# FACTORS INFLUENCING EFFICIENT TEACHING OF BASIC SCIENCE IN JUNIOR SECONDARY SCHOOLS

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***Abstract***

*This study was designed to examine Factors Influence Efficiency Teaching Of Basic Science In Junior Secondary Schools. A descriptive survey research design was adopted. A simple random sampling technique was employed in the study. The instrument used was self structure questionnaire to collect data from 100 Basic science teachers and students sampled for the study. The data collected were analyzed using mean and standard deviation. The findings revealed that some of the teachers teaching Basic science in junior secondary schools are not professional, it was also 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 in the junior secondary schools. The instructional materials are inadequate in teaching the subject. It was therefore recommended that only qualified and experienced teachers be employed to handle the subject at the Junior Secondary School level. And also, that instructional material which has remained an age old problem and learning in the educational system should adequately be addressed as matters arising in teaching and learning of Basic science in Nigeria.*

***Keywords: Basic Science, Teaching Method, Efficiency and Instructional Materials***

## Introduction

Learning entails an active process which includes student's contribution, engagement and involvement in the learning process. Currently, the teaching and learning atmosphere has changed from teacher-centred to learner centred using technology to enhance effective learning. Learning and teaching science in junior schools should help students to develop problem solving skills and critical thinking skills. However, the science curriculum needs to be strengthened so that it encourages students to enable them actively explore their environment. In this 21$^{st}$century, there are great changes in teaching and learning of science in term of pedagogy, epistemology, assessment and technology advancement. The most important transformation is that teaching and learning is no longer a one-way process but is a shared responsibility between the instructor and the students (Krishnan, 2016).

Agboghoroma (2005) said that effective teaching of Basic Science is an activity which will bring about the most productive and beneficial learning experience for students and promote their development as learners. Efficiency teaching of Basic Science goes further than just imparting knowledge but it is a purposeful activity carried out by somebody with a specialized knowledge in Basic Science in a skillful way to enhance cognitive, affective and psychomotor development of a person or group of persons.

For the teaching of Basic Science to be efficient, the basic Science teacher must have a broad knowledge of the subject, knowledge of the curriculum, knowledge and understanding of how children develop and how they learn. This includes knowledge of the context in which learning occurs (home, community, school factor) and knowledge of assessment techniques. A Basic Science teacher should have some

teaching skills and be able to plan lessons, manage a classroom, engage students in active learning, present challenging situations to encourage problem solving, collect and monitor information on achievement, maintain good students record, provide motivation for students and support cooperative group work. The teaching of Basic Science requires various teaching approaches and meaningful learning (Ayodele and Adegbite, 2003).

In another development, Ololube, Egbezor and Kpolovie (2008) argued that the falling educational standards can be attributed to the use of teachers who are unqualified for instructional purposes, including those with general education (academic) qualifications such as Bachelors of Science (B.Sc.), Bachelors of Arts (B.A), Master of Science (M.Sc.) and Masters of Arts (M.A) degrees without teaching qualifications. It must be noted that without a professional teaching qualification, no meaningful progress can be achieved in the teaching profession. Lawal (2003) indicated that skilled and effective teaching and learning are expected from professionally trained teachers.

Basic Science teachers are expected to use teaching aids to supplement other methods and manage and control their classes for effective learning of Basic Science. The use of inappropriate methods could affect students' performance in Basic Science. Many of the Basic Science teachers do not have a clear insight about the appropriate strategies to enhance Basic Science teaching and learning. Most of the teachers resort to teaching with only one major teaching method which is the conventional method or "chalk and talk" method in our Basic Science classroom. Sometimes, classes are too large for teachers to manage for effective teaching and learning, this has greatly affected Basic Science teaching ranging from methodology, learning environment and techniques of teaching (Okoye, 2004

In view of all the problems mentioned already, previous efforts to improve the performance of students in basic science focused on pedagogy alone and required yet result yet to be obtained. This study is being undertaken with a view of finding out the extent to which teachers' qualification, years of teaching experience and the availability of instructional materials in Basic Science classrooms, students factors and curriculum issues, affecting the teaching in Basic science. 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 Oyo 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.

**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 Oyo metropolis. 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

**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?

## 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.

## Research Design

This study employed 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

The population of the study consists (teachers and students) of Basic Science in the four Local Government Area in Oyo metropolis of Oyo State.

## Sample and Sampling Technique

The target population for this study consisted of all public junior secondary school II (JSSII) basic science students in Oyo metropolis. Eight public schools were purposely selected from public schools in Oyo metropolis. Sample consisted of 80 J.S.S 2 students and 20 Basic Science teachers. The junior secondary school 2 (JSS 2) 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 items structured questionnaire for 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 Oyo 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 and 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 0.76 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 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.

**Result and Discussion**

**Research Question 1**

What are the basic qualities of the science teachers teaching basic science in secondary schools?

| S/N | Items | VHE | HE | LE | VLE | | S.D | Interpretation |
|---|---|---|---|---|---|---|---|---|
| 1. | Our school has basic science teachers to an extent | 36 | 40 | 17 | 7 | 3.06 | 0.88 | Very high extent |
| 2. | The qualified basic science teachers teach their lessons very well | 23 | 45 | 22 | 10 | 2.80 | 2.85 | High extent |
| 3. | HND Holders teach basic science in our secondary schools | 25 | 43 | 25 | 7 | 2.86 | 0.87 | High extent |
| 4. | NCE holders among the Basic science teachers teach the subject | 30 | 36 | 28 | 6 | 2.88 | 0.98 | 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 |

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 | | S.D | Interpretation |
|---|---|---|---|---|---|---|---|---|
| 1. | Basic science teachers are available in our secondary schools | 35 | 41 | 16 | 8 | 3.06 | 0.88 | Very high extent |
| 2. | Qualified basic science teachers are available in our schools | 10 | 22 | 40 | 28 | 2.80 | 2.85 | Low extent |
| 3. | Most of the basic science teachers in secondary schools can improvise some of the non-available instructional materials | 25 | 7 | 25 | 43 | 2.86 | 0.87 | Low extent |
| 4. | OND holders teacher teach Basic science in secondary school to an extent | 30 | 36 | 28 | 6 | 2.88 | 0.98 | High extent |
| 5. | Instructional materials for teaching and learning of basic science in secondary schools are available to an extent | 3 | 21 | 39 | 37 | 3.10 | 0.83 | Very Low extent |

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 | | S.D | Interpretation |
|---|---|---|---|---|---|---|---|---|
| 1. | Animals and plants charts used for teaching basic science in schools are available to an extent | 23 | 6 | 37 | 24 | 2.78 | 0.89 | Low extent |
| 2. | Burette and Beakers are used in the basic science laboratory for practical work | 9 | 21 | 41 | 29 | 2.80 | 2.85 | Low extent |
| 3. | Durability of the science equipment in our secondary schools science laboratory are to an extent | 25 | 7 | 25 | 43 | 2.86 | 0.87 | Low extent |
| 4. | Materials for teaching and learning basic science in secondary schools are adequate to an extent | 30 | 6 | 28 | 36 | 2.88 | 0.98 | Low extent |
| 5. | Materials improvised by the basic science teachers are available to an extent | 5 | 22 | 41 | 32 | 3.10 | 0.83 | Very Low extent |

From results on the table above, it indicates that items 1,2,3,4 and 5 have low extent values. The grand mean of 2.77 also indicates high value. This implies that the materials used in teaching basic science are not available in secondary schools in Oyo metropolis of Oyo State.

**Discussion of Results**

The result showed that though there are teachers with B.Ed., B.Sc. and M.Sc. teaching the subject, there are not enough majoring in Basic Science and majority of the teachers teaching the subjects are graduates in other science disciplines but not qualified Basic Science teachers. This study corroborates with the works by Onyeachi (2008), Ololube, Egbezor and Kpolovie (2007), Gwany (2006) and Lawal (2003). This may probably be the cause of poor performance in Integrated Science at the JSS level.

The third research question sought to find out instructional materials available for effective teaching of Basic Science. The results show that instructional materials used for teaching Integrated Science were not adequate. Teachers have enough texts and guide but other facilities such as measuring cylinder, test tubes and chemicals were lacking. The study affirms that lack of these materials can lead to poor performance in the subject by students. This study supports the works of Onyeachi (2008) and Maduabum (2009) who assert that lack of instructional materials can affect teaching effectiveness in school subjects.

**Conclusion**

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. The following conclusions were arrived at:

1. Majority of teachers handling the subject are not professionally qualified to teach Basic Science hence the low teaching effectiveness in the subject.
2. Basic Science teachers have not acquired enough teaching experience that may enable them have enough mastery of the subject and hence the reduction in teaching effectiveness.
3. The instructional materials meant for teaching Integrated Science are inadequate and thus affects the teaching effectiveness of the subject.
4. Discussion and lecture methods are mainly used in teaching the subject to the detriment of STAN recommendation of either inquiry of activity methods.

**Recommendations**

Based on the findings of this study, it was recommends that the following conditions should be met:

1. 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.
2. The parents' teachers association (PTA), the government, the nongovernmental organizations (NGOs) and other good spirited individuals should see that they provide equipment and other instrumental materials to the schools.
3. Craft and science equipment centres should be established in all the local government areas and states; this will help in producing science teaching materials.
4. Science materials like periodicals, text-books journals and charts should be provided to schools.
5. Science teachers allowance should be paid to the science teachers regularly. This will help to motivate them.
6. 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 school.

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