skills thereby taking away the abstractness of mathematical concept. Musa and Agwagah (2006) in support of practical approach opined that practical activities enable learners to acquire the relative experience that links learning to environment on their own through the process of thinking, thereby causing positive change in their activities. In practical teaching class; the teacher becomes a leader of the group, providing stimulating learning situations. By so doing, the learners are guided to find out information and understand concepts through appropriate activities and demonstrate so as to encourage discovering patterns in mathematics leading to rules and formula (Koko, 2004).

If a learner is exposed early enough to mathematical activities requiring manipulative skills, then the learner could become a useful and industrious member of his community and hence create job for him and others (Eze, 2011). This implies that
Mathematical activities take cognizance of physical development, which is necessary in technology, thereby providing job to individuals. With all these and perhaps some others it is obvious there is need to enrich our mathematics teaching techniques

Techniques to Facilitate Developing Mathematics Concept

The following are some techniques to enhance the understanding of mathematics concepts in the classroom.

1. Mathematics laboratory

The laboratory approach is one of the many strategies, which can be used in the classroom in order to enhance the learning of mathematics. In the laboratory, the concrete objects, which are of course manipulative, serve as models for the thought images that are moved around in the mind. They serve both as means of recording what went on in the mind and also as sources of ideas to spark off others. (Attah, 2007). Students in the laboratory develop a method of enquiry; recording and representing data become essential skills. This method not only helps to develop imagination and creativity, it provides for discovery, motivates the students and helps them to develop interest in further enquiry but also provides for individualization, facilitating the use of language, and often provides the aesthetic appreciation.

2. Developing interest of students

The teacher should make effort to develop the interest of students in the subject mathematics. Interest in the materials enhances the understanding of the concepts and therefore helps the students to retain the concepts for a longer period. The mathematics teacher should use all known strategies to make the lesson interesting. No matter how a topic may appear dry, efforts should be made to make it interesting and captivating through demonstration, illustration or experimentation. The lesson should be practical and relevant to the needs of the students. Azuka (2012) supported this by saying that it is only when a student is interested in a lesson that he can put his heart and soul to it.

3. Use of mathematical games

A game is a competitive activity involving skills, chance and endurance on the part of two or more persons who play according to a set of rules, usually for their amusement or for their spectators (Eze, 2011). Mathematics games encourage students to learn without knowing in a play way method. Educational Games are enjoyable; it is among the social activities with goals, rules and educational objectives (Steven & Carry, 1994) as cited by Azuka (2012).

Mathematical games help to arouse and sustain the interest of learners in the study of mathematics. These games are educational games played using mathematical concepts. An important aspect of mathematical game is the enjoyment developed while playing. Teachers therefore should develop and play relevant mathematical games with
students in the classroom after teaching any topic. If mathematical games are effectively planned, they can be used to enhance creativity, encourage problem solving, introduce mathematical ideas and improve study habit.

4. **Use of computer**

   According to Malcolm (1993), “there is no single instructional aid, which can assume anything like the potential of the computer in the task of enriching the process of learning mathematics”. The potential lies in the computer’s power and versatility to enhance whatever is known to exist as content and to create new areas of interest and application. The potential also lies in the way mathematical activity can be extended in both range and depth. A useful starting point in using computers in the classroom may be to recognize and select familiar topics, which can be approached experimentally. The use of computer in the experimentation will of course depend upon the existing software and its quality or upon the user’s programming skills. The more experienced the teacher, the greater the use and more significant changes in the social behaviours of students during problem solving activity. Another factor, which appears to be enhancing, are persistence after encountering a difficulty, the ability to determine what is required through collaboration and the pleasure shown when success is achieved.

5. **Periodic revision of lessons taught in junior classes**

   A mathematics teacher should help students revise topics taught in junior classes periodically. This could be done by giving home works on past topics, setting examination questions on such topics and occasionally revising such topics in the class and during extra lesson hours. One of the reasons why many students fail mathematics is due to lack of proper revision on topics learnt in junior classes. The learning of mathematics concepts should be a cumulative affair and teachers should facilitate this in the classroom.

6. **Use of discovery approach to teaching**

   Discovery approach is a method where the learner is guided by the teacher to discover mathematical facts and formulae through observations and organized activities (Eze, 2011). This approach provides for activities, which permit self-direction, exploration, and the nurturing and satisfying curiosity on the part of the students. Since discovery activities could be done individually or in groups of few students. This approach enables students to participate in the learning process and discover things for themselves.

7. **Use of instructional materials.**

   Instructional materials are teaching aids that help the teacher to concretize mathematics concepts. It makes mathematics concept more meaningful and understandable to the learner. Instructional materials help to arouse and sustain the
interest of students in mathematics. These teaching aids when employed appropriately help to make mathematics concept real. Teachers are expected to use the instructional materials in the classroom to reduce the difficulties faced by the students. Such materials include charts, models, Television and computer to appeal to the learner’s senses. Unfortunately many teachers teach without teaching aids in the classroom.

8 Use of mnemonics for concepts.

These are devices created by students in form of summaries or abbreviations to help them during periods of recall such as examinations or interviews. The types of mnemonics vary from students to students. Some of them include BODMAS used in arithmetic operations, SOHCAHTOA and CAST used in trigonometry. Mathematics teachers should help learners to derive and use mnemonics in mathematics lessons. This actually helps and enhances recall of mathematics concepts.

9 Over-mastering of concepts

Mathematics should be taught for students to achieve over mastering in the classroom. The teacher should give students enough exercises to practice during and after each lesson. Over-mastering is achieved when the learner continues to practice with materials. This also enhances memory retention and recall of mathematics concepts.

10 Provision for individual differences in class.

Since individuals differ in their ability to retain learned materials over a period of time, the teaching methods ought to be varied to meet the needs of everybody in the class. The teacher should identify the different categories of abilities and plan lessons to suit the various ability levels. Therefore, active learning methods including discovery approach should be used in class where every child would participate in class activities and discussion.

11 Motivation of students

Motivation is central to all forms of learning. A motivated child performs better in class and would retain concepts for a longer period. The teacher can use incentives from time to time to enhance vigor in the learners. The learners should be made to realize the usefulness of the mathematics topics to real life situation.

Conclusion

Students understand mathematics concepts and perform better when they actively participate in the lesson. Teachers therefore should enrich their teaching by drawing away from conventional method and select approaches which promote active learning of mathematics in the classroom. Effective teaching strategy gives students multiple opportunities to demonstrate what they know, understand and can do in relation to the concept taught
Enriching the Teaching of Mathematics towards Better Performance – Odogo Nkechinyelu

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Recommendation

As part of measure for enriching the teaching of mathematics towards improving performance of learners in mathematics, the following recommendations are considered relevant.

1. Mathematics teachers should realize the need to depart from the traditional chalk and talk method of handling the teaching of mathematics concepts. They should therefore emphasize on the use of concrete or improvised materials to support the teaching of mathematics concepts.

2. Mathematics teachers should endeavor to choose laboratory method to support a diverse students population and their unique learning styles.

3. Government should establish at least a mathematics laboratory in each school for effective teaching and learning strategies that are students centered, collaborative engaging, and self-directed so as to develop higher order thinking skills in learners.

4. School management should consider it as an important part of schoolwork by allocating in the school timetable periods for practical teaching in mathematics.

5. Government should acquire instructional materials, textbooks to be distributed to schools both in Primary and Secondary Schools to aid in teaching and learning of mathematics.

6. There should be regular workshops and supervision for teachers to acquaint them with current trends in teaching and learning of mathematics.

7. Government should ensure that qualified mathematics teachers are allowed to teach students in order to discover the proper things to do as regarding any mathematics concept.

8. Textbook authors should place emphasis on the practical aspect of mathematics by publishing practical materials that will enable the students to constantly interact with mathematical concepts. With the presence of practical materials the mathematics teacher can easily guide the students.

9. Teachers should use different methods to secure attention of students in mathematics classes.
References


