APPROACHES FOR EFFECTIVE TEACHING OF CHEMISTRY IN NIGERIAN SECONDARY SCHOOLS

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ABSTRACT

This study reviewed the current approach to chemistry teaching in Nigerian secondary schools. The method by which the teacher presents his materials to students and the work ahead of them affect their interest and attitude towards the subject. Chemistry is a subject that is needed by all areas of medicine, engineering and other science subjects. For it successful study, the approaches to it teaching become crucial, faulty teaching can hinder or create a dislike for chemistry by the students. The study highlighted some of the ways the teaching of chemistry can be effective in Nigerian secondary schools. The adjustment of students, matching curricular offering with levels of mental development, motivations and some appropriate methods of teaching chemistry was looked into in the study. The researcher concluded that when the students are put into consideration and appropriate methods are used then the teaching of chemistry can be effective in our Nigeria schools.

Keywords: *Effective teaching, Schools, Chemistry, Students*

INTRODUCTION

In the teaching of chemistry, teachers are expected to have a good level of competence and mastry of the subject before intrducing it in the classroom. This will enhance effective teaching of the subject in the secondary schools. Teachers need to develop the interest and attitude of the students with regard to the subject through his/her method of teaching. The teachers as experts who have good exposure and experience in chemistry are expected to foster the adjustment of students, matching curricular offerings to levels of mental development, understand students' basic cognitive and social problems, making curricular specifications relevant, and motivate the students to learn the subject.

The main objectives of teaching chemistry in secondary schools are to enable the students to develop their knowledge and skills in chemical science and project their efforts in education so as to be useful to themselves and the society in general. For this reason, students have to appreciate the subject and pay special attention to its teaching. Giving the student opportunities for developing manipulative skill that will enable them to function effectively in the society within the limits of their capacity through the different methods of teaching based on the teacher’s competence, will encourage them make the learning process effective and rewarding.

According to Reginald (1980), methodology is defined as the method

by which the teacher presents his materials to the students and engage them in task at hand. Awoniyi in Okpala (2006), also observes that to be effective, the teacher has to be many things: a source of information and a guide, an organizer of opportunities for learning, someone who can structure a suitable environment for learning, a superior and a consultant. The teacher has to be aware of the current innovations in teaching so as to determine the most suitable method for a particular situation. The method used in teaching either promotes or inhibit learning. As a subject most students are afraid of teachers of chemistry must use appropriate method so as to arouse the students' interest and encourage them to develop positive attitude for effective learning outcome.

Hence, the need to use the appropriate methods that can stimulate the interest of students towards learning of chemistry at all levels of our educational system to make chemistry realize its ultimate goals in the curriculum and in the national policy on education. Apart from using the appropriate methods, teachers' classroom and professional competencies is of great importance to effective teaching of chemistry in schools. According to Nwachukwu (2009), "it is well known that a teacher's way of thinking and beliefs guide his or her behaviour and decisions inside and outside the classroom". He also said that, the teacher must have command over a wide repertoire of different teaching methods and strategies and understanding of the learning processes of student. Teacher's ideas of conception of knowledge and learning are the foundations of which successful teaching is built.

The teacher's knowledge about students helps in understanding different kinds of learners. Nwachukwu (2009) states that "the teacher's conception of knowledge, in turn, underpins his/her conception for learning. It is on this foundation that teachers base all problems solving in the line of work". Effective teaching connotes the ability of the teachers to communicate effectively and this cannot be done without knowing the characteristics of a learner and his problem and also by using the appropriate methods. Therefore, an appraisal of the approaches for teaching chemistry in Nigerian secondary schools is a right step taken in the right dircetion.

ADJUSTMENT OF STUDENTS

The teacher has numerous works to carry out in the classroom; he is not only to give information to students. According to Stone (1966), the traditional stereotype of the teacher as one who stands in front of the classroom and tells the children has been at odds with views of educationists for many years now. For the teaching of chemistry to be effective in the secondary schools, the teaching should involve the task of assisting the students in making worthwhile and satisfying adjustment to learning. In his view, Nwachukwu (2009) states that if the students are not assisted they may not appreciate learning since the main duty of the teacher is to remove obstacles from the learning

process and encourage them to learn. He also stated that if proper adjustment are not made frustrates will set in and learning will not be effective. Therefore, reduction of frustration is very important for effective teaching/learning to take place. The reduction of frustration enables the students to be more interested in studying chemistry.

MATCHING CURRICULAR OFFERINGS WITH LEVELS OF MENTAL DEVELOPMENT

The curricular and the level of mental development of the students must be considered for teaching of chemistry to be very effective in our schools. Who to teach and what to teach is very important for teaching in schools, if the teacher is to impact knowledge. Nwachukwu (2009), states that knowledge has various levels of obstruction which can be grasped by the child whose mental development is in keeping with the levels of knowledge given them also, the teachers should be concerned about the entering behaviour of the student which is the foundation new knowledge can be built upon.

The curriculum should be prepared in such a way that the students could hope to cover it with real understanding. The background and environment of the students should reflect their knowledge development which is very vital for an effective teaching of chemistry. Since any knowledge acquired has levels of obstruction, teachers should know the level of mental development of the students and make sure that his/her teaching technique suits such students level so that they can give feedback. When there is no feedback it means the teaching is not effective. For instance, the teacher cannot teach Gas Law and Gas Equation the combination of Boyle's and Charles's Law to junior secondary school students such topic will be difficult for the student to understand because it is above the level of their mental development.

For an effective teaching of chemistry the mental development of the students must suit the activities to be carried out otherwise teaching will be ineffective. The student strength and interest of learning will die off, if the mental development did not suit the level of student.

APPROACHES FOR EFFECTIVE TEACHING OF CHEMISTRY

Student Centered Approach: As the centre of all learning and teaching revolve around the student, it would be unwise if the teaching method fails to recognize the central position of the student and hence due attention paid to the student. In this method the student is considered to be foremost and all his interests are therefore served. The teacher then direct the teaching to serving the student best so that he comes out to be a good and useful citizen with all round education. This type of teaching recognizes the needs values and importance of the student as the centre post of all teaching. The teaching method based on the students centred approach allows the involvement of the student in an

open ended laboratory exercise.

According to Ehiametalor (1982), the informal method consists of spontaneous discussion, planed discussion, advisory approach, panel discussion, small group discussion, seminar, debate, committee and group work, problem solving research, case study and so forth.

Inductive Approach: The knowledge of the past can best be used to develop the knowledge of the future. According to Okpala (2006), the inductive method begins from specific to general, known to unknown, and concrete to abstract. To study any basic concept it is wise to first study the definition and all those issues leading to it. Okpala (2006) observes that inductive method is a method of discovering. The inductive method provides an opportunity for students to discover new concepts, laws, truths and new methods of solving a particular problem or finding solutions to problems in chemistry.

Process Approach: According to Ikeobi (1990) process approach is one of the best ways to teach chemistry. The students are taken out to observe natural things relating to chemistry. Thus process approach involves active participation by all students. This makes the students feel at their best instead of finding the lesson boring or dozing in the normal class-room situation. This method allows the students to feel, touch, see, smell and enquire into things they see.

Student Motivation Approach: Researchers are of the opinion that quality teaching is found in the school and it is being carried out by qualified teachers who can motivate students to learn under diverse conditions. Motivation is regarded as one of the qualities of achieving good teaching and learning in schools. According to Marshall (1987), student's motivation to learn can be defined as meaningfulness value, and benefits of academic tasks to the learner regardless of whether or not they are intrinsically interesting. Nwachukwu (2009) states that students are more effective learners if they are intrinsically motivated towards learning than if they are extrinsically motivated. When students are well motivated it makes teaching/learning to be effective. The appropriate motivational techniques should be used to arouse the interest of students towards chemistry learning. Also, the use of appropriate disciplinary measures by teachers can motivate the students to learn. A teacher should be a good role model for the students to emulate. A keen and competent teacher is always certain of good response. He should be punctual and regular to class so as to encourage the students to learn. A teacher who is always punctual in clas will through this action encourage even the most pertptual let comer to keep to time for classes. The teacher should make sure the class is well controlled otherwise teaching will be ineffective.

Socratic Approach: This approach involves the use of questions to elicit the hidden idea of the students. The students are asked questions to know how far they have acquired the necessary knowledge and skills imparted to them. This questioning method or Socratic Method is a good method of testing the

knowledge of the students. It also gives the student the opportunity to demonstrate what they have acquired before or how far they have mastered the imparted new knowledge. According to Okpala (2006), this method help in building sense of self expression in the students and also serves as means of giving practical experience and awareness. This method, if properly applied, has proved to have immense advantages over the lecture method of teaching chemistry.

CONCLUSION

There are several approaches/methods of teaching to inculcate and give students insight during instructional processes. So far, many researches have been carried out in education pertaining to the approachest/methods of teaching chemistry. However, it is not generally acceptable that all the methods are suitable for the teaching of the subject. It has been observed that the poor enrolment of students in chemistry in our secondary schools and tertiary institutions was as a result of the way student's background was laid. The manner chemistry teachers present chemistry concepts is one of the serious problems for the effective teaching of the subject. They present the concepts in unsystematic ways/manners. This may be attributed to the background of such teachers. A half baked teachers is bound to produce a half baked graduate. No one gives to another what he/she does possess. They select few aspects of the facts surrounding the learning of the concepts. Teachers must keep abreast the problem of students and various approaches that can be used to solve them.

Considering their adjustment, curricular offerings, age, performance ability and mental development, it is when an appropriate teaching method is used that teaching can be effective. Chemistry teachers should endeavour to focus their experiments on the true basis of students and their performance ability in order to develop the interest of the students. They should use the teaching approach/method that arouses the students interest intellectually and emotionally.

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