

PERCEPTIONS OF TEACHERS FOR THE APPLICATIONS OF SCIENCE PROCESS SKILLS IN THE TEACHING OF BASIC SCIENCE IN JUNIOR SECONDARY SCHOOLS IN EBONYI STATE NIGERIA

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Abstract

The study investigated the perception of teachers for the application of science process skill in the teaching of Basic Science in Junior Secondary schools in Abakaliki Education Zone of Ebonyi State. The instrument for data collection is researcher structured questionnaire. The instrument was validated. The instruments were distributed to 120 respondents. The population of the study comprised 600 teachers of Basic science in junior secondary schools in Ebonyi State. Simple random sampling was used to select 120 Basic science teachers. They rated their perception on the application of science process skills. Percentage was use in analysis to determine the degree of agreement or disagreement by the respondents. Finding indicated that science process skills remains an important facet in the teaching of Basic Science but teachers do not always apply them in the teaching of the subject in junior secondary schools.

There has been a growing worldwide movement towards Integrated Science Education in the last two decades. Bajah (1983) stated that the concept of "Integrated" in science has received wide spread attention of both scholars in academic world and the generality of the society. Howell (1999) alluded to integration in science when he stated that the essence of a beginning course in science is the teaching of science as a unified subject. The main reason of integration is that it widens the knowledge of the students, thus enabling them to appreciate the unity among science subjects. Furthermore, the recipients may gain the concept of the

fundamental unity of science, and the commonality of approach to solve problems of scientific nature. It is on this premise that science is presented as an integrated whole in junior secondary schools such that students can obtain a broad view of science as shown in its varied aspects in the world around them. This Integrated Science has been changed to Basic Science in Nigerian schools. According to science Teachers Association of Nigeria (1970), the approaches used in teaching basic science are as follows:

- i. Observing carefully and thoroughly
- ii. Reporting completely and accurately what is observed.
- iii. Organizing information acquired
- iv. Generalizing on the basis of acquired information's.
- v. Predicting as a result of generalization
- vi. Designing experiments (Including controls where necessary) to check predictions.
- vii. Using models to explain phenomena where appropriate.
- viii. Continuing the process of inquiring when new data do not conform to prediction.

Various studies indicated that science teachers do not apply these approaches to the teaching of Basic Science. (Nwafor, 2008). Moreover the inadequate supply of resource materials in many schools have led teachers to resort to the use of conventional method of teaching e.g. lecture method. The teachers more often, do not allow the active participation of learners in the teaching and learning process. Teaching is more of teacher-centered and

students, study for examination purposes only and not to demonstrate, practice, manipulate and retain experimental facts for understanding. The results being that the quality of teaching is unlikely to foster the development of independent, critical and creative thinking in learners.

Nigeria as a country has risen to the challenges of development through the science education on the bases of policies, curricula content and setting of educational objectives. The National Policy on Education (2004) set goals for science education in Nigeria that “government shall popularize the study of the science to inspire and support national development” (Federal Republic of Nigeria, FRN, 2004). To this end the Department of Science Education, Ebonyi State University, (EBSU 2005). Stated the objectives of science education programmes as follows:

- 1 To produce well qualified graduate teachers who would be competent in teaching all the science subjects.
- 2 To produce graduate science teachers who will be able to teach with the laboratory (experimental) and discovery methods
- 3 To produce teachers and graduates who can work in science related industries.
- 4 To produce teachers who can teach their students how to discover new things, especially as it concerns the production of drugs, plastics, etc. and those things that make life better, bearing in mind the ethical responsibility.
- 5 To provide science teachers the ability or skills to understand and use scientific products
- 6 To provide teachers and graduates with general education that would help them understand and face the challenging world of science information technology.
- 7 To produce highly motivated and competent science teachers for all the levels of our educational system.

The stated objectives of science cannot be achieved when science is taught using the traditional approaches of teaching represented by the lecture/talk and chalk method.

Presently, there has been a poor performance of students in Basic Science. The examination development center, Abakaliki. Ebonyi state indicate that in the years 2002, 2005, 2006 and 2007 the student failure in Basic Science ranges from 15%, 12% 18% and 9% while ordinary pass ranges from 50%, 80%, 60% and 70% respectively (ordinary pass is within the bracket scores of 40%-49%). This poor performance calls for a shift away from the traditional product driven approach to a process approach in the teaching of Basic Science, hence it is envisaged that the introduction of science process skills to the teaching of basic science is likely to enable learners to learn basic science with insight and understanding.

Science process skills is likely to enable students to learn by being actively involved, doing things by themselves, thinking critically and applying creativity in their studies. (Martin, sexton, Wagnr and Gerlovich1994). The big question is: how do teachers of Basic Science perceive the application of this science process skill in the teaching of the subjects.

The Science Processes: Overview

There are three dimensions of science that are all important. These are the content of science, the basic concepts and the scientific knowledge. The second dimension is the processes of doing science and the third is the scientific attitudes. The processes of doing science are the process skills that scientists use.

Matin, Wagner and Gerlvich (1994) difined science process skills as the way of thinking, measuring, solving problems and using thoughts. They are activities that scientists execute when they study or investigate a problem, an issue or question. There are about

fourteen science process skills but the six basic ones are as follows:

- i. Observing: Awareness of an object using senses to identify properties.
- ii. Communicating: To give explanations either oral or written representations of observation.
- iii. Classifying: Distributing of objects, or events representing or events in classes according to some method or system.
- iv. Measuring: Making quantitative observation by comparing to a conventional or non conventional standard.
- v. Inferring: To draw conclusion based on prior conditions expected to exist.
- vi. Predicting: To make a forecast of future events or conditions expected to exist.

These basic skills are usually integrated together when scientists design and carryout experiments. It is the duty of the teacher to ensure that the application of the process skills in the teaching of basic science in junior secondary school in Ebonyi state is effectively carried out. How do these teachers perceive these applications?

Design of the Study

The design of the study is the descriptive survey. A descriptive research seeks to describe the what, how or why something is happening. The study is in line with this research as it seeks to find the teachers perception on the application of science process skills. The study also employs quantitative approach as it provided junior secondary school Basic Science teachers with an opportunity to rate the frequency of use of different science process skills to the teaching of basic science in junior secondary schools in Ebonyi State.

Population of the Study

The population of the study consisted of one hundred and twenty Basic Science teachers, teaching Basic Science in junior Secondary schools in Ebonyi State. The Basic Science

teachers were chosen because they are the subject specialist

Sample and Sampling Technique

Simple random sampling technique were used to select one hundred and twenty (120) teachers of Basic Science in junior secondary schools in Ebonyi state. In a random sample the characteristics of each individual in the sample reflect the characteristics of the total population (Leedy 1993).

Instrument for Data Collection

The instrument for data collection is the questionnaire item on Basic Science process skills. The teachers rated their perception of the application of Basic Science process skills.

Validation of the Instruction

The instrument was validated using experts. Experts in Basic Science and experts in measurement and evaluation. They subjected the instrument to both face and content validation. The instrument was validated in terms of clarity of instruction, proper wording of the items, appropriateness and adequacy of the items in addressing the purpose of the study.

Reliability of the Instrument: The reliability of an instrument is the consistency of the instrument in measuring whatever it is designed to measure. The reliability of this study was determined using Cronbach Alpha. A reliability co-efficient of 0.78 was obtained.

Method of Data Collection

The instrument which contains item on the science process skills was distributed to basic science teachers in the various schools; filled questionnaire was collected and use for the analysis.

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	Questionnaire item on basic science process skills	Never	Sometimes	Often	Always	Total
1	I gave my students opportunities to observe basic science problems.	15 12.5%	30 25%	25 20.8%	50 41%	120
2	I gave my students opportunities to communicate by drawing maps, symbols, diagrams and learned information.	10 8.3%	35 29.2%	50 41.7%	25 20.8%	120
3	I organize classroom activities which allow the students to classify the observed science concepts.	10 8.3%	35 29.2%	50 41.7%	25 20.8%	120
4	I organize classroom activities in which my students measure objects using standard units of measurement and suitable measuring instruments.	15 12.5%	30 25%	60 50%	20 16.7%	120
5	I do exercises in which my students describe scientific phenomenon.	15 12.5%	30 25%	55 45.8%	20 16.7%	120
6	I do exercises in which my students conduct investigation.	10 8.3%	35 29.2%	50 41.7%	25 20.8%	120
7	I do exercises in which my students identify the variable under investigation.	10 8.3%	30 25%	60 50%	20 16.7%	120
8	I organize classroom activities in which my students organize science features in logical order.	10 8.3%	25 20.8%	50 41.7%	35 29.2%	120
9	I give my students hypothesis and request them to design investigation to test the given hypothesis.	10 8.3%	35 29.2%	50 41.7%	25 20.8%	120

Discussion of Findings

Table 1 show the percentage rating scores to the application of Basic Science process skills according to teacher's perception.

The teacher's responses to items 1-12 of the questionnaire enabled the researchers to apply the percentage scores of teachers rating to establish the extent to which teachers think they apply Basic Science process skills to the teaching of Basic science. The table 1 illustrates the percentage scores of the application of basic science process skills according to teachers' responses.

Table 1 indicates that the respondents recorded 41% in questionnaire item 1 exposing the students to opportunities to observe Basic Science problems. As such, teachers responses to the Basic Science process skills questionnaire items revealed that they think they always apply observation process skill to the teaching of Basic Science.

Observation: it is the way by which people obtain information about their environment through the five senses, namely, touch, smell, sight, taste and hearing. (Rerba 1995) learners can sometimes use a standard unit of measurement for more please information than the senses alone can provide.

Table 1 also indicates that the respondents recorded highest percentage scores across the different options in the other questionnaires items. As such teachers responses to the Basic Science process skills questionnaire items 2-12 revealed that they think they apply science process skill to the teaching of Basic science at intervals. This implies that the following Basic Science process skills are likely to be applied in basic. Science classrooms: classification, communication, inferring measuring, prediction, etc.

Classification: This takes place through observing similarities, differences and interrelationships; it requires people to organize their observations in ways that carry special meaning (Martin etal 1994).

Communication: Teachers communicate ideas instruction and knowledge to learners, learners also communicate knowledge and ideas to both the teachers and to one another. Communication may be inform of charts, symbols, usual demonstration or simply spoken words.

Measuring: It is the process by which the teacher and the learners measure objects, numbers, angles, volumes, mass, sizes, length of distance and others. The acquisition of skills needed for measurements enables learners to think critically in metric terms.

Prediction: This is a kind of thinking that requires learners best guesses based on the information available to them (martin et al 1994). Funk 1997 defines prediction as "a forecast of what a future observation might be". Learners should be able to predict what the outcome of their experiment might likely be.

Conclusion

The research revealed that Basic Science teachers do not always apply the basic science skill in the teaching of Basic science. The investigation confirms that learners are exposed to science processes during the teaching of basic science.

Recommendation

It is recommended that teachers should increase tremendously their application of science process skills in the teaching of basic science, by applying it always in a science classroom not intermittently, or as situation demands.

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