



# TEACHING AND LEARNING BASIC SCIENCE EFFECTIVELY: INHIBITIVE FACTORS

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## ABSTRACT

The study aimed at identifying the factors that inhibit or prevent effective teaching and learning of Basic Science Education in Ebonyi State. Questionnaire was the instrument used for data collection; it was designed and administered to both the teachers and students from the randomly selected secondary schools in the 3 education zones of the state. From the data analysis, it was found that low teacher qualification; inadequate number of basic science teachers, lack of laboratories among others are the factors that affect effective teaching and learning of Basic Science Education in the junior secondary schools. Based on these, suggestions and recommendations were made.

## Introduction

The relevance of science to national goals, aspirations and economy, dictates to a large extent, the huge commitment and support which most nations make and give to science and technological development (Olagunju, Adesoji, Iroegbu and Ige, 2003). This is because one of the indices of world leadership is a nation's capacity to make use of newer technologies. There are consistent reports in literature of students' poor performance in science in Nigeria (Mordi, 1983, Keeves, 1992, Olatoye and Afuwape, 2004 and Omiko, 2016). The poor and deplorable level of science achievement by students in latter years of the 20th and 21st centuries had attracted the attention of the government and several researchers for more positive action to be initiated to put science achievement back on track (Monk and Osborne, 2000).

Science education is an essential instrument for National development. There is an urgent need to revolutionize Education in Nigeria by full utilization and participation of both the teachers and students. The National Policy on Education (FRN, 2008) is very clear on Federal Government's wish that education, as an instrument, could be used to meet the needs of the people and determine the kind of society it could want to evolve. Some of the general objectives of education are to acquire appropriate skills, abilities and competences both for mental and physical as equipment or tool for the individuals to live in and contribute meaningful to the development of the society (FRN, 2008).

Therefore as stated above by the National policy on Education (FRN, 2008) for proper development of any society, Science Education is very important for scientific and technological development. Hence science can be given due consideration. Igwe (2003) observed that science is the knowledge attained through a "scientific method". Science enables us to see what every one has seen but to think about what no one else has thought. Science forms a seamless web of knowledge about the universe. An understanding of basic scientific concept is necessary in our scientific and technologically rich societies of the future (Okeda, 2012).

Jegede and Brown (1980) observed that the major consequences of education on national development stems mainly from science and technology. The Science Teachers Association of Nigeria (STAN), received request from the West African Examination Council (WAEC) in 1968, that STAN should make recommendations to WAEC for Revision and improvement in the science syllabus. The STAN acted on this request, they set up panels to deliberate on issues regarding to the existing science syllabuses.

Omiko (2015) noted that the effects of this request was the introduction of integrated science which is currently known as Basic Science in the Science Curriculum. STAN recognized the importance of integrated science. It was then introduced as a basic for laying solid foundation for our science and technology programmes in our schools and tertiary institutions. However, since after the introduction of this Basic Science curriculum in the Junior Secondary Schools, the students have consistently performed below expectations in this subject.

This ugly situation if not checked and controlled will continue to affect science Education programmes, Hence this study is set to ascertain the problems facing the teaching and learning of Basic Science in junior secondary schools in Ebonyi State of Nigeria.

## Purpose of the Study

The aim of this study was to find out the factors that inhibit the teaching and learning of Basic Science in Junior Secondary Schools in Ebonyi State. Specifically, this study sought to;

1. Identify students problems associated with teaching and learning of Basic science
2. Identify teacher problems associated with teaching of Basic Science.
3. Find out curriculum problems that affect the teaching and learning of Basic Science

## Significance of the Study

The findings of this study would serve as guide to the Basic Science teachers to effectively and efficiently improve on their teaching methods and use of instructional materials.

On the part of the students, the results of this study will help to stimulate the students mind and make them highly spirited in working hard in science as a result of their positive attitude and interest towards the learning of Basic Science.

The findings of the study will be made available to the government of Ebonyi State and the federal government of Nigeria, on the factors that affect effective teaching and learning of Basic Science and their solutions to the problems.

## Area of the Study

This study was conducted in secondary schools in Ebonyi State. The schools used in this study were chosen from the secondary schools in the three education zones in Ebonyi State (Abakaliki, Onueke and Afikpo).

## Research Questions

The following research questions guided the study

1. What are the basic qualities of the science teachers teaching basic science in secondary schools?
2. To what extent are qualified teachers of basic science available in the secondary schools.
3. To what extent are basic science teaching materials available in the schools?
4. What extent do basic science teachers improvise the non-available instructional materials?

## Methodology

This deals with the procedure the researcher adopted in carrying out the research study. It is specifically treated under the following sub-headings: design of the study, area of the study, population of the study, sample and sampling technique, instrument for data collection, validation of the instrument, reliability of the instruments, method of data collection and method of data analysis.

## Design of the Study

This is a descriptive survey design; descriptive survey consists of those studies in which data are collected from small sample of a large population to enable the researcher in a systematic way describe, the manner and interpret the feature about the existing or what is obtainable in the society.

## Population of the Study

The population of the study consists of 200 teachers and students of Basic Science in the three Education zones of Ebonyi State.

## Sample and Sampling Technique

Three schools were randomly selected from the three Education zones of the

State (Abakaliki, Afikpo and Onueke). Simple random sampling technique was used to select 80 J.S.S 3 students and 20 Basic Science teachers from the 3 education zones of the state. The junior secondary school 3 (JSS 3) students were considered because of their understanding, academic exposure and years of study; which is believed must have enriched them with knowledge.

**Instrument for Data Collection**

The instrument used for data collection were 20 item structured questionnaire from 100 teachers and students of Basic science chosen as sample. The questionnaire was designed to collect data relevant to answer the research questions which guided the study. The questionnaire was divided into 3 sections. Section 1: This contains the following information name of school, class taught, years of teaching, experience, marital status, qualification and sex, while section B was meant only for students and it contains personal data like name of school, sex, age, occupation of parents and class. Section C contains 20 relevant questions that elicited responses useful for answering the research questions on the factors that affect the effective teaching and learning of basic science in Ebonyi State. Section C also composed of four point rating scale value ranged from 1-4 in ascending order as follows.

- 1. Very High Extent (VHE) 4
- 2. High Extent (HE) 3
- 3. Low Extent (LE) 2
- 4. Very low Extent (VLE) 1

**Validation of the Instrument**

The instrument was validated by 3 experts, two from science education and the other one from measurement and evaluation. They validated the instrument in terms of clarity of the instruction, proper wording of the items, appropriate and adequacy of items in addressing the purpose and problems of the students.

**Reliability of the Instrument**

In order to ascertain the reliability of the instrument, 25 copies of the instrument were used, administered to 25 respondents. These respondents were not part of the sample of the study. Data collected were analyzed using Cronbach Alpha to determine the reliability coefficient. A reliability coefficient of 0.86 was obtained showing that the instrument is highly reliable.

**Method of Data Collection**

The researcher used only teachers and students of Basic science from the selected schools during the distributions of the questionnaire and data collection. The school authority addressed the students of basic science about the researcher's mission before the scheduled date. The researcher and with the assistance of the class teacher distributed the questionnaire to the students for filling. After filling the questionnaires, the researcher and the research assistant collected the filled questionnaire on the spot.

**Method of Data Analysis**

All the copies of the questionnaire collected from the respondents were analyzed with statistical tool, like mean and standard deviation. The number of responses made on each item by the respondents (students and teachers) in the questionnaire were summed up. The number of responses in each column was multiplied by the corresponding values. Any item with the mean of 2.5 and above was accepted while any mean below 2.5 was assumed to be disagreed or rejected.

**Results**

The results of the data analysis are presented in tables according to the research questions.

**Research Question 1**

What are the basic qualities of the science teachers teaching Basic Science in the Secondary schools in Ebonyi State?

S/ N	ITEMS	VHE	HE	LE	VLE	$\bar{x}$	S.D	Interpretation
1.	Our school has basic science teachers to an extent	36	40	18	6	3.06	0.88	Very high extent
2.	The qualified basic science teachers teach their lessons very well	20	48	24	8	2.80	0.85	High extent
3.	NCE holders among the Basic science teachers teach the subject	28	38	28	6	2.88	0.98	High extent
4.	HND Holders teach basic science in our secondary schools	25	43	25	7	2.86	0.87	High extent
5.	Basic science teachers are expected to be knowledgeable to an extent	37	39	21	3	3.10	0.83	Very high extent
	Grand mean					2.94		

From the results on the above Table 1, items 1 and 5 have slightly above high extent, while items 2, 3 and 4 have high extent as their rating. This implies that the qualities of the teachers teaching basic science in secondary school are to a high extent.

**Research Question 2**

To what extent are qualified teachers of basic science available in schools?

S/N	ITEMS	VHE	HE	LE	VLE	$\bar{x}$	S.D	Interpretation
6.	OND holders teacher teach Basic science in secondary school to an extent	20	40	33	7	2.73	0.86	High extent
7.	Basic science teachers are available in our secondary schools	28	30	30	12	2.74	1.01	High extent
8.	Qualified basic science teachers are available in our schools	23	31	33	12	2.64	0.98	High extent
9.	Instructional materials for teaching and learning of basic science in secondary schools are available to an extent	27	42	24	7	2.89	0.88	High extent
10.	Most of the basic science teachers in secondary schools can improvise some of the non available instructional materials	45	23	27	5	3.08	0.96	Very high extent
	Grand mean					2.81		

From the results on the table 2 above, items 1,2,3 and 4 had high extent while item 5 had very high extent. The grand mean has a value of 2.81, this implies that the availability of basic science teachers in our secondary schools is to a very high extent.

**Research Question 3**

To what extent are basic science teaching materials available in secondary schools?

S/N	ITEMS	VHE	HE	LE	VLE	$\bar{x}$	S.D	Interpretation
11.	Animals and plants parts used for teaching basic science in schools are available to an extent	24	37	33	7	2.78	0.89	High extent
12.	Burette and Beakers are used in the basic science laboratory for practical work	20	42	31	7	2.75	0.85	High extent
13.	Durability of the science equipment in our secondary schools science laboratory are to an extent	19	35	39	7	2.66	0.86	High extent
14.	Materials for teaching and learning basic science in secondary schools are adequate to an extent	24	44	24	8	2.84	0.88	High extent
15.	Materials improvised by the basic science teachers are available to an extent	28	34	33	5	2.85	0.89	High extent
	Grand mean					2.77		

From results on the table above, it indicates that items 1,2,3,4 and 5 have high extent values. The grand mean of 2.77 also indicates high value. This implies that the materials used in teaching basic science are available in secondary schools in Ebonyi State.

**Research Question 4**

What extent do Basic science teachers improvise the non-available instructional materials in our secondary schools?

S/N	ITEMS	VHE	HE	LE	VLE	$\bar{x}$	S.D	Interpretation
16.	Trained basic science teachers are available in our schools	18	51	24	7	2.80	0.81	High extent
17.	Dissected animals are used in teaching the skeletal systems during the laboratory practical	29	38	29	4	2.92	0.86	High extent
18.	Environmental factors affect teaching and learning of basic science in the secondary schools	22	41	34	3	2.82	0.80	High extent
19.	Poor school management affects the teaching and learning of basic science in our schools	17	44	31	8	2.70	0.84	High extent
20.	Improvisation of instructional materials helps in effective teaching and learning of basic science	23	38	35	4	2.80	0.84	High extent
	Grand mean					2.80		

From the findings on Table 4 above items 1,2,3,4 and 5 had high extent values of 2.80, 2.92, 2.82, 2.70 and 2.80. The grand mean of 2.80 is also of high extent value. This implies that in secondary schools, the materials used in teaching and learning of basic science are available to a high extent.

**Findings**

The results obtained from the analysis of the data collected were presented in tables 1-4.

**Table 1:** The results on table 1 indicated that items 1 and 5 had mean scores of 3.06 and 3.1 respectively. The values are of very high extent; this is inline with what the respondents observed that the qualities of basic science teachers in secondary schools are to a very high extent to teach JSS classes. Items, 2,3 and 4 whose mean scores are 2.80, 2.88 and 2.86 respectively were of high extent indicating that the basic qualities of basic science teachers are encouraging and are expected to teach basic science in the secondary schools.

**Table 2:** The results on table 2, indicate that items 6,7,8 and 9 had mean scores of 2.73, 2.74, 2.64 and 2.89 respectively were of high extent, as indicated by the respondents that teachers of basic science are available in secondary schools to a high extent; while item 10 with mean score of 3.08 indicated very high extent, this also agrees with the respondents that basic science teachers are available in the secondary schools.

**Table 3:** The findings on table 3 indicate that items 11, 12, 13 14 and 15 had mean scores of 2.76, 2.75, 2.66, 2.84, 2.85. The values imply that the respondents agreed that materials for teaching basic science are available in the secondary schools to a high extent.

**Table 4:** In table 4, the results indicate that items 16,17,18,19 and 20 had mean scores of 2.80, 2.92, 2.82, 2.70 and 2.80. These indicate high extent values for the items, implying that the Basic science teachers improvise non-available instructional materials to a high extent during teaching and learning of basic science.

**Conclusion and Recommendations**

Effective teaching and learning of basic science at the junior secondary school level in Nigeria should be encouraged by all stakeholders in education. The study of Basic Science at the JSS level lays sound foundation for future study of other sciences like, Biology, Chemistry, Physics, and other professional courses at the tertiary Education level. Based on the findings of this study, the researcher recommends that the following conditions should be met:

- a. Science teachers should be sent on regular in-service training to update their knowledge in the current issues in Basic Science and other science subjects in general.
- b. The parents' teachers association (PTA), the government, the non-governmental organizations (NGOs) and other good spirited individuals should see that they provide equipment and other instrumental materials to the schools.
- c. Craft and science equipment centres should be established in all the local

government areas and states; this will help in producing science teaching materials.

- d. Science materials like periodicals, textbooks journals and charts should be provided to schools.
- e. Science teachers allowance should be paid to the science teachers regularly. This will help to motivate them.
- f. Recruitment of teachers should not be done on political ground, it should not be based on quarter system, rather qualified and certificated (trained) teachers should be employed on merit. This will enhance effective teaching and learning of Basic Science in secondary schools.

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