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IMPACT OF PICTURE AND REALIA ON PERFORMNCE IN SKELETAL SYSTEM AMONG SENIOR SECONDARY SCHOOL STUDENTS IN AZARE, BAUCHI STATE NIGERIA.

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ABSTRACT

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The study investigated Impact of Picture and Realia on Academic Performance in Skeletal System among Senior Secondary School students in Azare. The study adopts a Quasi-Experimental Design, involving Pretest, Posttest, Non-Equivalent Groups Design. The population comprised of all one 5,202 SS2 Biology students from 18 public Senior Secondary Schools . A sample of 110 students from two schools was randomly selected. The study involves two groups- an experimental and a control group. The experimental group was taught Skeletal system using Picture and realia while the control group was exposed to the same concept using Conventional Method. One instrument was used for data collection Namely Skeletal System Performance Test. The instrument was validated by experts and have reliability coefficient of 0.87, using Pearson Product Moment Correlation statistic. Two research questions and two null hypotheses were formulated to guide the study. One of the research was “What is the difference between the mean performance scores of students taught concept of Skeletal system using Picture and Realia and those taught same concept using conventional method?” The correspondence null hypotheses was

“There is no significant difference between the mean performance scores of students taught concepts of Skeletal system using Picture and Realia and those taught same concepts using conventional method”. Research questions were answered using Mean and Standard deviation statistics while hypotheses were tested using Independent Samples t-test at alpha 0.05 level of Significance. The major findings reveal a major significant difference between the mean scores of experimental and control groups when taught concept of skeletal system, the mean academic Performance of students exposed to picture and realia was in favour of experimental group the results also show that male and female students in groups do not significantly differ in their academic performance. Based on the findings, the researcher concludes that picture and realia is gender-friendly. It is therefore recommended that among others, that the use of pictures and realia materials in teaching Biology in schools should be encouraged. Federal and State ministries of education should intensify effort to make facilities available to teachers, also, teachers should be encouraged to attend conferences, seminars, and workshops

Introduction

Biology is a life science that involves the study of plants and animals. The contents range from microscopic organism to biosphere in general, encompassing the earth surface and the living things. Some of the branches of biology include anatomy, morphology, cytology, genetics, entomology, parasitology among others. The teaching and learning of biology, particularly concepts such as the skeletal system, often present challenges due to their abstract nature and the difficulty students face. Conventional instructional strategies, such as lecture method have been found insufficient in enhancing active engagement, and long-term retention of content (Umeh, 2011). Researchers are increasingly turning to hands-on-minds instructional method such as pictures and realia to bridge the gap between theoretical knowledge and practical understanding.

Pictures, including diagrams, charts, and digital images, serve as powerful visual stimuli that enhance students' ability to conceptualize biological components and processes. They help to concretize abstract concepts and facilitate memory retention through visual representation (Mayer, 2009). On the other hand, realia—real-life objects or models used in teaching—provide learners with hands-on experiences, making abstract concepts more tangible and relatable. In biology education, the use of real or model skeletons, bones, and body part replicas enables students to observe and manipulate structures, leading to deeper cognitive processing (Okebukola, 2002).

The skeletal system, being a foundational aspect of human biology, requires more than rote memorization for mastery; it demands a clear understanding of bone structure, location, and function. Numerous studies have shown that when students are exposed to multimodal teaching aids such as pictures and realia, their academic performance, interest, and retention significantly improve (Adebayo & Olatoye, 2016; Adeyemo, 2010). Despite the promising benefits, the integration of these tools in secondary school biology classrooms remains inconsistent and under-researched, particularly within developing educational contexts.

Realia is a teaching material method that uses real-life objects, artefacts, or materials to enhance students' learning experiences. These objects can be anything from everyday items like coins, maps, or newspapers to specialized things like scientific equipment or cultural artefacts. Realia are objects from real life used to improve students' understanding of other cultures and real-life situations in classroom instruction (Aggarawal 2008). Realia refers to authentic objects from real life that one uses in the classroom to teach a specific concept. Realia can be both physical and virtual, as long as it is something used in the real world. It can make the learning experience more memorable and create connections between objects and topic of discussion. One of the benefit of using Realia in classroom is that, it helps make it easier for young learners to recall information.

The importance of Biology as a valuable science subject is further emphasised in the Joint Admission and Matriculation Board syllabuses (JAMB, 2019/2020), it is stipulated that a minimum of credit pass in Biology Unfortunately,, the numbers of candidates with a minimum of credit pass in biology is low. This has denied many Nigerian students the opportunity of getting admitted into higher institutions to study science and science related courses.

Gender is another important variable of this research. Gender according to Adeyemo (2019) is the property that differentiate individuals based on reproductive roles. Research conducted on the impact of pictures and realia on gender states that gender has no significant effects on the impact of pictures and realia on students

Statement of the Problem

Teaching complex topics in science especially Biology remains a major challenge in secondary schools due to their abstract nature. Many students find it difficult to understand and retain certain concepts when taught using lecture methods alone (Adebayo & Olatoye, 2016). These methods often fail to make learning interactive or relatable, leading to low academic performance, reduced interest, and poor conceptual understanding. To arrest this worrisome trend, several researches such as Argawati ,(2015) who worked on effectiveness of Realia in Teaching English Vocabulary have been carried out but the problem still persists. To provide clue to these problems may requires constant use of picture and realia to teach students as suggested by scholars such as (Ahmed et. al 2024). Hence, is the need to carry out research on the Impact of Pictures and Realia on Academic Performance in skeletal system

Objectives

The objectives of this study was to:

- 1) determine effects of Picture and Realia on students' Performance in the concept of Skeletal system
- 2) examine effect of Pcture and Realia between male and female students' Performance in the concept Skeletal system

Research Questions

The study formulated two research questions for answering:

- 1.) What is the difference between the mean performance scores of students taught concept of Skeletal system using Picture and Realia and those taught same concept using conventional method?
- 2) What is the difference between the mean academic scores of male and female students taught concepts of Skeletal system using Picture and Realia?

Null Hypotheses

The following null hypotheses were stated and testing at $p \leq 0.05$ level of significance:

HO₁: There is no significant difference between the mean performance scores of students taught concepts of Skeletal system using Picture and Realia and those taught same concepts using conventional method.

HO₂: There is no significant difference between the mean academic scores of male and female students taught concepts of Skeletal system using Picture and Realia.

METHODOLOGY

The study was quasi-experimental-control group design employing pretest, posttest. Two groups of students were used for data collection; experimental (EG) and control groups (CG). A pretest was administered to the two groups in order to determine the equivalence in ability of the two groups. The experimental group was taught concept Skeletal using Picture and Realia. The control group was taught same concept using Lecture Method (LM). At the end of the six weeks treatment, a posttest was administered to both groups of students to evaluate the effectiveness of the treatment in enhancing students' academic performance in Skeletal system

Population of the Study

The population for the study was made up of all the Senior Secondary II student in Azare Metropolis, with a total number of 110 students comprising males and female. Seventy nine were selected using simple random sampling technique

Results

What is the difference between the mean performance scores of students taught concept of Skeletal system using Picture and Realia and those taught same concept using conventional method?

Table 1 .: Mean and Standard Deviation Statisces of Pretest and Posttest for Students in Experimental and Control Groups.

N	Pretest Mean	Standard deviation	Posttest SD	Mean Mean Gain
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Experimental	54	22.06	3.95	46.83	7.51	24.75
Control	56	21.51	3.05	36.21	8.62	14.70
Mean Difference		0.57		10.72		

Table 1 shows that the result of the means and standard deviations of experimental and control group are 22.06 and 46.83 with standard deviations of 3.95 and 7.51 respectively. The control group has pretest mean scores of 21.51 36.21 with standard deviation of 3.05 and 8.62 respectively. The mean gain for experimental group is 24.75 while the control group is 14.70. The mean gain is 10.05 . The higher the mean gain of the experimental group over the control group as well as the large mean gain indicates the superiority of Picture and realia over Conventional Method infostering the performance among secondary school Biology students in skeletal system concept

Hypotheses Testing

The state null hypotheses were tested at $p \leq 0.05$ Level of significance.

H₀₁:There is no significant difference between the mean academic performance scores of students taught Skeletal system concepts using Picture and Realia and those taught using conventional teaching method.

Table 2: t-test Analysis on the Mean Performance Scores of Experimental and Control Groups

Gender	N	Mean	SD	DF	t- CAL	P	Remark
Exp	54	46.83	7.51	108	6.48	0.001	S
CONRT	56	36.21	8.62				

Significant at $P \leq 0.05$

From Table 2, the calculated P-value of 0.01 observed at a degree of freedom of 108. This p-value is less than the 0.05 level of significance, indicating that there is a significant difference between the mean performance of students taught skeletal system using Pictures and Realia and those taught using Conventional Method. The observed difference is in favour of the experimental group which was exposed to Picture and Realia. Hence, the null hypothesis was rejected implying that the picture and Realia improved students academic Performance and is effective in enhancing student's performance in Skeletal system concepts

Research Question 2

What is the difference between the mean performance scores of male and female students taught Skeletal system concepts using Picture and Realia

Table 3.: Means and Standard Deviation of Male and Female in Experimental Group.

Gender	N	Pretest Mean	Standard deviation	Posttest SD	Mean	Mean Gain
Male	34	22.19	3.84	51.27	7.93	29.08
Female	20	21.64	2.79	46.70	6.80	25.06
Mean Difference		0.55		4.57		4.02

Table2. Shows the pretest and posttest mean scores of the male students in the experimental group were 22.19 and 51.27 with standard deviation of 3.84 and 7.93 respectively. The female students have pretest and posttest mean scores of 21.64 and 46.70 with standard deviation of 2.79 and 6.80 respectively. The mean performance gain for male students is 29.08 while that of female students is 25.06. The mean gain is 4.02. The higher mean gain of the male over the female counterparts shows the slight superiority of the male students over the female students in their performance when taught concept of skeletal system using Pictures and Realia.

Hypothesis 2: There is no significant difference between the mean academic scores of male and female students taught concepts of Skeletal system using Picture and Realia.

Table 4. t-test Analysis of Mean Scores of Male and Female Students in Experimental Group.

Gender	N	Mean	SD	DF	t-CAL	P	Remark
Female	34	51.29	7.79	52	1.71	0.132	NS
Male	20	45.08	7.23				
MD		6.21					

Significant at $P \leq 0.05$

Table 4. reveals a p-value of 0.132 observed at a freedom of 52. This p-value is greater than the 0.05 level of significance indicating there is no significant difference between male and female students academic performance scores when exposed to picture and realia instructional strategy. They male and female recorded a mean of 51.29 and 45.08 respectively. Therefore, the null hypothesis is retained implying that there is no significant difference between male and female students when taught concept of skeletal system using Picture and Realia instructional strategy

DISCUSSION

The result of analysis showed that the students taught Skeletal system concept with picture and realia instructional strategy had a higher mean score than the students taught using lecture method. This result is in agreement with the findings of Argawati; Umar, (2015) and whose works found that picture and realia instructional strategy enhanced students academic performance in science subjects. The findings of this study are also in agreement with that of Adeyemo (2019) that the use of picture and realia instructional strategy results in higher Performance of students in Biology concepts. However, the finding is not in agreement with the findings of (Adebayo & Olatoye, 2016) who found no significant difference in performance of picture and realia instructional strategy on the concept of physics education. Also, there was no

significant difference between male and female students .i.e picture and realia instructional strategy had impact on performance of both male and female students who were exposed to it. This findings agree with the findings of (Ahmed et. al 2024). who reported no significant difference between the academic performance girls and boys who were exposed to picture and realia strategy. No significant difference between males and females students exposed to picture and realia instructional strategy as revealed by the result of this study may be due to the fact that picture and realia instructional strategy encourage students to work on the same task, share ideas and experiences freely. This equal opportunity for the students to learn together irrespective of their gender differences.

CONCLUSION

In the light of the findings of the study, the researcher concluded that:

1. Picture and realia Instructional strategy enhances students performance in Skeletal sytem concepts
2. The findings in this study revealed that Picture and realia Instructional Strategy model of instruction is efficacious in eliminating gender related differences in science learning, indicating that the strategy is gender friendly.

RECOMMENDATIONS

Based on the findings in the study, the researcher wished to make the following recommendations.

1. Biology teachers should adopt the use of Pictures and Realia Teaching Method in teaching various concepts in Biology.
2. Seminars, Conferences and Workshops should be organized by ministry of education for Biology teachers to appraise them with the use of Pictures and Realia Teaching Method

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