

CHAPTER FOUR

TEACHING PRIMARY SCIENCE IN SENIOR PRIMARY SCHOOL: THE DISCOVERY METHOD APPROACH

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ABSTRACT

The national policy on Education, de-emphasizes memorization and regurgitation of facts and encourages practical exploration and experimental methods. Against this background, this paper takes a look at the discovery method of science teaching in the primary school, which leads to gaining knowledge by self-effort as against rote learning which involves memorization of scientific facts. The paper also identifies some constraints preventing effective science teaching activities in the primary school, and recommends among other things, the recruitment of only trained science teachers as well as constant retraining of these teachers through seminars and workshops.

INTRODUCTION

Primary education is the foundation for all formal education. Hence, it is the key to the success or failure of the education system. According to the National Policy on Education (Federal Republic of Nigeria, - 1985: 12), primary education is referred to as; education given in an institution for children of ages 6 to 11.

Since the laying of a sound basis for scientific and reflective thinking is one of the general objectives of primary education, the method

of teaching primary science should be given a serious thought. Regrettably, the common method used in science teaching in primary schools is the expository or lecture method. Eighty percent of the scientific information the pupils receive from their teachers comes through the lecture method (Abdullahi, 1982:70). This involves verbal explanation of the subject matter by the teacher. The pupils might ask questions about given information, but seldom have the opportunity to express their own opinions. The method relies mostly on learning of facts and the acceptance of these as proven beyond all doubt.

Science teaching is obviously not an easy thing. Due to problems that accompany science teaching, concepts to be taught to pupils are usually presented repeatedly without the pupils grasping them. Edwards and Knight (1994:28) agree that educating others is certainly not simple and, according to Abdullahi (1982:33), most of the problems of science teaching in Nigerian Schools today are attributed to the teachers' inability to help students learn science in a meaningful way.

In view of the above and as a remedy, resource based learning is advocated for use by primary school teachers towards the effective teaching of primary science.

This method consorts with the aim of the Nigerian government to ensure that the teaching methods employed in the primary school de-emphasize the memorization and regurgitation of facts, encourage practical exploration and experimental methods, and in particular that the development of manual skill is stressed and encouraged, by re-orientating the present system of teacher education towards this objective (FRN,1985:14).

Recent studies have shown that if the walls of scientific knowledge are to be extended, students of science at all levels have to be allowed to ask questions like "How is this happening?", "Why is it happening?", "What caused it?", " Will it occur again ?". These are some of the questions pupils are bound to ask their science teacher. The pupils are not challenging the teacher's authority by asking these questions, they are just curious to know and learn (Jegede and Brown, 1980:28).

Rationale for the Discovery method

Many theories concerning the world are still mysterious to the human race. Even the authenticities of some facts in science are later disputed through the scientific process.

Discovery method, which is also referred to as a heuristic method or resource based on learning, is a strategy for teaching, that seeks to avoid the lecture method and encourages pupils to ascertain things for themselves. It is distinct from the lecture method where the concept of teaching is a process by which a body of knowledge is transferred from the teacher to the pupils.

According to Farrant, (1980:46), the discovery method has a claim on knowledge gained by self-effort. When knowledge is gained by discovery, it is better assimilated and recalled, than when it is memorized. Ango (1990:18) noted that as the child is allowed to question things, carry out discovery activities and get fully involved in the learning process, he is curtailed from rote learning to thinking and evaluative learning.

In Abdullahi (1982:35), Brunner's model of learning by discovery process also promotes the acquisition of knowledge through the discovery method. Brunner's theory diagnoses the discovery method as a form of obtaining knowledge for oneself by the use of one's mental process. The theory emphasizes cognitive effectiveness or learning by discovery, and the effective simulation of what scientists do through problem solving. The implication of Brunner's theory for teaching primary science, is that science teachers should purposefully create problems for pupils by the introduction of some potential contradictions among sources of information which are given in the process of instruction. Such inconsistencies lead to 'intellectual discomfort' (according to Brunner) that will stimulate individual discoveries, through cognitive restructuring by the pupils.

Uyoata (1997: 28) noted that science itself is an inquiry in the sense that it is concerned about finding out what events occur, how they happen and systematically arranging explanations of why the event

occurred. There are two approaches to the discovery method: the guided discovery method and the unguided discovery method. In the guided discovery approach to teaching primary science, the teacher poses a problem and may break it down into simple or sub-problems, he gives advice on how the pupils would get about solving the problem. In the case of the unguided discovery method, pupils are required to formulate problems themselves and devise strategies to solve them. This has been found to be useful to the gifted pupils and children in the senior classes of the primary school.

Children acquire basic scientific knowledge, skills and attitudes through the discovery approach. This they do through experimental procedures such as observation, measurement and classification.

A child subjected to the discovery method, develops useful attitudes important in further science learning and problem solving.

The discovery method of science teaching would lead to achieving the objectives of primary science education as spelt out by the National Policy on Education (1980) thus:

- a) observe and explore the environment,
- b) develop basic science process skills; including observing, manipulating, classifying, communicating, inferring, hypothesizing, interpreting data and formulating models.
 - c) explain simple natural phenomena,
- e) develop a scientific attitude; including curiosity, critical reflection and objectivity,
- f) apply the skills and knowledge gained through science, solving everyday problems in his environment,
- g) develop self-confidence and self-reliance through problem solving activities in science,
- h) develop a functional awareness of and a sensitivity to the orderliness and beauty in nature.

Constraints:

A lot of constraints have continued to prevent effective science teaching activities in the primary school level. Some of these constraints include:

1. Inadequate science equipment and materials: There is shortage of science equipment and materials in the primary schools. This makes the science teachers find it difficult to employ other methods of teaching apart from the "chalk-talk" method.
2. Lack of funds: Funds are not readily released to schools to purchase basic materials needed for improvising apparatus. Imported materials, which are too expensive, are not the last resort. If funds are made available, teachers can source for local materials, which are usually affordable. These improvised apparatus can go a long way into making the science curriculum more relevant, meaningful and beneficial to the pupil.
3. Over population: Because of inadequate teaching and learning facilities, the classes in the primary schools are always over-crowded. As a result effective teacher supervision of primary science learning is impeded by the large number of pupils he has to handle.
4. Lack of adequate trained science teachers: Many primary science teachers are not professionals. The few trained and qualified ones prefer to work elsewhere or in higher institutions.

RECOMMENDATIONS

To solve the problems, above the following recommendations are suggested:

1. Adequate and good resource materials should be provided to primary schools. This is because, according to Farrant (1980:40), discovery method can only work where there are good supplies of well-indexed resource materials.
2. For effective teacher supervision, the teacher-ratio of 1:30 as recommended in the National Policy on Education (1985:14)

should be implemented in the primary schools. Maintaining this ratio or a ratio of one teacher to even less number of pupils as proposed would also facilitate science learning, especially resource based learning.

3. Only trained and qualified science teachers should be employed to teach primary science. The teachers should be made to work under good conditions of service, so as to motivate them as well as make them stay on the job. They should be constantly retrained through seminars and workshops.
4. The financing of primary science education should not be done by government alone, parents, charitable organizations and philanthropist should also be involved.
5. In view of the time-consuming nature of the discovery method, more time should be created for teaching primary science in the primary schools.

CONCLUSION

For a meaningful breakthrough in science education in the primary school, any method, which encourages rote learning, should be de-emphasized. Children are very curious about the natural happenings in their environment, and could be highly motivated to learn science, if the discovery method is often used.

REFERENCES

- Abdullahi, A (1982). *Science Teaching in Nigeria*, Ilorin : Toto Press Limited.
- Ango, M.I (1990). *Basic science laboratory*, Jos : Ehindaro (Nigeria) Limited
- Edwards, A and Knight, P(1994). *Effective Early Years Education, Teaching Young Children*. Buckingham: Open University Press.

- Farrant, J.S. (1980). *Principles and Practice of Education*, Essex: Longman.
- Federal Republic of Nigeria (1980). National Policy on Education (revised). Lagos: Federal Government Press.
- Federal Republic of Nigeria (1985). National Policy on Education (revised). Lagos: Federal Ministry of Information, Printing Division.
- Jegede, O.J. and Brown, D.P. (1980). *Primary Science Teaching*, Lagos: Macmillan Nigeria Publishers limited.
- Uyoata, U.E(1997). "*Innovations in Primary Science*", 40th Annual Conference Proceedings of Science Teachers Association of Nigeria (STAN). 291-282.