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Original Article

Instructional Material Influence on Biology Students Academic Performance in Senior School in Ilorin West, Kwara State

Abidoye, Florence Omosholape*,
Abidoye Adekunle Omotayo, Malik Sarat Olaide

University of Ilorin, Ilorin, Kwara State, Nigeria

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Abstract: This Study examined the influence of instructional material on Biology students' academic performance in senior school in Ilorin West LGA, Kwara State. The negligence of the effective use of instructional materials and facilities in learning Biology by students has affected the successful performance of students in senior secondary schools across Nigeria. Three research questions were formulated while two hypotheses were tested for the study. The study was a descriptive research of the survey type. It was targeted at the Biology students in senior secondary schools in Ilorin West LGA, Kwara State, Nigeria. A random sampling technique was used to select 120 Biology students from senior secondary schools in Ilorin West LGA, Kwara State, Nigeria. A researched designed questionnaire was used to accumulate information from respondents. The data accumulated was analyzed using frequency count and percentage, mean and standard deviation while the research hypotheses were analyzed using an independent t- test to test the hypotheses 1 and 2. Findings from the study revealed that Biology instructional materials has a great influence on senior secondary students' academic performance. The students taught with Biology instructional materials have excellent performance compared with those taught without. The findings shows that there was no significant based on gender while there was significant influence based on school type. Recommendations made were that; Ministry of Education should take responsibility in providing Biology instructional materials to schools, all Biology teachers should make use of Biology instructional materials in the delivery of their lessons to the students to facilitate competition among the male and female students, government should provide public schools with Biology instructional materials to enhance better performance of students in Biology.

Keywords: Instructional material, Biology Student, Gender, School Type, Academic Performance.

* Corresponding author.
E-mail address: abidoye.fo@unilorin.edu.ng

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1. Introduction

Biology is a science subject being taught at the secondary school. Biology teaching helps learners to understand biological concept, principles theories and laws. Biology is the branch of science that involves the study of living things. It is fascinating study that ranges from microscopic cellular molecules to the biosphere, encompassing the earth's surface and its living organism. The influence of Biology on the life of individual globally cannot be compared with any other science subject. In general, biology recognizes the cell as the basic unit of life, genes as the basic unit of heredity, and evolution as the engine that propels the synthesis and creation of new species. Biology has two main branches; plant biology or botany and zoology, the former is the study of plants while the latter is the study of animals [1].

The teaching of Biology subjects in school has not been encouraging due to this abstract nature of the subject. Therefore, the use of instructional materials is necessary and needed to facilitate students' learning of Biology [2].

Biology is deemed difficult to teach and to learn because it consists of unfamiliar concepts involving complex relations.

Instructional materials are resources or teaching resources that the teacher uses in presenting his lesson so that the students can easily understand what is being taught and a means of making teaching and learning process more meaningful, effective and understandable. Instructional materials are different teaching aids or apparatus which a classroom teacher use to facilitate his or her teaching for the stated objectives. Instructional resources play an important role in conducting a quality education. Instructional resources assist teachers to transmit knowledge in an impressive way making learning more effective as they help learners in greater acquisition of knowledge. It encourages participation especially if student are allowed to manipulate material use [3].

Instructional resources stimulate students' interests; help the teacher and students to overcome physical limitation during the presentation of the subject matter. Instructional materials help teacher to meet individual differences of the students in the class by using aids that appeal to different senses [7].

A lot of researches relevant to gender, and school type as moderator variables on its effect in instructional materials influence on biology students' academic performance have been carried out; Mberekpe [10] on effects of students improvised instructional materials on senior secondary school students in Biology revealed that students taught using instructional materials; male students did not perform better than their female counterparts in Biology. Furthermore, Igbinedion and Epumepu [14] on student's performance in Business studies in private and public school junior Secondary School Certificate Examination, the result showed that there was a significant difference in the performance of students in public and private schools.

Many empirical studies have been conducted to find out disparities between these two groups of schools and gender but but gaps still exist in understanding how these variables interact to influence the effectiveness of instructional materials in biology education. Despite numerous studies, the nuanced effects of gender and school type on the use of these materials remain inconclusive, necessitating further research. Understanding these dynamics is crucial for designing targeted interventions that can optimise improve student academic performance in biology.

2. Literature Review

The use of instructional materials in biology education has been extensively studied due to their critical role in facilitating effective teaching and learning. Instructional materials help to demystify abstract concepts, making lessons more interactive and engaging while improving students' academic performance. Over the years, researchers have investigated various aspects of instructional material utilisation, including their impact on students'

academic achievement, the influence of gender, and disparities between school types. These studies provide valuable insights into the importance of instructional resources and their potential to address challenges in biology education.

A study carried out by Awolaju [4] on instructional materials as correlates of students 'academic performance in Biology in senior secondary schools in Osun State. Findings revealed that students taught with instructional materials performed better than those taught without instructional materials. Studies conducted by Odita, Osamor and Odebisi [5] on the effect of instructional materials on academic achievements of Biology Students in Aniocha North LGA of Delta State. The target population of the study consisted of Biology Teachers and Students in Aniocha North LGA. The result of the study reveal that instructional materials in schools are inadequate and the available ones are utilized by the teachers. It also shows that instructional materials utilized in the teaching and learning of Biology enables students make more achievement unlike situations where instructional material used is inadequate.

A research study carried out by [6] on the effects of the use of instructional materials on students' performance in Biology in Surulere LGA, Lagos. The findings of the study was that, instructional materials have significant effect on the teaching of Biology. Also, the uses of instructional materials have significant effect on the learning of Biology.

Abdulmumini et al., [8] studied the effect of improvised Teaching Aids for Teaching Separation Techniques and Student's Achievement in Chemistry in Misau Local Government Area, Bauchi State and the result indicated that there is a significant difference in the mean achievement score of male and female students' academic performance. It was discovered that as the class size increases, students' academic performance declines. For this purpose, the research seeks to examine influence of biology instructional materials on students' academic performance in senior secondary school. A study by [9] on compared the academic performance between private and public primary schools using a sample of 240 pupils randomly selected from Ilesa East and Ilesa West Local Government Council Areas of Osun State, Nigeria. The result showed that pupils in private schools performed significantly better than those in public schools.

A study by [10] on the effects of students improvised instructional materials on senior secondary school students' achievement in Biology and the results revealed that there was no significant difference in the performance of male and female. A study by [11] investigated the effects of instructional materials on academic achievement of SS1 chemistry students in Cross River State Nigeria. The result shows that those students taught acid and base using improvised material performed better than those taught without them and that there was a non-significant interaction effect of gender on academic performance of SS1 Chemistry students.

A study conducted by [12] on the effect of laboratory practical on senior secondary school students in Biology in Ilorin south, Kwara State. The findings reviewed that the impact of Biology practical was significant to the students' performance. There was no significant difference in students' opinion towards the impact of laboratory practical on the performance of students based on school type. Ekundayo and Alonge [13] conducted a study on human and material resources as correlates of academic performance of private and public secondary school students in Ondo State, Nigeria. The study also revealed that there was no significant difference in human resources availability in the two schools. It was also revealed in the study that private schools were better equipped in terms of material resources than the public schools and those private schools had better academic performance than the public schools in public examinations.

Igbinedion and Epumepu [14] carried out a study on students' performance in business studies in private and public Junior Secondary School Certificate Examination showed that

from 2008-2011, the result shows that there was a significant difference in performance of the students. This study was able to observed the influence of Biology instructional materials on students' academic performance of Senior Secondary Students in Ilorin West, Kwara State, Nigeria.

3. Purpose of the Study

The main purpose of this study is to examine influence of Biology instructional materials on students' academic performance of Senior Secondary Students in Ilorin West, Kwara State, Nigeria.

Specifically, the study investigated:

i) Influences of Biology instructional materials on students' academic performance?

ii) Influence of Biology instructional materials on students' performance based on gender;

iii) Influence of Biology instructional materials on students' academic performance based on school type;

4. Research Questions

In this work, the following research questions are set for answering;

i) What are the influences of Biology instructional materials on students' academic performance?

ii) Does Biology instructional materials have influence on students' academic performance based on gender?

iii) Does Biology instructional materials have influence on students' academic performance based on school type?

5. Research Hypotheses

H_{01}: There is no significant influence of Biology instructional materials on students' academic performance in Senior Secondary School based gender.

H_{02}: There is no significant influence of Biology instructional materials on students' academic performance in Senior Secondary School based on school type

6. Research Method

The study employed descriptive research of the survey type. Survey type of research described and interpreted events and ideas the way they are without any external manipulation.

The population for this study comprised of selected students in senior secondary schools in Ilorin West L.G.A in Kwara State. The target population consists of biology students from both public and private secondary schools. There are 348 public secondary schools and 114 registered private schools in Kwara State making grand total of 462 Secondary Schools in Kwara State L.G.A. The total number of public secondary schools in Ilorin west is 28 while private secondary schools are 25 making a grand total of 53 secondary Schools in Ilorin West LGA. The scope was delimited to 6 secondary Schools consisting of three (3) private and three (3) public schools. The target population consists of one hundred and twenty (120) biology students from public and private secondary schools. The students were selected from the sampled schools using simple random sampling technique.

This study made use of an adapted questionnaire tagged "Influence of Biology Instructional materials on Students' Academic Performance in Senior Secondary Schools''. The questionnaire items were constructed as much as possible to elicit correct and accumulate information required for the study from the respondent.

The questionnaire consists of two sections A and B. Section A includes information on personal data of the respondents; name of school, gender, school type and class while section B contain items carefully organized in accordance to the research questions raised. The instrument has both closed and open-ended questions with its section B divided into four sub-sections. The section required the respondents to make choices from four options of a Likert scale answer by ticking their choice: SA (Strongly Agreed), A (Agreed), D (Disagreed) and SD (Strongly Disagreed)

The researcher collected a letter of introduction from the Head of Department, Department of Science Education, University of Ilorin. The letter from the head of the department helped the researcher to gain access to the teachers of the schools sampled for the study. Also, respondents consent form was given to the principal of the selected secondary schools before questionnaires were administered to the students. The instruments were administered by the researcher to the sampled biology students. The researcher provided necessary instructions to the respondents with regard to the whole exercise. The completed questionnaires were personally retrieved immediately to avoid loss of questionnaires.

The data collected from the study was utilized to answer the research questions and test the hypotheses. The data was analyzed using descriptive and inferential statistics. Demographic information was subjected to frequency and percentage (%), the research questions was answered with Mean and Standard Deviation. Hypotheses 1 and 2, were tested with t-test.

7. Data Analysis And Results

Research Question 1: What are the influences of Biology instructional materials on students' academic performance?

Table 1 presents the mean and standard deviation on influences of Biology instructional materials on students' academic performance. From the table, it was revealed that all the listed items are the influence of Biology instructional materials on students' academic performance because all the items had a mean greater than 2.50. These items include the use of textbook and charts makes Biology appear real, when I am learning Biology with the use of charts, it makes it simpler and gives meaningful learning, Biology pictorial charts attracts my attention during Biology lessons, the use of biology specimen in learning Biology makes me to be more interested in learning Biology, the use of realia encourages me to understand difficult topics in Biology and I am able to answer Biology question on my own when instructional resources are used to break down the topics among others.

Table 1. Mean and standard deviation on influences of biology instructional materials on students' academic performance

Items	Mean	SD
The use of textbook and charts makes Biology appear real.	3.35	0.61
When I am learning Biology with the use of charts, it makes it simpler and gives meaningful learning.	3.44	0.57
The use of instructional resources by my teacher makes Biology easy to apply in daily activities.	3.43	0.59
The use of microscope by my teacher makes it easy for me to interpret biology abstract.	3.25	0.65
Biology pictorial charts attracts my attention during Biology lessons.	3.30	0.73
The use of biology specimen in learning Biology makes me to be more interested in learning Biology.	3.40	0.60
I concentrate a lot when my teacher is giving examples using instructional resources.	3.27	0.67
The use of microscope by the teacher makes me participate actively in Biology class.	3.20	0.77
The use of Biology related resource persons motivates me to learn Biology.	2.91	0.77

The use of instructional resources reduces the movement of students during biology lessons.	3.30	0.70
The use of Illustrations and charts in teaching Biology makes the class interactive during the lesson.	3.38	0.65
Biology field trips makes leaning Biology fun to me.	3.21	0.62
The use of realia encourages me to understand difficult topics in Biology.	3.30	0.70
I am able to answer Biology question on my own when instructional resources are used to break down the topics.	3.40	0.67
Instructional resources help me to have a wider knowledge about the topics learnt in Biology.	3.42	0.66
I am able to answer questions better in Biology when learning with the use of instructional resources.	3.42	0.66

Research Question 2: Does Biology instructional materials have influence on students' academic performance based on gender?

Table 2 shows the results of the mean and standard deviation of biology instructional materials influence on male and female students' academic performance. The mean score of male students is 53.57 (SD=4.29) while that of female students is 53.79 (SD=4.32). This implies that biology instructional materials influence both male and female students' academic performance without any significant difference.

Table 2. Mean and standard deviation of biology instructional materials influence on male and female students' academic performance

Gender	N	Mean	Std. Dev	Mean Diff
Male	58	53.57	4.29	0.22
Female	62	53.79	4.32	

H_{01}; there is no significant influence of Biology instructional materials on students' academic performance in Senior Secondary School based gender.

Table 3 shows a t-test conducted to test for influence of gender on Biology instructional materials and students' academic performance. The analysis conducted reveals that there was no statistically significant difference between male students and female students at df=118,t –value =-1.95 and p> 0.05 alpha level. Therefore, this implies that the null hypothesis is not rejected.

Table 3. t-test Analysis on influence of Biology instructional materials on students' academic performance based on gender

Gender	N	Mean	SD	Cal. t-value	Df	Sig (2-tailed)
Male	58	53.57	4.29	-1.95	118	0.054
Female	62	53.79	4.32			

Research Question 3: Does Biology instructional materials have influence on students' academic performance based on school type?

Table 4 shows the mean score of private school students is 54.11(SD=4.25) while that of public school students is 51.98 (SD=4.23). This implies that the Biology instructional materials

influence private schools students' academic performance more than the public schools.

H_{02}; there is no significant influence of Biology instructional materials on students' academic performance in Senior Secondary School based on school type.

Table 5 shows a t-test conducted to test if school type has an influence on Biology instructional materials on students' academic performance. The analysis conducted reveals that there was a statistically significant different between private schools and public schools at df =118, t-value =-2.75 and $p<0.05$ level of significance. Therefore, the null hypothesis is rejected. This implies that there is significant influence of school type in the use of Biology instructional materials on students' academic performance in Senior Secondary School in Ilorin.

Table 4. Mean and standard deviation of biology instructional materials influence on public and private school students' academic performance

School Type	N	Mean	Std. Dev	Mean Diff
Private	60	54.11	4.25	2.87
Public	60	51.98	4.23	

Table 5**.** t-test analysis on influence of biology instructional materials on private and public school students' academic performance

School Type	N	Mean	SD	Cal. t-value	Df	Sig (2-tailed)
Private	60	54.11	4.25	-2.75	118	0.007
Public	60	51.98	4.23			

8. Summary of Findings

The following are the summary of the major findings of this study:

1. Biology instructional materials has an influence on students' academic performance in Senior Secondary School Ilorin.
2. There was no significant influence on Biology instructional materials on students' academic performance in Senior Secondary School Ilorin based on gender.
3. There is a significant influence on Biology instructional materials on students' academic performance in Senior Secondary School Ilorin based on school type.

9. Discussion of Findings

This study examined the influence of biology instructional materials on students' academic performance of biology in Ilorin West Local Government Area, Kwara State. The result revealed that students performed better when taught with Biology instructional materials which has an influence on their academic performance. This may be due to the fact that Biology instructional materials provide the students with an opportunity to learn and improve on their academic performance. This is in line with the findings [4] observed the instructional materials and students' academic performance in Biology in senior secondary schools in Osun State, Nigeria. The finding reveals that students taught with instructional materials performed better that those taught without instructional materials.

The finding of the study indicated that there was no significant influence on Biology instructional materials on students' academic performance in Senior Secondary School based on gender. This result indicated that both male and female Biology students hold similar views

on the influence of Biology instructional materials. This may be as a results that both male and female pay attention to Biology instructional materials during lesson. This is in line with the study of [10] on effects of students improvised instructional materials on senior secondary school students in Biology revealed that students taught using instructional materials; male students did not perform better than their female counterparts in Biology.

The finding showed that there was significant influence on Biology instructional materials on students' academic performance in Senior Secondary School based on schools type. This may be due to the fact that private schools concentrate on the Biology instructional materials more than public schools. This result corroborates with the findings of [14] on student's performance in Business studies in private and public school junior Secondary School Certificate Examination, the result showed that there was a significant difference in the performance of students in public and private schools.

10. Conclusion

This study was concluded that student's academic performance in biology was significantly influenced by Biology instructional materials in Ilorin West, Kwara State. The gender of the students' was not significantly influenced to academic performance while it was significantly influenced based on school type. Private schools performed better than public schools when taught with instructional materials.

11. Recommendations

Based on the findings made in this study, it is therefore recommended that:

i) Ministry of Education should take responsibility in providing Biology instructional materials to schools;

ii) All Biology teachers should make use of Biology instructional materials in the delivery of their lessons to the students to facilitate competition among the male and female students;

iii) Government should provide public schools with Biology instructional materials to enhance better performance of students in Biology.

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