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EDITORIAL

Dear Readers,

We are excited to announce the launch of International Journal of Contemporary Issues in Integrated Science Education (IJCIISE). This Association Integrated Science Educators' Association of Nigeria (ISEAN) play a vital role in promoting scientific advancement, supporting science education, informing science policy, recognizing science excellence and fostering community engagement. The desire to float this journal was borne out of the passion to organize a yearly conference of Integrated Science by the Integrated Science Educators' Association of Nigeria, of which selected scholarly articles will be published after a thorough review. The journal dedicated to advancing knowledge and fostering dialogue within. Our mission is to publish high-quality research, innovative ideas, and critical analyses that contribute to the understanding and development of Integrated Science. At IJCIISE, we believe in the power of interdisciplinary collaboration and inclusivity. We welcome contributions from scholars, practitioners, and thought leaders worldwide, providing a space for diverse perspectives and groundbreaking work. As we embark on this journey, we invite you to submit your research, engage with our content, and join us in creating a vibrant academic community. Together, we can push the boundaries of knowledge and inspire future generations. Thank you for your support as we launch this exciting new endeavour.

This edition moves around issues that border on "**Enhancing Quality Assurance in Integrated Science in Nigeria.**" It is believed that diverse contributions from scholars and researchers expressed in this edition will provoke the understanding of issues that could foster education for societal transformations on a global scale
We look forward to your contributions!

For further information on future conference activities, visit <http://ijciise.org/index.php/ijciise>

Warm regards,
Professor O. S. Agboola
President, Integrated Science Educators' Association of Nigeria (ISEAN)

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EFFECT OF MULTI-MEDIA TEACHING STRATEGY ON STUDENTS' PERFORMANCE IN SECONDARY SCHOOL BIOLOGY IN DEKINA LOCAL GOVERNMENT AREA OF KOGI STATE

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Abstract

The study examined effect of multi-media teaching strategy on students' performance in secondary school biology in Dekina Local Government Area of Kogi State. Two objectives, two research questions and two hypotheses guided the study. The design adopted was a pretest and posttest non-randomized quasi-experimental design. The population of the study is made up of 6,480 senior secondary school two (SSS II) students in the area of the study. Simple random sampling technique was used to select three hundred and twenty four (that is, 176 male and 148 female) SSS II students in their intact classes from four co-educational secondary schools in Dekina Local Government Area of Kogi State. The instrument for data collection was Biology Performance Test (BPT). Kuder-Richardson formula (k-R-20) was used to

determine the reliability coefficient index for BPT which was 0.82. After administering the instruments, data were collected. Mean and standard deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. The results of the study revealed that students taught biology using multi-media teaching strategy had their performance enhanced than those taught using conventional method. The result also showed that multi-media teaching strategy has a significant effect on male and female performance in Biology. Based on the findings, it was recommended among other things that Biology teachers should use interactive strategies such as multi-media teaching strategy to teach biology in order to enhance students' academic performance.

Keywords: Multi-media teaching strategy, Performance, Biology, Gender

Introduction

The act of teaching may be traced back to our traditional culture, where everyone was involved in some form of education. That is, a person teaches when he or she influences facts and information, cultivates habits, instructs in skill development, develops capacities, and awakens people's interest. Olinya (2017) defined teaching as an articulated attempt by the teacher to help students acquire skills, attitude, knowledge, idea to better their worth in life. That means, teachers' task is to create or influence desirable positive changes in behavior and academic achievement of the students. In view of this, success of any teaching is measured by the degree to which the teacher is able to achieve the desired academic results. Thus act of teaching is the only way to drive home the aims and objectives of science education in Nigeria, through different instructional methods of teaching adopted by science teachers.

To attain the noble goals of teaching as contained in the National Policy on Education, science teachers needs to adopt certain techniques and teaching approaches in science and science related subjects. Such approaches include: lecture method, demonstration, peer tutoring strategy, laboratory method and field trip discussion. All these are in attempt to enhance students' academic achievement in science education Federal Government of Nigeria of Education (FGN, 2014). Also, the learning environment in the 21st century is becoming challenging in view of prevailing insecurity. The onus is on nations across the globe to resort to providing learning environment that will be suitable for learning especially science subjects such as basic science. Such learning environment should equip both teachers and learner to employ non-conventional strategies to science teaching such as virtual laboratories, peer tutor teaching, and use of new technologies that will help both teachers and learners with minimal hazards or danger to lives and properties and efficiency in teaching and learning science subjects (United States Agency for International Development, 2019).

Multi-media teaching strategy refers to teaching strategy that allows a teacher to use diverse electronic soft-wares and hardware to teach learners to ensure

that the brighter students teach their counterpart who may be slow in learning (Rohrbeck, Ginsburg, Fontuzzo & Miller, 2013). According to Golding, Lisa and Veniesa (2016) multimedia teaching strategy is the process by which a pupil, with guidance from a teacher, helps in teaching one or more classmate to learn a skill or concept. This means that this approach focuses on peers to solve a problem, and is most effective in fostering creativity, experimentation, problem-solving skills and the learning of deep concepts (Cohen, Kulik & Kulik, 2012).

Nathern and Liz (2019) noted that multi-media teaching strategy gives teachers the capability to accommodate a classroom of diverse learners to improve academic performance across ability levels and content areas. Similarly, Miller and Miller (2015) posit that multi-media teaching strategy is an economically and educationally effective intervention for slow learners and great achievers that can benefit both the tutor and tutee socially and educationally by motivating them to learn. It means that when multi-media is carefully used by a teacher, the interaction among individual learners using multi-media electronic devices in the classroom will deepen the understanding of scientific concepts especially in biology which is a foundation subject among students (Spencer, 2016; Smith, 2018).

Biology refers to the study of living things which include plants and animals. General science was taught in primary schools and replaced by elementary science in Nigeria in the 19th century following the adoption of National Policy on Education in 1977 (Federal Republic of Nigeria, 2014). The subject was structured to assist learners to develop interest in science and technology and to prepare learners for future biology related career. Biology was intended to lay a foundation for science and technology education along with other science subjects in Nigeria (Obioma, 2012; Adeniyi, 2012). It is worthy of note that the followings are the objectives of the Biology curriculum. To help learners (i) acquire knowledge in biology (ii) develop adequate laboratory and field skills in biology, (iii) develop ability to apply scientific knowledge to everyday life in matters of personal and community health and agriculture and (iv) reasonable and functional scientific attitude.

Gender entails the division of people into two categories, “men” and “women. (Webster, 2019). Gender from the above, is the societal meaning assigned to male and female with a particular role that each should play. This is verifiable because, there is a general belief among Nigerians that males are superior to females in terms of physical physique, cognition, logical reasoning and even superior in academic achievement (Anigbogu, 2019). In Nigeria, also, it is believed that science subjects like physics, mathematics, chemistry and biology are male dominated subjects (Anigbogu, 2019). While others have a counter opinion for instance, Nworgu (2016) was neutral in his view as regard gender differentiation in some of the science courses. Consequently, gender differentiations that exist in some science related subjects, which lead to variation in academic achievement of male and female students remain an issue of concern to researchers. Nevertheless there are probably hundreds of factors that can affect academic achievements of students independent of gender. Such factors include the following: social, economic,

medical/health, familial, relationships between teachers and students and school expectation.

Statement of the Problem

Biology is the bedrock for many science courses such as medicine, pharmacy, nursing, biochemistry, genetic, agriculture among others. This account for the high enrolment of students in the Senior School Certificate Examination (SSCE). In spite of the high number of students' enrolment in biology in Senior School Certificate Examination, studies by (Adeyemi & Ajibade, 2018; Chief Examiner's Report, 2021) have shown that students' achievement in science subjects like physics in the external examinations is poor. The poor achievement of students in science subjects like mathematics and physics in external examination is linked to the use of traditional method (lecture method) in teaching secondary school (Adeniyi, 2012). The traditional/conventional teaching methods often used by teachers in teaching biology include the lecture method, demonstration and direct instruction. These traditional methods of teaching stress more of the roles of the teacher than learner during science lesson. As a result, the use of traditional method does not encourage science process skill acquisition needed for proper understanding of science principles, concepts and facts. The inadequacy of traditional teaching methods account for this study which is set to determine how multi-media teaching strategy will affect students' performance in biology in Dekina Local Government Area of Kogi State, Nigeria.

Purpose of the Study

The study was guided by the following objectives.

1. To determine the effect of multi-media teaching strategy and conventional method on academic performance of students taught biology in senior secondary schools.
2. To determine the interaction effect of multi-media teaching strategy on performance of male and female students taught biology in senior secondary schools

Research Questions

This study was guided by the following research questions.

1. What is the effect of multi-media teaching strategy and conventional method on students mean performance scores in biology?
2. What is the interaction effect of multi-media teaching strategy on mean performance scores of male and female students in Biology?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

- H₀1: There is no significant difference between the mean performance score of

student taught biology with multi-media teaching strategy and those taught with conventional method.

H₀2: There is no significant interaction effect of multi-media teaching strategy on students' academic performance in biology based on gender.

Methodology

The design adopted for this study was quasi-experimental design. Because it involves the administration of pre-test and post-test to respondent in their intact classes. The study was conducted in Dekina Local Government Area of Kogi state. The area is made up of numbers of town and villages such as Ologba, Ulaja, Biradu, Agala, Egume. Educationally, the area has about sixty three (63) public and private secondary schools where biology is taught as a subject at senior secondary schools.

The population of the study was made up of all senior Secondary School two (SSS II) students in Dekina Local Government Area of Kogi state. That is, 6,480 SSS II students on the whole make up the population of the study (Kogi State Schools Service Commission, 2023). Simple random sampling technique was use to select 324 students in their intact classes from senior secondary school two (SSSII) from four co-educational secondary schools in Dekina Local Government Area. The four schools were grouped into two experimental schools and two control schools.

The instrument for collecting data for the study was Biology Performance Test (BPT). The BPT was a twenty (20) item multiple choice questions which were developed by the researcher from the biology content area. The instrument has options A-D for each of the item. The items were drawn from selected topics in biology curriculum. The BPT was face validated by three (3) research experts in Science Education Department, Prince Abubakar Audu University, Anyigba.

The trial testing of the instrument BPT was carried out by the researcher using 30 SSS II students from one co-educational school outside the area of study in Ankpa L.G.A. of Kogi state. The data collected from the trial testing of BPT was used to determine the reliability coefficient of the instruments using Kuder-Richardsons 20 (k-R20) formular which was 0.83. Research assistants in the four schools were trained for two days on how to use lesson plan for experimental and control groups to teach three selected topics (balanced diet, waste disposal, pollution and energy) in biology curriculum. Pretest was administered before treatment which multi-media teaching strategy for experimental schools. While lesson plan on conventional teaching method (lecture method) was used to teach students in control schools. Post-test was administered to students after four weeks of teaching in both experimental and control schools. The data obtained from the pre-test and post-test scores were analyzed. Means and standard deviations were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. The justification for the use of ANCOVA is due to control extraneous variables of non-equivalent subjects as more than two variables were considered in the study.

Results

Results obtained from that data are discussed as follows. The results were based on the data analyzed. Mean and standard deviation were used to answer the research questions while hypotheses were tested using analysis of Covariance.

Research Question 1:What is the effect of multi-media teaching strategy and conventional methods on students' mean performance scores in biology?

Table 1: Mean Performance Scores of Students Taught Biology Using Multi-Media Teaching Strategy and Conventional Method

Group	No. of Students	Mean Scores		Standard Deviation	Mean gain
		Pre-test	Post-test		
Experimental	148	20.36	37.84	1.50	17.48
Control	178	19.2	22.48	2.22	13.28
Mean Difference		1.16	15.36		4.20
Total	324				

Table 1 shows that the mean performance scores of students taught biology using multi-media teaching strategy is 20.36 at the pretest stage. But their mean performance score at the post test stage is 37.84 with a standard deviation of 1.50. While the students taught biology using conventional method has mean performance score of 19.20 at the pretest stage. But at the post test stage, their mean performance score is 22.48 with a standard deviation of 2.22. This by implication shows that, mean scores gain by students taught biology using biology strategy was 17.48 while those taught biology using the conventional method was 13.28 with a mean score difference of 4.20. Thus, those taught with biology strategy did better in performance.

Research Question 2:What is the effect of multi-media teaching strategy on mean performance scores of male and female students in Biology?

Table 2: Mean Performance Score of Male and Female Students Taught Biology Using Multi-Media Teaching Strategy

Group	No. of Students	Mean Scores		Standard Deviation	Mean gain
		Pre-test	Post-test		
Male	148	18.33	34.18	2.38	15.85
Female	176	20.82	37.50	1.77	16.68
Mean Difference		2.49	3.32		
Total	324				

Table 2 shows that for the experimental group, the mean performance scores of male students at both pretest and posttest stages are 18.33 and 34.18 respectively while those of the female are 20.82 and 37.5 respectively. The analysis reveals that the mean performance score of female experimental students is higher than that of the male experimental students. This implies that the posttest mean performance of female students is slightly higher than the male students. Thus, female performs better than male when multi-media teaching strategy was used.

Test of Hypotheses

Hypothesis one: There is no significant difference between the mean performance scores of students taught biology using multi-media teaching strategy and those taught with conventional method.

Table 3: Analysis of Covariance of the Effect of Multi-Media Teaching Strategy and Conventional Teaching Method on the Students' Performance in Biology

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	6566.237	4	1641.559	19.642	.000
Intercept	25766.759	1	25766.759	308.312	.000
Pretest	2079.363	1	2079.363	22.881	.000
Treatment	3925.154	1	3925.154	46.966	.000
Sex	16.080	1	16.080	.192	.661
Treatment*Sex	3.204	1	3.204	.038	.845
Error	18636.904	322	83.574		
Total	767572.000	324			
Corrected Total	25203.140	324			

The analysis of data in Table 3 shows that the probability value associated with the calculated value of F (46.966) for the effect of method on the performance of students in biology is 0.000. Since this value (0.000) is less than the 0.05 level of significance, the null hypothesis is not rejected. Hence there is a significant difference in the mean performance scores of students taught biology using multi-media teaching strategy with mean score of 37.84 and those taught using conventional strategy with mean score of 22.48 which was in favour of the students taught Biology using multi-media teaching strategy.

Hypothesis 2: There is no significant difference between the mean score of performance male and female students taught biology using multi-media teaching strategy.

Table 4: Analysis of Covariance for the Effect of Multi-Media Teaching Strategy on Performance of Male and Female Students in Biology

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2011.375	4	2011.375	16.142	.000
Intercept	9014.145	1	9014.145	42.110	.000
Pretest	3882.076	1	3882.076	14.162	.000
Treatment	3743.112	1	3743.112	26.966	.000
SexGender	18.080	1	18.080	.122	.332
Treatment * Sex	2.412	1	2.412	.018	.242
Error	16224.406	322	56.214		
Total	68252.000	324			
Corrected Total	1178.601	324			

Table 4 shows that the probability value of F (0.122) for the effect of gender on students achievement is 0.05 level of significance, the null hypothesis was not rejected. Thus, there is no significant difference between the mean achievement score of male and female students taught biology using multi-media teaching strategy. Though, the female students perform slightly better than the male.

Discussion of findings

The result of this study, in Tables 1 and 3 have shown that students taught biology using multi-media teaching strategy significantly achieved better in the BPT than those taught basic science using conventional method. The result of those taught biology using multi-media teaching strategy at posttest level had the highest mean achievement score of 37.84 while the conventional method had the least mean achievement score of 22.48. This results shows that multi-media group differed from the conventional method in the mean performance score by 15.36. It can therefore be seen that multi-media group achieved better than conventional lecture method group. This result shows that students score at large extent depend on instructional teaching method applied by biology teachers. Therefore the finding of this study concord with the view of Fakiye (2021) who found out that students exposed to multi-media instructional strategy had higher scores and performed significantly better than those exposed to the conventional strategy.

Tables 2 and 4 shows that performance was enhanced slightly in favour of female than male students in biology by 3.32. The study revealed that gender has no significant effect on student academic performance in biology. Thus female and male students slightly differ in their academic performance in biology when taught biology using multi-media teaching strategy. This result is in agreement with the findings of Tubonemi and Martha (2021) who find out in their research that there is no significant difference in the achievement of male and female students who were taught biology using multi-media teaching strategy. On the contrary, the findings

disagree with findings by Greenwood, Carta and Hall (2012) which noted that male students performed better than female students in science subjects such as biology.

Summary of the Findings

1. Multi-media teaching strategy enhanced the student's academic performance in biology than the conventional strategy of instruction..
2. Academic performance was enhanced slightly in favour of female students than male students taught biology using multi-media teaching strategy.

Recommendations

Based on the findings in the study, the following recommendations were made.

1. Biology teachers should use more of interactive strategies such as multi-media teaching strategy in teaching to improve students' performance in Biology.
2. Government at all levels should in providing funds to enable teachers undergo professional training through organizing workshops and seminars centered on the use of multi-media teaching strategy to promote science teaching.
3. There should be more collaboration among science educators, curriculum reviewers and planners in modifying existing Biology curriculum to accommodate content that focuses on multi-media teaching strategy and all gender friendly learning materials.

Conclusion

The growing concern in the educational sector is the need for teachers to deploy teaching strategies facilitate teaching and learning in science subjects. Thus, the results of the study have revealed that the use of multi-media teaching strategy in teaching fostered students' performance in biology than conventional method. Secondly, the study also revealed that no gender disparity was found among male and female students taught biology using multi-media teaching strategy.

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