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TEACHERS BASED STRATEGIES FOR MOTIVATING THE INTEREST OF STUDENTS IN MATHEMATICS AND ENTREPRENEURSHIP FOR NATIONAL DEVELOPMENT

By

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Abstract

Scientific and technological developments through entrepreneurship are very paramount and crucial for National Development; therefore, there is need for teachers based strategies for motivating the interest of students in Mathematics and entrepreneurship for sustainable and national development. Students who are the future leaders of tomorrow should be guided and their interest be motivated in the teaching and learning of Mathematics. This paper put into consideration ways of motivating interest of students in mathematics and entrepreneur for national development. Discussed in the paper are strategies for motivating interest in learners; these includes using instructional materials, employing a learner – centred type of teaching and motivating the students etc. The paper also x-rayed the strategies that will provide necessary competencies among teachers and knowledge needed for the teaching profession. Among others, the paper recommended that teachers should use all resources available, employ different teaching strategies in order to properly implement the curriculum and sustain the interest of the learners in Mathematics so as to meet the scientific and technological developmental needs of the nation.

Introduction

The students' performance in both the external and internal examinations over the years in Mathematics has been poor Adeyegbe (1993), Adeniyi (1998). Nwafor (2012) opined that student's performance in Mathematics in Junior Secondary School Examination in Ebonyi State Nigeria has not been encouraging. It has been observed through literature that these poor performances span from both students and teachers factors. If students' performances are the basis within which data collected could be used to ascertain their interest in Mathematics, it therefore becomes necessary that emphasis should be geared towards motivating the interest of students in Mathematics. The role of the teacher is paramount and influential in motivating students' interest in Mathematics and other science related subjects. The students should be guided by their teachers' quest for knowledge, and be actively involved in the classroom exercises. There should be a proper interaction between the teacher and the students in Mathematics so that interest can be developed and sustained. Mathematics is a tool for national development; the students themselves are the youth of the nation and as such should be involved in the development of the nation. Therefore, they need to be properly grounded in Mathematics and also maintain and sustain interest in the subject to move the nation to a greater height.

Interest

Interest can be said to be a response to liking or disliking an event, activity, person or situation. It is a state of concern or curiosity. Hornby (2008) defined interest as the feeling that one has when he/she wants to know or learn about something. To show interest in a thing is to actively be involved in that thing. It is also to show concern or be curious in that thing.

Interest in an activity cannot be absolute; it involves not only showing concern for, but being actively involved in all the activities of that thing. Hence, the more interesting the activities are, the higher such activities will score on the scale of interest (Nwafor, 2014). To

be interested in Mathematics involves showing concern for and curiosity in the subject. Student's interest in Mathematics can be shown through:-

(i) Observing/exploring the environment
(ii) Developing attitudes/attributes such as curiosity, logical thinking and evaluation.
(iii) Manipulation of devices such as tools and equipments.
(iv) Classifying, experimenting and analysing data
(v) Making inferences, constructing and hypothesizing where necessary
(vi) Application of related concepts, principles, ideas in varied situation

To generate interest in Mathematics, the students must possess potentials, and be able to constantly repeat activities in the subject without feeling bored or fatigue. It is then that the teachers' role in arousing and subsequently sustaining such interest can be achieved (Ekekwe, 2008).

Mathematics teacher must show interest in the subject and urge the students to learn Mathematics. He / She must possess the following attributes:-

(i) Be able to identify and know his students well
(ii) Be a mentor or a role model to them
(iii) Ability to identify students that are science inclined
(iv) Create conducive atmosphere for students to learn Mathematics
(v) Be able to extract information from the students tactfully and guide them accordingly (Ivowi, 1996).

The teacher should also put into consideration the following factors in order to generate and facilitate the interest of the students in the learning of Mathematics:-

(i) Good/adequate demonstration and application of Mathematical concept
(ii) Using good and relevant illustrations/examples
(iii) Simple explanations of common phenomena and events
(iv) Allowing the students to be actively involved in the teaching and learning not just giving them lecture all through the Mathematics class.
(v) Encourage creativity in the students

To achieve the above state factors and to generate and sustain interest, the need to motivate the students become necessary.

Motivation

Motivation is an important factor in classroom learning. To motivate is to instigate or incite lawfully. Hornby (2008) defined motivation as "a reason for doing something" or that which makes somebody want to do something. Motivation in this concept refers to the efforts which learners or students put into action in order to learn. Akiboye (1996) stated that a student's desire for knowledge, need for achievement, ego-involvement, interest in a particular subject matter are all explained by motivational attitudinal behaviours. The main aim of motivating student interest is to enhance learning. Motivation is of two types the intrinsic and extrinsic. Intrinsic motivation has to do with the student's personal satisfaction and self fulfilment while extrinsic is concerned with the appreciation, gesture, reward or material benefit or recognition in a class, school or society. He further enumerated three ways by which motivation can affect the students in the learning of Mathematics:

(i) It triggers off behaviour sequence in the learner when it is present; and since learning is said to be reaching, the learner so activated attains learning readiness.

(ii) It is said to lower the threshold of reinforcement, so that reinforcement can more easily be contingent on learning.

(iii) It could serve as prompts or stimulus discrimination for learning.

The teacher's role in motivation and sustaining interest in Mathematics is crucial; the teacher must device his/her own strategies to motivate the students to learn. Ivowi (1996) opined that curriculum provisions and instructional strategies are the tools capable of sustaining student's interest in Mathematics.

Mathematics and Entrepreneurship

Ngada (2014) defined entrepreneurship as the skill, ability, capability, willingness and drive to identify and harness investment opportunity. He added that it includes the drive and skill necessary to harness available resources to achieve a particular objective. According to Egai (2009), entrepreneurship is an intentionally planned process of actions aimed at transforming a nation's economy by promoting a positive enterprise culture. Udofia (2010) defined entrepreneurship as a vehicle for the training about national development in general and socio – economic development of a particular society.

Basically, entrepreneurship can be described as equipping the individual through skills acquisition in different vocational trades to make the individual financially buoyant, independent and self employed.

The role of mathematics in acquiring skills in different vocations can never be over emphasized. There is no skill that does not require knowledge of mathematics. A metal worker will need to measure the metals to be welded together for any form of construction. A wood worker will use the knowledge of mathematics in measuring the woods to be put together to have a chair, table or a bed. Generally, figures are used to keep records of the work done or undone. Shapes are used to plan the design to be worked on. Hence, mathematics play a vital role in entrepreneurship.

Teachers' Based Strategies in Motivating Interest in the Learners

The following are the tools that can be used to facilitate motivation for the students to learn and understand mathematics:

Reward: - According to Ekekwe (2008), reward is an important strategy that will help to motivate students' interest towards Mathematics education; extrinsic motivators in the form of reward can help students who do not yet have powerful intrinsic motivation to learn.

In Mathematics classroom, the teacher can give students such simple but encouraging reward e.g. if a student tries to get the answer to a question correct, the teacher calls the student by name and make this remark: Chika, beautiful! Good girl! Class clap for her! Again! Another clap! The praises together with the applause will boost Chika's moral and motivate her to learn more.

Other times, the teacher may present a material gift (e.g. exercise, book, pen or pencil) to the best students that answers his/her questions correctly during class evaluation. In this situation every member of the class tries to get the question right to get the gift and impress the teacher. By so doing, interest in the subject is sustained. The Mathematics teacher must at all times generate students' interest in concept/object of learning and use reward to sustain such interest until student's passion attained mastering of such matter.

(ii)Effective Teaching Method:- Good teaching method is one of the strategies for motivating students' interest in Mathematics. The teacher must be able to select the various

teaching methods that are suitable to teach a particular concept in Mathematics. For example, a teacher who wants to teach Construction should use demonstration method and not lecture method. He/she should bring the instruments inside the class and demonstrate it for the purpose of understanding. In this situation the students should be able to carry out the activity by themselves alongside the teacher. The feeling of participating and doing it yourself will boost the morale of the students and motivate them to study harder. The use of good teaching method removes difficulties from the learning of Mathematics by the students and it as well motivate them to develop positive interest in learning Mathematics. Other times, the teacher may combine two or three methods in the teaching of a topic to enable students learn with ease. Macmillan and Forsyth (2001) stated that variety reawakens students' motivation and involvements in the subject. He stressed that to break the routine by incorporating a variety of teaching methods and activities in the subject e.g. brainstorming, discussion, group work, field trip, will definitely motivate and sustain interest of the learner. Ekekwe (2008) noted that poor interest might arise from dislike of subject due to unsustainable method of the teaching.

Moreover, teaching inductively by presenting the work to the students and allowing them to brainstorm will allow them to make sense of the topic and also help students develop interest in Mathematics rather than lecturing and presenting conclusions which will rid students the joy of discovery and make them passive listeners at all times.

Other techniques the teacher should employ during the period of classroom interaction are as follows:

(i) Jokes, short stories and questioning such that students' attention are assured.
(ii) Classroom discussion aimed at involving the students actively in the teaching and learning science and Mathematics.
(iii) Field trips to show students things in their natural environment.
(iv) Projects to enable students do it themselves and carry out activities independently or by consulting peers, parents, persons or even literature.
(v) Practical for the purpose of giving the students opportunities to do Mathematics. To verify claims, analyse and synthesize scientific facts.
(vi) Inquiry to help students discover meaningful ideas.
(vii) Cooperative learning to enable the students co - operate with each other to perform or complete a particular task. Teacher should assign roles to students in Mathematics classroom to help them develop social skills and improve communication skills.
(viii) Games and play to give enjoyment and satisfaction to the students. It will also make learning lively and active. It creates awareness, reinforcement and knowledge; it also provides an innovative education, entertainment and participatory approach to learning (Adeyegbe, 1993).

Explanation

Students most often perform poorly in Mathematics class due to the fact that they do not understand the teaching, what to do and why they should do it. It is the duty of the teacher to thoroughly explain in details, the concept expected of the students to learn and why they must learn. The teacher must not feel fatigued or lazy in asking the students to read up on their own without thorough explanation. Akiboye (1996) opined that if a teacher becomes bored or apathetic, students will too. Apart from explanation, the teacher should also stimulate interest in the students by giving them the opportunity to make their contributions

or ideas in the class, these will enable them see limitations of their ideas as well as appreciate other teachers' knowledge and experience.

Satisfying students' Need

In Mathematics class, there are specific areas of students need. Macmillan and Forsyth (2001) argued that students learn best when incentives for learning in a classroom satisfy their own motives for engaging in the subject. They stress that such needs are the needs required by the students to acquire knowledge in order to complete a particular task. They include:-

(i) The need to seek new experience
(ii) The need to feel involved and to interest with other people
(iii) The need to succeed and do well
(iv) The need to complete the course of instruction

Towards this development, Ekekwe (2008) identified the needs as follows: survival, love, power, fun and freedom.

She stated that satisfying students' need primarily motivate and keeps them interested in Mathematics. The need of power allows the students to choose from among the alternative things to do. The need for fun allows students to interact, get excited, sometimes make noise and have fun in a friendly and active way. The teacher's role should be at all times design educational activities that will meet with these needs. He should avoid any behaviour that will suppress these needs e.g. being too strict, quarrelling and beating the students or even using abusive words on the students simply because they did not do well. Remarks like "I know it, you can never get it", "this one is not serious" and "she can never make it in school" should never be used by a teacher of mathematics. Moreover, the teachers should understand how students learn Mathematics, taking special note of students with special need and ensure equal opportunities for all students irrespective of gender differences. A mathematics teacher should identify students in class that need special attention in the following areas:

(i) Outstanding abilities/disabilities such as being very bright and below average intelligence.
(ii) Language barriers, for example students schooling in localities that use their vernacular.
(iii) Cultural differences e.g. belief of a particular community or even misconceptions.

The teacher should be able to be professional and technical in handling all these needs.

Good use of instructional Materials

A good teacher should appreciate the need of instructional materials in teaching and learning process. The concept of using instructional materials is to enhance the teaching and learning process. The National Teachers Institute Kaduna NTI (2012) defined instructional materials as all the resources a teacher uses to help him/her explain or elucidate the topic/contents/subject to the learners so that he/she is able to fully comprehend the topic. The institute listed the reasons for using instructional materials as:-

(i) Gain and hold the attention of the learner.
(ii) Provide visual aspects to a process or techniques
(iii) Focus attention on highlight of the lesson
(iv) Create impact on the part of the learner

(v) Facilitates the understanding of abstract concepts
(vi) Save time by putting a limit at the use of word explanations
(vii) Provides a common framework of experience to a large number of learners
(viii) Stimulate reality
(ix) Provide opportunity for the learner to manipulate objects in the environment.

The use of instructional materials helps to concretize the learning process. It makes the teaching – learning process easier, hence Mathematics teachers must always use teaching aid in the course of his lessons. The teacher should also improvise instructional materials where they are not available and such improvised materials should be able to convey instructional messages just as the original materials.

Professional Development of the Mathematics Teacher

A Mathematics teacher who wants to motivate interest in students must first of all take interest in his professional development. He/she should attend Mathematics conferences and workshops, read Mathematics magazines, journals and bulletins. Above all, he/she must belong to a professional association. These associations organize workshops and conferences for their members. They also have a number of publications that are loaded with up to date knowledge and information based on research which the teachers needs to constantly develop and upgrade their knowledge at all times.

Learners Centred Strategy/Group Work

The learner centred strategies are methods and techniques a teacher employs to motivate and sustain interest in the learning and consequently bring about permanent learning. It is learner-driven, learner focused and learner friendly. The teacher should make the teaching and learning interactive in nature for example, teach for 20 minutes, then divided or create small groups within the students. He/she will then ask the students to write down the important points and come up with a different opinion; this will give the students the chance to relate with one another in their classroom experience. The students can also exploits the benefits of group work where the weak students will learn from the active ones. The teacher should also do the following during an interactive class section:

(i) Ask a lot of questions at regular intervals
(ii) Encourage students to constantly ask their questions when not cleared or in doubt.
(iii) Encourage students to turn in written questions, discuss answer at intervals within the class section.
(iv) Encourage problem solving and critical thinking
(v) Use small group e.g. group of 4
(vi) Ask open ended questions
(vii) Ask students on the middle, back, and extremely 2 sides of class questions to ensure everybody is carried along and cannot hide from the teacher.
(viii) Encourage group brainstorming exercises
(ix) Encourage peer feedback by motivating students
(x) Students interaction and feedback

National Teachers Institute Kaduna (2012) outlined the conditions that must be met and are necessary to be fulfilled in order to make teaching methods to be learner-centred as:-

(i) The techniques must appeal to the needs, interest and demands of the learners, thereby making them wanting to learn continuously.

(ii) The techniques must give room for absolute participation of learners throughout the lesson period.
(iii) The techniques should have as a focal point the learners not the teacher. The learners must be active performers not the teacher.
(iv) The technique should be helping students to learn
(v) The technique must conform to the five pillars of effective learning namely active, gender sensitive, consistent, meaningful and productive.
(vi) The technique should give room for interaction between the learner and his/her fellow learners, teachers and learners, brilliant learners and weak ones, males and female etc.
(vii) The technique should give room for collaborative or cooperative learning by sharing experiences.
(viii) The techniques should give room for critical thinking on the part of the learner and the tapping resourcefulness of learner.
(ix) The techniques should give room for constant practice at the learners rate
(x) The techniques must be adopted during and at the end of teaching.

It is necessary that all the conditions listed above must prevail in a Mathematics lesson. However a significant number of these conditions must prevail in order for a technique to be learner-centred and also for interest of the learners to be sustained in Mathematics lesson.

Conclusion

In order to achieve the goals and objectives of teaching and learning of Mathematics, as stated by the National Policy on Education, for students in Secondary Schools, motivation and interest are required. Interest concerns the students' preference for particular types of activity while motivation inspires student's action towards learning. The ability of the teacher to apply these strategies in the teaching and learning of Mathematics will go a long way to enhance and achieve the educational objectives and consequently motivate and sustain interest in the subject. These strategies include but not limited to rewards, effective teaching method and satisfying student's interest among others. The authors strongly believe that if these strategies are applied in the Mathematics classroom, interest in the subject must be attained.

Recommendations

From all the foregoing, it is recommended that the teacher should use all resources available, employ different teaching strategies so as to properly implement the curriculum and sustain the interest of the learners in Mathematics so as to meet the scientific and technological development needs of the nation.

Teacher needs to boost their teaching experience by attending seminars, workshops, conferences and refer to various Mathematical bulletins, newsletters and others in other to perform as expected in creating conducive learning environment for the learners.

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