

Effects of Mentoring and Peer Tutoring Instructional Strategies on Secondary School Students' Interest and Achievement in Biology in Pankshin Zonal Education, Plateau State

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Abstract

The study determined the effects of mentorship and peer tutoring instructional strategies on secondary school students' interest, achievement and retention in Biology. Specifically, the study was guided by 4 objectives, 4 research questions were raised and 4 hypotheses which were tested at 0.05 levels of significance. The study adopted the non-randomized pre-test posttest control group design and the study area was Pankshin Zonal Education Inspectorate covering five (5) Local Government Areas of Plateau State. The population of the study consist of 6502 Senior Secondary One (SS1) Students. The sample for the study comprises 262 senior secondary one students. Three instruments namely: Biology Interest Questionnaire (BIQ), Biology Achievement Test (BAT) and Biology Retention Test (BRT) were used as instruments for data collection. The instruments were validated by five experts. The Biology Interest Questionnaire yielded a reliability coefficient of 0.81, while the Biology Achievement Test yielded a reliability coefficient index of 0.91. The researcher visited the sampled schools and sought permission from the principals of the various schools in which the study was carried out. The regular Biology teachers in the selected schools were used as research assistants for the study. The research assistants in each school helped the researcher to collect data and the data collected were analyzed using descriptive statistics of mean and standard deviation and inferential statistics of ANCOVA. The study found that the students taught Biology using mentoring strategy improved more in interest ratings, academic achievement and retention than those taught using the conventional method and the differences between the two groups were statistically significant. The study also found that the students taught Biology using peer-tutoring strategy improved more in interest ratings, academic achievement and retention than those taught using the conventional method and the differences between the two groups were statistically significant. Based on the findings of this study, it was concluded that the mentorship and peer-tutoring strategies are effective ways of improving students' interest and achievement in Biology irrespective of the gender of the students. The study recommended that schools should incorporate mentoring strategies into Biology instruction to enhance students' interest and engagement in the subject and those teachers should provide proper training for student tutors to ensure the effectiveness of peer-tutoring, enhancing the overall learning experience and academic interest in Biology.

Keywords: Mentoring, Peer-tutoring, interest, achievement, instructional strategies

Introduction

Science has become a critical factor in the sustainable development worldwide. Hence the world today can rightly be described as that of science and technology. Nations all over the world are striving to develop their science and technology because it has contributed significantly to the quality of life in areas like Health, Agriculture, Education, Communication, Energy, and Transport, amongst others. For this reason, nations strive so daringly to develop their human and natural resources to the fullest. Hence, nations all over the world, especially the developing ones like Nigeria are striving hard to develop scientifically and technologically. This is because the world is turning scientific and all proper functioning of lives depend greatly on science (Adejoh, Amali & Omega 2013) and nations that claimed developed is as a result of science and technology (Adejoh & Ekele, 2014; Obiekwe, 2018).

Biology is the scientific study of life and living organisms, including their structure, function, growth, evolution, distribution, and interrelationships. It covers a wide range of fields and specialties that explore life at various levels, from the molecular and cellular levels to the ecosystem and biosphere levels. Biology is the study of plants and animals (Michael, 2015). It is one of the science subjects studied at the senior secondary school level in Nigeria. It is among the science subjects taken in Senior School Certificate Examination (SSCE). Many students that registered for these science subjects in secondary schools in Nigeria performed poorly in internal and external examinations (Ikitde, & Edet 2013). The study of Biology in senior secondary schools according to Obiekwe (2018) can equip students with useful concepts, principles and theories that will enable them face the challenges before and after graduation.

Biology teaching needs to be friendly and relevant in order to make necessary provisions for students' active participation in the learning process so that they will be able to connect scientific theories and concepts to real purposes and practices in the world in which we live. Among the methods and strategies for teaching Biology are demonstration, peer-tutoring, cooperative learning, problem-solving method, expository method, inquiry-based teaching approach, among others. Unfortunately most teachers teach Biology using predominantly the traditional or lecture method (Aniakwu, 2012). Lecture method according to Adeyemi (2018) is a teaching approach that entails verbal presentation of scientific facts, concepts and principles to learners. During lecture, teacher focuses the students' attention on the key points in the lesson and may use diagrams or other representations to elaborate on the subject matter. A neglected variable in the teaching and learning of Biology is the students' learning abilities. The objectives of science teachers are to identify the ability of students in their classroom and device teaching strategies that could best carry along the entire class during lesson. Hence, the need for a strategy that will ease the way teacher teaches such as mentoring and peer-tutoring instructional strategies.

Mentorship is the act of supporting and encouraging younger ones to manage their learning behaviors for career success by older individual (Anagbogu & Nwokolo, 2015). According to Anthony *et al.* (2018), mentorship is not a new concept in the academic circles. One way to maintain academic standard and performance is mentoring - a training and development relationship that enhances an individual's professional growth (Salami, 2010). Mentorship in Biology means to support and encourage young Biology students to manage their own learning in

order that they can maximize their skills, improve their performance and become the person they want to be, as well as have an opportunity to think about options and progress. Mentorship is a powerful personal development and empowerment tool. It is an effective way of helping young Biology students to progress in their career and is increasingly imperative. It is a partnership between two people (mentor and mentee) normally working in a similar helpful relationship based upon mutual trust respect (Schwartz & Leelawong, 2017). The central focus of mentoring is learning through knowledge and skills acquisition. The learning process requires that responsibilities be shared between mentee and mentor (Usman, 2017). The more experienced and skilled mentor guides and nurtures the less experienced mentee to foster growth and development (Wheeler, 2019).

The actions in mentorship are focused on providing support through modeling, teamwork, questioning, observations, and critical constructive feedback. This allows practices-embedded professional development through synergy and leveraging of knowledge and skills. The mentor provides guidance, instruction and encouragement aimed at developing the competence and character of the mentee. The development of a mentoring relationship between teacher/student was believed by Jegede & Olu-Ajayi (2017) to reinforce the students' interest and confidence in his ability to learn as it reduces the teacher-student barrier. It was recorded by Kalu-Uche & Ogbonna (2020) that positive perceptions of teacher-student relationships are consistently associated with increase in motivation, academic competence and achievements, school engagements, school value, and behavioral adjustment. Similarly, the mentoring relationship may contribute either directly or indirectly to the child's success in school. Another teaching strategy that can affect students' interest, achievement and retention in Biology is Peer tutoring.

Peer tutoring is one of the strategies of instructions that involve students teaching other students. Peer tutoring was described by Kalu-Uche & Ogbonna (2021) as an instructional strategy that permits students to assist one another learn materials reinforce skills or practice a learned task. Similarly, Aminu (2019) stated that a peer is more sensitive active and responsive to picking up Biology concepts and other nonverbal cues. When a peer tutoring strategy is designed properly each of the participating students gets more attention from the tutor and freer to speak, interact and contribute to topical issues within the and without the course contents, thereby enhancing their active knowledge construction and understanding. Peer tutoring has the capacity to assist learners receive individualized and targeted instructions that they do not get in the traditional teaching method.

Peer tutoring instructional strategy is an instructional process by which a learner helps one or more students on the same grade level to learn a skill or concept (Kalu-Uche & Ogbonna, 2021). This method has been described as a type of cooperative learning that is effective at increasing students' academic achievement at various stages of learning (Idris, 2019). Peer tutoring that has to do with students' partnership where students teach their peers, linking high and low achievers or with those comparable achievements which help the low achieving students to gain knowledge through practice and reinforcement. The teacher serves as a facilitator hence Ayuba (2011) noted that it's a powerful means of developing academics as well as social skills in both the tutor to have more time to speak while others listen and this greatly enhances communicative skills as they actively construct knowledge. This helps the students to solve problems and is most effective in solving skills and learning difficult concepts become easier (Kayode, 2021). This peer tutoring is very significant in the context of learning among students and it offers some advantages such as peer tutors speak the same language and connect with the students, peer tutors serves as role

models and mentors to other students. A student who is working with another student is less anxious, more comfortable and less afraid to speak and ask questions. Students often feel a strong sense of partnership in working with the peers because they are close and less distance with the tutor and the tutee. The tutor is happy because they want to help the tutee. Peer tutoring helps the students to develop self-responsibility and self-direction and create sense of independence. The major goal is to help the tutee to master the subject matter, learn new ideas, friendship with enhanced social skills thus making learning more meaningful and real and when concepts are meaningfully learned it enhances achievement and increases students' interest and retention capacity.

The cardinal objectives of any teaching and learning is the process that the learner is able to carry out a specific task and if possible, transfer the knowledge in solving problem in a new situation. It is unfortunate that despite several efforts been made by different scholars, these objectives are hardly realized over the years. The persistent poor performance in science among students makes it imperative to keep on searching for better instructional strategies for effective teaching and learning of scientific concept especially at the secondary school level where the foundation of science is laid. Over the years, various reports have revealed the poor performance of students especially in science subjects at the secondary school public examination this could be as result of poor instructional teaching strategy (Tofi, Achor & Eje, 2022). According to WAEC report from 2015-2022, there has been a decline in the achievement of students in Biology in Pankshin Educational Zonal, Plateau State, (WAEC Chief Examiner's Report, 2015, 2018, 2019, 2020, 2021, & 2022). Several reasons have been adduced by Shahjam, Ahmed, Islam, & Khan, (2022) that poor results manifested into lack of employment, high level of anxiety, depression, demotivation, discouragement, hopelessness, and doubtfulness and is supported by Mahrukh (2022) that it is detrimental to the future of students who are nation builders while some capitalize on the prevalence of misconceptions that hinder proper understanding and meaningful learning (Ejekwu & Ogunlaye, 2020; Kayode, 2020). Tofi, Achor, and Eje, (2022) hinged the poor performance on poor pedagogic skill and inadequate teaching facilities. In order to deal with the problem of teaching methods as it affects students' achievement in science, there has been a sudden rise of researchers into innovative teaching techniques. Yet not much has been recorded in terms of progress in interest, achievement and retention especially in Biology.

It is against this background that the researcher decided to investigate the effects of mentorship and peer-tutoring teaching strategies on students' interest achievement and retention in Biology in Plateau State.

Objectives of the Study

Specifically, the study addressed the following objectives:

1. To examine the mean difference in interest ratings of students taught Biology using the mentorship instructional strategy and conventional method.
2. To determine the mean difference in academic achievement of students taught Biology using the mentorship instructional strategy and conventional method.
3. To examine the mean difference in interest ratings of students taught Biology using the peer-tutoring instructional strategy and conventional method
4. To determine the mean difference in academic achievement of students taught Biology using the peer-tutoring instructional strategy and conventional method

Research Questions

The following research questions were raised to guide this work:

1. What is the mean difference in interest ratings of students taught Biology using the mentorship instructional strategy and conventional method?
2. What is the mean difference in academic achievement of students taught Biology using the mentorship instructional strategy and conventional method?
3. What is the mean difference in interest ratings of students taught Biology using the peer-tutoring instructional strategy and conventional method?
4. What is the mean difference in academic achievement of students taught Biology using the peer-tutoring instructional strategy and conventional method?

Hypotheses

The following hypotheses were formulated to guide the research work and would be tested at 0.05 level of significance:

1. There is no significant difference in the mean interest ratings of students taught Biology using the mentorship instructional strategy and conventional method.
2. There is no significant difference in the mean academic achievement of students taught Biology using the mentorship instructional strategy and conventional method.
3. There is no significant difference in the mean interest ratings of students taught Biology using the peer-tutoring instructional strategy and conventional method
4. There is no significant difference in the mean academic achievement of students taught Biology using the peer-tutoring instructional strategy and conventional method

Research Methodology

The study adopted quasi experimental research design. A quasi-experimental design is a research design that aims to establish a cause and effect relationship between an independent and dependent variable. This study specifically adopted the non-randomized, pretest, post-test, experimental and control group design. This design is selected because the subjects were not randomized as this would disrupt the normal classroom organization of the schools. The study used students in intact classes. Hence, intact classes of students were randomly assigned to the experimental and control groups.

The Study Area

This study was carried out in Pankshin Zonal Education Inspectorate covering five (5) Local Government Areas of Plateau State. The five Local Government Areas are Mangu, Pankshin, Bokkos, Kanke and Kanam L.G.As which politically they are regarded as the Plateau Central Senatorial Zone of Plateau State with an estimated population of about 1,963,797 people based on the 2006 census. The Zonal Inspectorate Office headquarters is located in Pankshin, Pankshin Local Government Area Plateau State in Central Nigeria along the Plateau Hills.

Population of the Study

The population of the study consist of 6502 Senior Secondary One (SS1) Students in all government approved secondary schools in Pankshin Zonal Inspectorate office of Plateau State that are offering Biology (Plateau State Ministry of Education, 2023). The choice of Senior Secondary School One (SS 1) is considered suitable for this study because, it is where the foundation of sciences is properly laid at the senior secondary school level and mentorship and peer tutoring in any field is best achieved at the foundation.

Sample and Sampling Technique

The sample for the study comprises 262 senior secondary one students. This comprises 128 males and 134 female students. The sample size was arrived at using six intact classes. The study adopted multi-stage sampling procedure. At the first stage, three local government areas were randomly selected for the study. At the second stage, two schools each were selected randomly from the three local government areas selected for this study. Two schools were selected for the control group, two schools for the experimental group one (students taught Biology using mentorship instructional strategy) and two schools for the experimental group two (students taught Biology using peer-tutoring strategy). The control group contained 79 students, the experimental group one contained 88 students while the experimental group two contained 95 students. In all, two schools were used for the control group and four schools were used for the experimental groups. The schools selected are co-educational because gender is a moderating factor in the study. A total of 12 arms of classes were used in all the schools selected for this study

Instrument for Data Collection

Three instruments were used to collect data for this study these are:

Biology Interest Questionnaire (BIQ)

The Biology Interest Questionnaire was developed by the researcher. It has section A and B. Section A is on personal data while section B consists of statements on students' emotions, likes, values, knowledge and engagement in Biology learning. It is based on four-point Likert like Scale. The students are required to respond to items using the responses of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). The ratings range from 4 to 1 point for all positive statements and 1 to 4 points for all negative statements. The BIQ consists of 30 items and were used in the study to measure the interest of the students towards Biology.

Biology Achievement Test (BAT)

Biology Achievement Test (BAT) was adapted by the researcher using some of the items from WASCCE 2017-2023 that were relevant to the study. It is made up of two sections: A and B. Section A consists of personal information of the students such as name of school, class, sex, date and time/duration. Section B consists of 40 multiple choice questions from SS one curriculum. The items were drawn based on the second term SS one curriculum which are Tissues and Supporting Systems. The questions depend on the volume of the content in WASSCE syllabus and as shown in the test Blue Print Table. Each question carries equal mark (2 marks).

Biology Retention Test (BRT)

The Biology Retention Test (BRT) was a reshuffled version of BAT that was conducted two weeks after the administration of the BAT. It has the same contents and number of questions as BAT but differs in the arrangement of the questions and the options.

Validation of the Instruments

The instruments were validated by five experts. One of the experts was from Taraba State University, Jalingo the second was from Federal University Lafia, while the two experts was from Federal College of Education Pankshin and one a seasoned Biology teacher from a Government Secondary School, Mangu Halle. The corrections and suggestions made by the experts who

validated the instrument were affected accordingly to improve the validity of the instruments. The instruments constructed by the researcher, were given face and content validation to three experts. A copy of the upper Biology subject curriculum, lesson plans and marking scheme were given to them to enable them carry out objective validation of the items of the instruments. The appropriateness of the items, construction and the structure of the questions, suitability of questions and options and scope (coverage) of the questions as well as the stated behavioral objectives were requested to be confirmed by the validators. They also checked if there were sufficient varieties on the test scores ensuring that there was no miss-specification on the linked function or omission of relevant non-linear terms on the achievement test. The language used in the construction of some items in the instructions were reframed to the simpler forms for clarity and were modified with regards to the information each instrument was soliciting for. All corrections were made based on the validators' comments than final copies were used for the study (see Appendix J).

Reliability of the Instruments

To establish the internal consistency of the instruments (Biology Interest Questionnaire and Biology Achievement Test), the instruments were trial-tested on twenty (20) Senior Secondary One (SS 1) students of Government Secondary School Bet, Pankshin, in Pankshin Local Government of Plateau State who were not part of the main study but have the same characteristics with the main sample of the study. Cronbach Alpha method was used to determine the reliability coefficient of the Biology Interest Questionnaire. The Cronbach Alpha coefficient was used because the items of the instrument were not dichotomously scored. In other words, the items of the instrument do not have a right or wrong answers but are based on the feelings and emotional states of the respondents. The Biology Interest Questionnaire yielded a reliability coefficient of 0.81.

Test re-test method was used to determine the stability of the responses of the respondents on the Biology Achievement Test. To estimate the reliability of the test by means of Test re-test as an index of stability, the same test was administered twice to the same group of respondents with a time interval of four (4) days between the administering the test. The resulting test scores were correlated using spearman Rank order and a correlation coefficient of 0.91 was obtained. The choice of test re-test method was because the items on the instrument were dichotomously scored. In other words, the items have a right or wrong answer. The reliability coefficients of 0.81 and 0.91 obtained for the Biology Interest Questionnaire and the Biology Achievement Test respectively indicating that both instruments are highly reliable and thus can be used for the study.

Method of Data Collection

The researcher employed the help of biology teachers as research assistants who helped in the administration of the pre-test for the students' that participated in the study before the treatments. Thereafter, the research assistants taught the topic for the study using conventional classroom method for the student in the control group. Mentorship and Peer tutoring intervention were introduced to the experimental groups. The teaching period lasted for four weeks after which the post-test, BIQ and BAT were administered to the experimental group. And two weeks after the post-test the Retention Test (BRT) was administered to the experimental group.

Data Analysis Techniques

The data collected were analyzed using descriptive statistics of mean and standard deviation to answer the research questions. The research hypotheses were tested using inferential statistics of Analysis of Covariance (ANCOVA) at significant level of $P=0.05$. The choice of ANCOVA is due to the fact that it provides method of statistical control of the differential in the criterion scores attribute to covariate that is the case where experimental control of a covariate has not been done.

RESULTS

Research Question One

What is the mean difference in interest ratings of students taught Biology using conventional method and those taught using mentorship instructional strategy?

Table 1: Mean and Standard Deviation of the Interest Ratings of Students Taught Biology Using Mentorship instructional strategy and Those Taught using conventional method

Groups	N	Pre-test		Post-test	
		Mean	SD	Mean	SD
Conventional	79	1.85	0.37	2.00	0.40
Mentoring	88	2.58	0.24	2.62	0.30
Mean Diff.		0.73		0.62	
N Total	167				

The result presented in Table 1 shows that the mean interest ratings of students taught Biology using conventional method is 1.85 with a standard deviation of 0.37 in the pre-test and 2.00 with a standard deviation of 0.40 in the post-test. Similarly, the result shows that the mean interest ratings of students taught Biology using mentorship instructional strategy is 2.58 with a standard deviation of 0.24 in the pre-test and 2.62 with a standard deviation of 0.30 in the post-test. Inferring from Table 1, it is obvious that the experimental group improved more in the interest ratings than the control group. Also, the mean difference between the control and experimental groups was 0.73 for pre-test and 0.62 for post-test. The mean differences indicate that the experimental group out-performed the control group. To ascertain if the observed difference in the mean interest rating was significant, the corresponding hypothesis was tested.

Research Hypothesis One

There is no significant difference in the mean interest ratings of students taught Biology using the mentorship instructional strategy and conventional method.

Table 2: Analysis of Covariance of Significant Difference in the Mean Interest Ratings of Students Taught Biology Using Mentorship instructional strategy and conventional method

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	23.563 ^a	2	11.781	119.795	.000	.571
Intercept	5.833	1	5.833	59.308	.000	.248
PreInterest	3.195	1	3.195	32.483	.000	.153
Group	2.355	1	2.355	23.943	.000	.117
Error	17.702	180	.098			
Total	1037.345	183				
Corrected Total	41.265	182				

The result of the Analysis of Covariance presented in Table 2 shows that the P-value of 0.000 is less than 0.05 level of significant at 1 degree of freedom. This shows that the test was significant. The result implies that there is a significant difference in the mean interest ratings of students taught Biology using the mentorship instructional strategy and conventional method. Therefore, the null hypothesis of no significant difference was rejected.

Research Question Two

What is the mean difference in the academic achievement of students taught Biology using conventional method and those taught using mentorship instructional strategy?

Table 3: Mean and Standard Deviation of the Academic Achievement of Students Taught Biology Using Mentorship instructional strategy and Those Taught Using Conventional Method

Groups	N	Pre-test		Post-test	
		Mean	SD	Mean	SD
Conventional	79	41.0	5.57	42.2	7.30
Mentoring	88	49.2	8.10	54.2	7.53
Mean Diff.		8.2		12.0	
N Total	167				

The result presented in Table 3 shows that the mean academic achievement of students taught Biology using conventional method is 41.0 with a standard deviation of 5.57 in the pre-test and 42.2 with a standard deviation of 7.30 in the post-test. Similarly, the result shows that the mean academic achievement of students taught Biology using mentorship instructional strategy was 49.2 with a standard deviation of 8.10 in the pre-test and 54.2 with a standard deviation of 7.53 in the post-test. Inferring from Table 3, it is obvious that the experimental group improved more in their academic achievement than the control group. Also, the mean difference between the control and experimental groups was 8.2 for pre-test and 12.0 for post-test. The mean differences indicate that

the experimental group out-performed the control group. To ascertain if the observed difference in the academic achievement is significant, the corresponding hypothesis was tested.

Research Hypothesis Two

There is no significant difference in the mean academic achievement of students taught Biology using the mentorship instructional strategy and conventional method.

Table 4: Analysis of Covariance of Significant Difference In the Academic Achievement of Students Taught Biology Using Mentorship instructional strategy and conventional method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	7918.873 ^a	2	3959.437	63.839	.000	.415
Intercept	10050.703	1	10050.703	162.049	.000	.474
PreAchievement	16.445	1	16.445	.265	.607	.001
Group	5991.151	1	5991.151	96.596	.000	.349
Error	11164.070	180	62.023			
Total	472432.400	183				
Corrected Total	19082.943	182				

The result of the Analysis of Covariance presented in Table 4 shows that the P-value of 0.000 is less than 0.05 level of significant at 1 degree of freedom. This shows that the test is significant. The result implies that there was a significant difference in the mean academic achievement of students taught Biology using the mentorship instructional strategy and conventional method. Therefore, the null hypothesis of no significant difference was rejected.

Research Question Three

What is the mean difference in interest ratings of students taught Biology using peer-tutoring strategy and those taught using conventional method?

Table 5: Mean and Standard Deviation of the Interest Ratings of Students Taught Biology Using Peer-Tutoring strategy and Those Taught Using Conventional Method

Groups	N	Pre-test		Post-test	
		Mean	SD	Mean	SD
Conventional	79	1.85	0.37	2.00	0.40
Peer-tutoring	95	2.56	0.26	2.75	0.27
Mean Diff.		0.71		0.75	
N Total	167				

The result presented in Table 5 shows that the mean interest ratings of students taught Biology using conventional method was 1.85 with a standard deviation of 0.37 in the pre-test and 2.00 with a standard deviation of 0.40 in the post-test. Similarly, the result shows that the mean interest rating of students taught Biology using peer-tutoring strategy was 2.56 with a standard deviation of 0.26 in the pre-test and 2.75 with a standard deviation of 0.27 in the post-test. Inferring from Table 7,

it is obvious that the experimental group improved more in the interest ratings than the control group. Also, the mean difference between the control and experimental groups was 0.71 for pre-test and 0.75 for post-test. The mean differences indicate that the experimental group outperformed the control group. To ascertain if the observed difference in the mean interest rating was significant, the corresponding hypothesis was tested.

Research Hypothesis Four

There is no significant difference in the mean interest ratings of students taught Biology using the peer-tutoring instructional strategy and conventional method

Table 6: Analysis of Covariance of Significant Difference in the Mean Interest Ratings of Students Taught Biology Using Peer-Tutoring instructional Strategy and Conventional method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	29.708 ^a	2	14.854	152.685	.000	.629
Intercept	8.473	1	8.473	87.097	.000	.326
PreInterest	2.324	1	2.324	23.892	.000	.117
Groups	5.541	1	5.541	56.953	.000	.240
Error	17.511	180	.097			
Total	1096.113	183				
Corrected Total	47.219	182				

The result of the Analysis of Covariance presented in Table 8 shows that the P-value of 0.000 was less than 0.05 level of significant. This shows that the test was significant. The result implies that there is a significant difference in the mean interest ratings of students taught Biology using the peer-tutoring instructional strategy and conventional method Therefore, the null hypothesis was rejected.

Research Question Four

What is the mean difference in the academic achievement of students taught Biology using peer-tutoring instructional strategy and those taught using conventional method?

Table 7: Mean and Standard Deviation of the Academic Achievement of Students Taught Biology Using Peer-Tutoring instructional strategy and Those Taught Using Conventional Method

Groups	N	Pre-test		Post-test	
		Mean	SD	Mean	SD
Conventional	79	41.0	5.57	42.2	7.30
Peer-tutoring	88	47.2	7.42	62.9	8.26
Mean Diff.		6.20		20.7	
N Total	167				

The result presented in Table 7 shows that the mean academic achievement of students taught Biology using conventional method is 41.0 with a standard deviation of 5.57 in the pre-test and 42.2 with a standard deviation of 7.30 in the post-test. Similarly, the result shows that the mean academic achievement of students taught Biology using peer-tutoring strategy was 47.2 with a standard deviation of 7.42 in the pre-test and 62.9 with a standard deviation of 8.26 in the post-test. Inferring from Table 8, it is obvious that the experimental group improved more in their academic achievement than the control group. Also, the mean difference between the control and experimental groups was 6.2 for pre-test and 20.7 for post-test. The mean differences indicate that the experimental group out-performed the control group. To ascertain if the observed difference in the academic achievement was significant, the corresponding hypothesis was tested.

Research Hypothesis Four

There is no significant difference in the mean academic achievement of students taught Biology using the peer-tutoring instructional strategy and conventional method

Table 7: Analysis of Covariance of Significant Difference in the Academic Achievement of Students Taught Biology Using Peer-Tutoring Strategy and Conventional Method

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	19433.318 ^a	2	9716.659	156.317	.000	.635
Intercept	9300.813	1	9300.813	149.627	.000	.454
PreAchievment	124.609	1	124.609	2.005	.159	.011
Groups	15135.457	1	15135.457	243.491	.000	.575
Error	11188.819	180	62.160			
Total	564617.400	183				
Corrected Total	30622.137	182				

The result of the Analysis of Covariance presented in Table 7 shows that the P-value of 0.000 was less than 0.05 level of significant. This shows that the test was significant. The result implies that there is no significant difference in the mean academic achievement of students taught Biology using the peer-tutoring instructional strategy and conventional method Therefore, the null hypothesis was rejected.

Discussions of Findings

The study found that the students taught Biology using mentorship instructional strategy improved more in interest ratings than those taught using the conventional method and the difference in the mean interest ratings between the two groups was statistically significant. This finding maybe due to the fact that mentorship instructional strategy provides students with tailored support and individualized attention, fostering a deeper interest in Biology. Also, mentoring often encourages more interactive and meaningful learning experiences, which can increase student motivation and interest compared to conventional methods. The findings of this study agree with that of Jegede & Olu-Ajayi (2017) who found that mentorship instructional strategy improves students' interest, achievement and retention

The study found that the students taught Biology using mentorship instructional strategy improved more in academic achievement than those taught using the conventional method and the difference in the mean academic achievement between the two groups was statistically significant. The findings of this study agree with that of Edekwor and Adatorworyor (2023) who found that students exposed to the peer mentoring instructional technique did much better than those exposed to the speak and chalk style of teaching.

The study found that the students taught Biology using mentorship instructional strategy improved more in retention than those taught using the conventional method and the difference in the mean retention between the two groups was statistically significant. The findings of this study agree with that of Jegede & Olu-Ajayi (2017) who found that mentorship instructional strategy improves students' interest, achievement and retention.

The study found that the students taught Biology using peer-tutoring strategy improved more in interest ratings than those taught using the conventional method and the difference in the mean interest ratings between the two groups was statistically significant. The findings align with that of Kayode (2021) who found that students taught using peer-tutoring performed better than those taught using the conventional method.

The study found that the students taught Biology using peer-tutoring strategy improved more in academic achievement than those taught using the conventional method and the difference in the mean academic achievement between the two groups was statistically significant. The findings of this study agree with that of Irfan, Rabia & Muhammad (2018) who found that the mean score of the experimental group was significantly better than that of the control group.

Conclusion

Based on the findings of this study, it was concluded that mentoring and peer-tutoring strategies are effective ways of improving students' interest, achievement and retention in Biology irrespective of the gender of the students.

Recommendations

In view of the findings of the study, the following recommendations were made.

- i. Schools should incorporate mentoring strategies into Biology instruction to enhance student interest and engagement in the subject.
- ii. Teachers should provide proper training for student tutors to ensure the effectiveness of peer-tutoring, enhancing the overall learning experience and academic interest in Biology.
- iii. School should provide training for teachers to effectively facilitate and manage mentoring and peer-tutoring activities.
- iv. Relevant stakeholders should establish channels for feedback from students to continually improve mentoring and peer-tutoring programs.
- v. Biology curriculum developers should integrate mentoring and peer tutoring into the curriculum.

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