

Teachers Based Strategies for Motivating Students Interest in Basic Science and technology

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Abstract: *Basic Science and Technology is paramount and crucial for national development. The learners who are the teachers and future leaders of tomorrow must be guided and their interest in Basic Science and Technology be sustained, once it is generated. To motivate and sustain these interests in the learners, the role of the teacher becomes absolutely necessarily. The teacher has to be professionally up-to-date in devising various strategies for performing these obligations. Teachers as motivator of student's interest must produce conducive atmosphere to enable them practice and learn. One of the problems of some science teachers is how to motivate and create interest among the learners. This paper x-rayed the strategies that will provide the teachers necessary competencies and knowledge needed for their teaching profession.*

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I. Introduction

Over the years, student's performance in external and internal examinations in science and technology has been poor. Adeyebe (1993), Adeniji (1998). Nwafor (2012) opined that the student's performance in Basic Science in Junior Secondary School Examinations 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 performance are the basis within which data collected could be used to ascertain their interest in Science and Technology, it therefore becomes necessary that emphasise should be geared towards motivating students interest in Basic Science and Technology. The role of the teacher is paramount and influential, in motivating students' interest in those Science and Technology related subjects. The students should be guided by their teachers in their quest for knowledge, and be actively involved in the classroom exercises. There should be a proper interaction between the teacher and the students in Science and Technology so that interest can be developed and sustained. Science and Technology 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 Science and Technology and also maintain and sustain interest in the subject to move the nation to greater height.

Interest

Interest is a response to liking or disliking to an event, an activity, person or situation. It is a state of concern or curiosity. It is to cause or become involved in something. Hornby (2008) defined interest as the feeling that one has when he/she wants to know or learn about something "interest concerns the individual preferences for particular type of activity". To show interest in a thing is to be actively involved with 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. To be interested in Science and Technology involves showing concern for and curiosity in the subject. Student's interest in Basic Science and Technology can be shown through

1. Observing/exploring the environment
2. Developing attitudes/attributes such as curiosity, logical thinking and evaluation.
3. Manipulation of devices such as tools and equipment
4. Classifying, experimenting and analysing data
5. Making inferences constructing and hypothesizing where necessary.
6. Application of related concepts, principles, ideas in varied situation

To generate interest in Basic Science and Technology, the students must possess the potentials, and be able to constantly repeat activities in the subjects without feeling boredom, or fatigue. It is then that the teachers' role in arousing and subsequently sustaining such interest can be lost.

The Science teacher must urge the students to learn science. He/she must possess the following attribute:

1. Be able to identify and know his student's well
2. Be a mentor or a role model to them
3. Ability to identify student that must be science inclined
4. Create conducive atmosphere for student to learn science
5. Be able to extract information from the student tactfully and guide them accordingly.

The teacher should also generate interest in Science and Mathematics by other factors such as:

1. Good/adequate demonstration and application of Science concepts
2. Using good and relevant illustration/examples
3. Simple explanations of common phenomena and events
4. Allowing the student to be actively involved in the teaching and learning not just giving them lecture all through the science class
5. Encourage creativity in the students.

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

Motivation

Motivation is an important factor in classroom learning. To motivate is to instigate or or incite. Horby (2008) defined motivation as "a reason for doing something" or that which makes somebody want to do something. Motivation in these concepts refers to the efforts which learners or students put into action in order to learn. Akiboye (1996) stated that a students 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 students interest is to enhance learning. Motivation is of two types the intrinsic and extrinsic. Intrinsic motivation has to do with the students personal satisfaction and self-fulfilment while extrinsic is concerned with the appreciation, gesture, reward or material benefit or recognition in a class, school, society. Akiboye (1996) enumerated three ways by which motivation can effect the students.

1. 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.
2. It is said to lower the threshold of reinforcement, so that reinforcement can more easily be contingent on learning.
3. It could serve as prompts or stimulus discrimination for learning.

The teacher's role in motivating and sustaining interest in Basic Science and Technology is crucial, the teacher must devise 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 Basic Science and Teachers' Based Strategies in Motivating Interest in the Learner

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

In a Basic Science and Technology 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 her name and make this remark: Chika, beautiful!, good girl!, class clap for her, clap again and 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 question correctly during class evaluation. In this situation every member of the class try to get the question right to get the gift and impress the teacher, by so doing interest in the subject is sustained. The science teacher must 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.

2. Effective Teaching Method: Good teaching method is one of the strategies for motivating students' interest in Basic Science and Technology. The teacher must be able to select from the various teaching methods the one suitable to teach a particular concept in Basic Science and Technology classroom. For example, a teacher who want to teach the internal organs of a rat, should use demonstration method and not lecture, he/she should bring the rat inside the laboratory prepare it for dissection and demonstrate it on the practical table for the students to see and do the same. In this situation the student should be able to carry out the activity by themselves alongside the teacher. The feeling of participating and doing it yourself will boost the moral of the student and motivate them to study harder. The use of good teaching method removes difficulties from the learning of Basic Science and Technology by the students and it as well motivate them to develop positive interest in learning science. Other times the teacher may combine two or three method in the teaching of a topic to enable students learn. Macmillan (2001) stated that variety reawakens students' involvements in the subject and their motivation. He stressed that to break the routine by incorporating a variety of

teaching method and activities in the subject e.g. brainstorming, discussion, group work, field trip, will definitely motivate and sustain interest in the learner. Ekekwe (2008) noted that poor interest might arise from dislike of subject due to unsuitable method of the teaching.

Moreover, teaching inductively by presenting the work to the students and allowing them to brain storm will allow them to make sense of the topic and also help students develop interest in Basic Science and Technology rather than lecturing and presenting conclusions which will rob 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:

1. Jokes, short stories and questioning such that student's attention is assured.
2. Classroom discussion aimed at involving the student actively in the teaching and learning science and mathematics
3. Field trips to show students things in their natural environment
4. Projects to enable student do it themselves and carryout activities independently or by consulting peers, parents, persons or even literature.
5. Practical for the purpose of giving the students an opportunity to do science. To verify claims, analyse and synthesize scientific facts.
6. Inquiry to help student discover and see relationship in what they discover and organize their new discoveries into meaningful ideas.
7. Cooperative learning to enable the students cooperate with each other to perform or complete a particular task. Teacher should assign roles to students in Basic Science and Technology classroom to help the mdevelop social skills and improve communication skills.
8. Games and play to give enjoyment and satisfaction to the students. It will also make learners lively and actively involved in learning. It creates awareness, reinforcement and knowledge, it also provides an innovative educative entertainment and participatory approach to learning.
9. Summary to present in a form which coincides with what has been taught for ease of reference and understanding.

Explaining

Students most often perform poorly in science 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 detail the concept expected of the students to learn and why they must learn. The teacher must not feel fatigue or lazy in asking the student to read up on their own without thorough explanation. Ebele (2008) 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 a science class there are specific areas of the students' need. Macmillan and Forsyth (2001) argued that student 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:

1. The need to seek new experiences
2. The need to feel involved and to interact with other people
3. The need to succeed and do well
4. The need to complete the course of instruction

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

She stated that satisfying students' need primarily motivate and keeps them interested in Science. The need for power allows the student to choose from among the alternatives things to do, the need for fun allows student 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 student simply because they do not do well. Remarks like "I know it, you can never get", "this one is not serious", "she can never make it in school". Moreover, the teachers should understand how students learn sciences, taking special note of students with special need and ensure equal opportunities for all students irrespective of gender differences. She should identify student in class that need special attention in the following areas:

1. Outstanding abilities/disabilities such as being very bright and below average intelligence
2. Language barriers, for example students schooling in localities that use their vernacular
3. 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 Material

A good teacher should appreciate the need for instructional material in teaching and learning process. The concept of using instructional materials is to enhance the 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/content/subject to the learner so that he/she is able to fully comprehend the topic. They listed the reasons for using instructional material as:

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1. Gain and hold the attention of the learner
2. Provide visual aspects to a process or technique
3. Focus attention on highlight of the lesson
4. Create impact
5. Facilitates the understanding of abstract concepts
6. Save time by limiting the use of word explanations
7. Provides a common framework of experience to a large number of learners
8. Stimulate reality
9. Provide opportunity for the learner to manipulate objects in the environment. (NTI, 2012:32)

The use of instructional materials helps to concretize the learning process. It makes the teaching - learning process easier hence a science teacher must always use them in delivery of his lessons to enable the students achieve the objectives of his lessons. The teacher should also improvise instructional material where they are not available and such improvised materials should be able to convey instructional messages just as the original material.

Professional Development of the Science Teacher

A science teacher who must motivate interest in student must first of all take interest in his professional development. He/she should attend science and mathematics conferences and workshops, read science and technology magazines, journal and bulletins. Above all he must belong to professional associations and also register with the Teachers Registration Council of Nigeria. Professional organizations like Science Teachers Association of Nigeria (STAN), National Association for Technology Teacher (NATT) and Mathematics Association of Nigeria (MAN). These associations organize national workshops and conferences for their members and have a number of publications that are loaded with up to date knowledge and information based on research which the teachers needed to constantly develop and upgrade their knowledge at all times.

Learner 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 student. 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 exploit 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:

1. Ask lot of questions at regular interval
2. Encourage students to constantly ask their questions when not cleared or in doubt.
3. Encourage students to turn in written questions, discuss answers at interval within the class section
4. Encourage problem solving and critical thinking
5. Using small group e.g. group of 4
6. Ask open ended questions
7. Ask students on the middle, back, and extremely 2 sides of class question to ensure everybody is carried along and cannot hide from the teacher.
8. Encourage group brainstorming exercises
9. Encourage peer feedback by motivating students
10. Students' interaction and feedback.

There are conditions that must be met and are necessary to be fulfilled in order to make methods (Techniques to be learner-cantered) the National Teachers Institute Kaduna (2011:32) outlined these conditions as:

1. The techniques must appeal to the needs, interest and demands of the learner there by making the learner wanting to learn continuously.
2. The techniques must give room for absolute participation of learner throughout the lesson period.
3. The techniques should have as a focal point the learner not the teacher. The learner must be active performer not the teacher.
4. The technique should be helping students to learn
5. The technique must conform with five pillars of effective learning namely active, gender sensitive, consistent, meaningful and productive.
6. 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 females etc.
7. The technique should give room for collaborative or cooperative learning by sharing experiences.
8. The technique should give room for critical thinking on the part of the learner and the tapping of resourcefulness of learner.
9. The technique should give room for constant practice at the learner's rate.
10. The technique must be adopted, during and at the end of teaching.

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

II. Conclusion

In order to achieve the goals and objective of Basic Science and Technology, by student in Junior Secondary Schools, motivation and interest are required. Interest concerns the students' preference for a particular type of activity which motivation inspires students' action towards learning. The ability of the teacher to apply these strategies in the teaching and learning of Basic Science and Technology 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 methods, and satisfying students' interest among others. The author strongly believes that if these strategies are applied in the Basic Science and Technology classroom, interest in the subject must be attained. Recommendation The curriculum for Basic Science and Technology reflects depth, appropriateness and inter-relatedness of the curricula contents. Other issues which covered value orientation, family life HIV and AIDS education, entrepreneurial skills were all incorporate into the content of the curriculum, which represents the total experiences to which all learners must be exposed, it is therefore recommended that the teacher must use all resources available, employ various teaching strategies to properly implement the curriculum and sustain students interest in Basic Science and Technology. It is also recommended that the teacher should refer to Journal of Science Teachers Association (JSTAN) proceedings of STAN, STAN bulletins, STAN newsletters and also attended workshop and conferences.

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