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Effects of Scaffolding Instructional Strategy on Students' Performance, Gender and Location In Biology among Secondary School Students in Ekiti State, Nigeria

Author(s), ABIDAKUN, Ojo Titus (Ph.D), OKEYA, Abiodun Emmanuel (Ph.D), ADEDEJI, Florence Taiwo (Ph.D)

Abstract:

The study examined the effects of scaffolding instructional strategy on students' performance, gender and location in Biology among secondary school students in Ekiti State, Nigeria. Specifically, the study ascertained the difference in the pre-test and post-test mean scores of students exposed to scaffolding instructional strategy and conventional method of teaching Biology in secondary schools. The study investigated of gender and location on students' performance. This study adopted a two group quasi-experimental of pre-test, post-test and control group design. The population for the study comprised 12,585 SSII students in 205 public secondary schools in Ekiti State, Nigeria. The sample for the study consisted of 159 SS II students in the selected schools using multistage sampling procedure. An instrument was designed to collect data for the study, Biology Performance Test (BPT). The instrument was validated by experts. The reliability of the instrument (BPT) was established using test-retest method of testing reliability. The reliability coefficient of 0.81 was obtained A question was raised and answered while four hypotheses were generated and tested. The data collected were analysed using descriptive and inferential statistics. Research question was answered using mean and standard deviation. Hypotheses were tested using t-test. The findings of the study showed that: there was significant effect of scaffolding instructional strategy on the performance mean scores,

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also gender and location has no effect on students' performance in Biology after treatment. Based on the findings it was recommended that, implementing scaffolding as instructional strategy can significantly enhance students' academic performance in Biology, Therefore, the use of scaffolding instructional strategy should be included into Biology curriculum.

Keywords: Scaffolding, Performance, Gender, Location,

About Author

Author(s):

ABIDAKUN, Ojo Titus (Ph.D)
Department of Science Education, Faculty of Education,
Ekiti State University, Ado - Ekiti.
titusabidakunoludare@gmail.com

OKEYA, Abiodun Emmanuel (Ph.D)

Department of Science Education, School of Science Education,
College of Education,
Bamidele Olumilua University of Education, Science and Technology
Ikere – Ekiti, Ekiti State, Nigeria.
okeya.abiodun@bouesti.edu.ng

ADEDEJI, Florence Taiwo (Ph.D)
Department of Science Education, Faculty of Education,
Ekiti State University, Ado - Ekiti.
adedejifloxyt@gmail.com

Introduction

Biology is a Science subject concerned with the study of living organisms with regards to their structure, function, growth, evolution, distribution, identification and taxonomy. The study of Biology enables man to understand the diversity of life forms, conservation and sustainable use of natural resources. Biology as a Science subject occupies a central position in the Science curriculum its inclusion as a core subject for Science students cannot be de-emphasized.

The benefits of Biology for the development of any nation are too numerous to mention, and this is because Biology plays a key role in industrialization and other sectors of the economy. It serves as a prerequisite subject for most Science and related professions like Biochemistry, Pharmacy, Medicine, Nursing, Environmental Sciences among others. According to Umoru and Onoja, (2017), the basic knowledge and skills acquired from the subject can be of tremendous help to man and the society. The impact of Biology on the life of living organisms is wide; all ensuring that the required standard of living for both plants and animals are maintained (Ugwadu & Joda, 2015).

There is no doubt about the immense contributions of Biology to the economic growth and development of a nation. Its inclusion as a core subject for students in Senior Secondary School calls for an effective teaching using various recommended strategies. Biology as a Science subject is practical oriented subject which focuses more on knowledge application than mere knowledge acquisition, its objectives as contained in the Federal Republic of Nigeria (FRN, 2014) includes among others are; to equip learners with meaningful and relevant knowledge of Biology, adequate laboratory and field skills, this can be achieved through effective teaching strategies. It is observed that the performance of students in external examination are not encouraging, However, Umaru, (2011), Joda & Mohammed, (2017) and Joda, (2018) in their reports showed that there is a persistent low performance in Senior Secondary Certificate Examination and National Examination Council Biology examinations annually. This low performance in Biology could be attributed to poor instructional delivery approaches adopted by teachers, students' attitudinal problems, teachers' laxity towards teaching, concentration on few topics for examination purpose and students inability to recall previously learnt materials (Umoru & Onoja, 2017).

The West African Examination Council (WAEC) chief Examiner's Report (2018) pointed out that among the factors that cause low achievement of students in Biology; poor instructional delivery approach to teaching by teachers is the most prominent factor. It observed that most Biology teachers seem not to understand other teaching strategies but hold on to the old chalk and talk method. Similarly, given students tasks seems not in vogue, few teachers that ventured into giving tasks do not mark to correct the students appropriately.

In pursuance of the objectives, content, and context of Biology, curriculum developers had recommended some teaching approaches which are learner-centered for the effective teaching and learning of the subject so as to bring the expected desired learning outcomes. Despite the recommendation for the use of these approaches by curriculum developers in

teaching Biology, students' performance in the subject seems not to be encouraging because teachers seem not to understand the importance of using the recommended approaches.

The low performance of students in Biology at Senior Secondary certificate examination raises doubt about the effectiveness of current teaching approaches in use by Biology teachers. More so some topics are perceived as difficult topics by secondary school Biology students. Exposing learners to the understanding of basic concepts in Biology and achieving desirable outcomes requires the use of creative, innovative and interactive teaching approaches such as scaffolding teaching strategies which may arouse the interest of the learners, demystify difficult concepts in Biology improve their attitude, retention and performance. In addition, it is counter-productive to present ideas to learners without fully engaging them in the learning process. According to Olagunju and Akpan (2019) practical skills should be considered when taking topics in biology as it has an effect on students' skills.

Looking at the past records of Biology from West African Senior Certificate Examination from the year 2017 to 2022 indicated that there is fluctuation in the results. The number of students with grade A1 – B3 in each of the year is observed to be dwindling also the number of students with the overall grades are not encouraging compared with the total population that wrote the examination. Also the number of students that have C4 –C6 are many which indicate that larger percentage of the students have credit passes which seems not to be adequate as they are likely to record low mark during admission process into higher institution. The number of students that have D7 –E8 and F9 seems to be larger as those in this category may not be admitted into higher institution. Generally, the results is fluctuating and not encouraging. This fluctuation in the performance of students in Biology has become an issue of great concern in recent times, however this might be as a result of teachers teaching strategies, students' attitude towards Biology, lack of adequate instructional materials among others.

Table 1: Analysis of Results of West African School Certificate Examination from 2017-2022

Year	***Total Candidate***	***A1-B3***	***%***	***C4-C6***	***%***	***D7-E8***	***%***	***F9***	***%***
2017	5641	1120	20	3333	59	570	10	618	11
2018	5578	1248	22.4	3389	61	466	8	475	9
2019	5563	824	15	3098	56	1069	19	572	10
2020	7161	642	9	3007	42	1719	24	1790	25
2021	6707	4765	71	1286	19	133	2	523	8
2022	7252	4230	58	1800	25	560	8	622	9

Source: Ekiti State Ministry of Education, Planning, Research and Statistics Department (2023)

The researcher observed that the fluctuation performance in the result released by West African Examination Council could be improve if new teaching methods are adopted by Secondary School Biology teacher because exposing learners to the understanding of basic

concepts in Biology and achieving desirable outcomes requires the use of creative, innovative and interactive teaching strategy such as scaffolding instructional strategy.

The word Scaffolding is derived from construction work, where it represents a temporary structure that is used to erect a building. In education, scaffolding strategy is a strategy of teaching where the teacher gives support or assistance to students in a learning situation which is tailored to the needs of the students with the intention of helping the students achieve their learning goals. The teacher gives or assigns the new tasks to students in stages and also allows the students to generate tasks and complete the tasks individually. Scaffolding instructional strategy may assist the students while learning new concept or skill in Biology this could eventually foster ability to use the knowledge acquired independently by the learners.

Scaffolding Instructional strategy may provide sufficient support to promote learning when concepts and skills are being first introduced to students. The teachers help the students master a task or a concept by providing support. These supports may include models, hints, partial solutions, think-aloud modelling, questioning, resource, compelling task, templates, coaching, guides and guidance, among others. These supports are gradually removed as students develop autonomous learning strategies, thus promoting their own cognitive, affective and psychomotor learning skills and knowledge.

Scaffolding is a teaching strategy which may provide creative ideas to individual learners and makes each interact with peers and transfer scientific knowledge. Transfer of knowledge here means knowledge gained while solving a particular problem in Biology is used to solve a likened task or used in another topic. The strategy limits the idea of teacher-centred instructional strategy where the transfer of teachers' knowledge to students in the order. It encourages the individual learner to be more industrious and be self-confident. The activities are student centred, and students are encouraged to ask their own questions, carry out their own finding and draw their own conclusion. Brunner,(1977) stated that scaffolding involves helpful structured interaction between an adult and a child with the aim of helping the child achieve a specific goal, the purpose of the support is to allow the child to achieve higher levels of development by simplifying the task or idea, motivating the child.

Scaffolding instructional strategy is designed for students to be actively engaged 'in doing things 'rather than in 'learning about' something. In doing things, the learner will not be passive; he will be a party to the provision of the solution. The learner is not only learning about what others brought as ideas, but he also brings the solution to the problem as a result of his observation, critical thinking and manipulations

Scaffolding instruction as an instructional strategy originated from Lev Vygotsky's social-cultural theory and his concept of the Zone of Proximal Development (ZPD). The Zone of Proximal Development is the distance between what children can do by themselves and the next learning that they can be helped to achieve with competent assistance (Margaret, 2018). It is the zone where instruction and learning can take place. The activities provided in scaffolding instruction are just beyond the level of what the learner can do alone. Scaffolding instruction is temporary, as the learners' abilities increase the scaffolding provided by the more knowledgeable other is progressively withdrawn. The learner may be able to complete

the task or master the concepts independently. Therefore, the goal of the educator when using the scaffolding instructional strategy is for the student to become an independent, self-regulating learner and problem solver.

Scaffolding instructional strategy of learning may help to improve students' performance and retention, self –esteem, critical thinking and interest. It is a teaching strategy that engages and motivates the learner to learn. The strategy also reduces uncertainty, stress, frustration, surprise, discontent, test anxiety, among others. Scaffolding instructional strategy may provide activities and tasks that will motivate or enlist the students' interest related task; simplify the task to make it more manageable and achievable for a student; may provide some direction in order to help the child focus on achieving the goal; clearly indicate differences between the student's work and the standard or desired solution; reduce frustration and risk, model and clearly define the expectations of the activity to be performed.

Janneke, Monique and Jos (2010) defined scaffolding as the support given by a teacher to a student when performing a task that the student might otherwise not be able to accomplish. There are three essential features of scaffolding that facilitate learning. The first feature has to do with the interaction between the expert (teacher) and the learner. This interaction should be collaborative for it to be effective. In the second feature learning should take place in the learner's Zone of Proximal Development (ZPD). This is the zone where instruction and learning can take place. To achieve that, the expert needs to be aware of the learner's current level of knowledge and then work to a certain extent beyond that level. The third feature of scaffolding is that the scaffold, the support and guidance provided by the expert, is gradually removed as the learner becomes more proficient.

The support and guidance provided to the learner are compared to the scaffolds in building construction where the scaffolds provide both "adjustable and temporal" support to the building under construction. The support and guidance provided to learners facilitate internalization of the knowledge needed to complete the task. This support is weaned gradually until the learner is independent. The scaffolding learning approaches become most effective when it contributes to the learning environment. Scaffolding is applied gradually, modified and finally removed according to the needs of the student.

Scaffolding strategy is a student-centred strategy which gives students more ownership of their learning, while gradually decreasing the teacher's role in the process. It also allows students to grasp the content in small chunks without being overwhelmed. Students receive guidance at the beginning of a task. Teacher support slowly decreases as students start to demonstrate mastery. Each stage allows the students to build upon the previous stage, and the teacher becomes more of a facilitator while the students become independent. Scaffolding strategy focuses on raising students' abilities one step at a time and removing support as they progress. This encourages and enables the students to be active learners in the teaching and learning process. Scaffolding begins with materials that are just a step beyond what the learners are able to accomplish unassisted. The teacher builds on the students' previous knowledge and then removes the support, allowing the learners to master the content.

In spite of the possible influences of scaffolding instructional strategy on students' retention and performance in Biology, there are possibilities that other factors may also affect students' performance and retention in Biology. For instance, findings from the study of Popoola (2014) showed that teacher's characteristics, students' attitude, gender differences, school location are among the factors that influence students' performance.

Students' performances play a crucial role in educational system. Yusuf, Onifade and Bello, (2016) refers academic performance as a measurable and observable behaviors of a student within a specific period. In schools, student's successes are reflected in their academic performances. The academic performance is considered as a criterion to judge their total potentiality and capacities. Therefore, academic performance occupies a very important place in education and learning as well. Morgan (2010) defined academic performance as an assessment strategy by which the evidence about students' learning is gathered through students' work on a performed task. That is achievement is reflected by the extent to which skills and knowledge has been impacted to a learner.

Conventional teaching method or traditional teaching method involving instructors and students interacting in a face to face manner in the classroom. It is a method aimed at enabling the teacher to communicate information to the learner, the common mode in this communication is the spoken word while the learners are the passive recipients. Many teachers are still teaching their students in the same manner as how they were taught and how their own teachers were taught, not much of progress in terms of the teaching perspectives (Anglin & Anglink, 2018). Transformation to these conventional methods of teaching results in fear and reluctance from teachers who find the change hard and risky.

Devinders and Zaitun (2016) cited that many teachers are still using conventional teaching classrooms while the teacher is explaining and writing on the board, students would be copying the same thing into their notes, some day-dreaming and some sleeping. Conventional teaching is also limiting room for more creative thinking and also not considering individual differences. According to Neji and Joda (2016) academic performance is the attainment of set objectives measure from the score obtained through a test. If a learner accomplished a task successfully and attained the specific goal for a particular learning experience, he/she is said to have achieved. Gender is a socio-cultural construct of ascribing characters and roles to sex such as male and female. Serious attention has been given to gender differences in Biology by researchers over the years. It has been one of the noticeable factors influencing the performance and attitude of students towards Biology. Biology is often considered to be a field in which male students have higher achievements, in terms of attitudes and academic performance.

Gender issues in academic performance has been the concern of educational researchers and administrators over the years. Different researchers have offered varying hypotheses to explain their observed gender differences in academic attainment. Yang (2010) defined gender as the social attributes and opportunities associated with being male and female and the relationships between women and men; girls and boys, as well as the relations between women and those between men. These attributes, opportunities and relationships are socially constructed and are learned through socialization processes. Gender refers to the

social meanings associated with being a male or a female, including the construction of identities, expectations, behaviors and power relationships that are derived from social interactions.

According to a study carried out by Udousoro (2013), gender differences in computing participation, stated that there is no significance difference in the academic performance of male and female students. Considering all these views, one cannot draw any meaningful conclusion on the influence of gender on academic performance of students since studies on gender differences in achievement are still inconclusive.

School location refers to the particular place, in relation to other areas in the physical environment (rural or urban), where the school is sited. In Nigeria, rural life is uniform, homogenous and less complex than that of urban centers, with cultural diversity, which often is suspected to affect students' academic achievement. This is because urban centers are better favoured with respect to distribution of social amenities such as pipe borne water, electricity, healthcare facilities while the rural areas are less favored. This is also true in the distribution of educational facilities and teachers. These prevailing conditions imply that learning opportunities in Nigerian schools differ from school to school. It would appear therefore that students in Nigerian urban schools have more educational opportunities than their counterparts in rural schools have. While some studies have shown positive influence, others have shown negative influence of school location on the students' learning outcome or achievement. Nwogu (2010) found that location was significant in learning aspects of Biology that involve angles, with rural students exhibiting more learning difficulties than their urban counterparts do.

Location of a school seems to determine to a large extent the level of students' performance in Biology. It is observed that students living far away from school seems not to be punctual in school and classroom activities in addition, long trekking to school may cause tiredness, low retention thereby leading to low performance. This means that the performance of students may be influenced by the location of the school. Therefore, the area in which a school is located can affect the educational performance and retention of a student. Owoeye and Yara (2011) in their studies on school location and academic performance of secondary school students in Ekiti State, Nigeria asserted that the various review of literature on school location influence on academic performance is not the same. While some maintain that urban students perform better in examinations than their rural counterparts, others found out that rural students (in spite of all odds) perform better. Some have submitted in their findings and concluded that no particular set up (urban or rural) can claim superiority over the other because their performances are the same. It was in view of this that this study investigated effects of scaffolding instructional strategy on students' Gender and Location in Biology among senior secondary school students in Ekiti state, Nigeria.

Statement of the Problem

Biology is a practical subject that requires to be taught in a manner that the students will be actively engaged in the teaching and learning processes. It was observed that most Biology teachers in Secondary schools seems not to teach the subject by involving students in practical activities unless after they must have received instruction to practical from the

examining body towards preparation for external examination. In spite of the importance placed on Biology in Science education, The report from West African Examination Council (WAEC) 2017-2022 Senior Secondary School Examination (SSCE) showed that students performance in Biology examinations in Ekiti State appear to be fluctuating.

This fluctuating performance could be attributed to the problem of teaching strategy adopted by most Biology teachers. The researcher personal experience as a biology teacher showed that most biology teachers are used to conventional method of teaching which is teachers centred, students depend on memorization without having a complete understanding of the subject. It is also observed that Biology teacher seem not to encourage interaction and sharing of ideas among students. This perhaps serve as impediment for Biology to fully achieve its objectives.

Observations also showed that poor teaching methods adopted by teachers at Senior Secondary School in the State have been identified as one of the major factors contributing to dwindling in the performance of students over the years. It is also observed that teachers do not give tasks to the students, the persistent use of this method make students passive rather than active listeners this may not promote insightful learning and long term retention of some abstract Biological concepts.

Researcher also observed that Biology students depend on memorization of fact without understanding the basic concepts furthermore, It appears students attitude and retention is being influenced by the teachers disposition and teaching methods which may consequently have effect on their performance. Therefore, this study examined the effects of scaffolding instructional strategy on students' performance, gender and location in Biology among secondary school students in Ekiti State, Nigeria

Purpose of the Study

The study examined the effects of scaffolding instructional strategy on students' performance, gender and location in Biology among secondary school students in Ekiti State, Nigeria. This study specifically:

i. examined the difference in the mean scores of students in the experimental and control groups before treatment in Biology;
ii. investigated the effects of scaffolding instructional strategy on students' Gender and Location in Biology among senior secondary school students in Ekiti state, Nigeria.

Research Question

1. What is the performance of students before and after treatments in Biology?

Research Hypotheses

Two hypotheses were formulated for this study and tested at 0.05 level of significance:

1. There are no significant effects of gender on students' performance in Biology
2. There are no significant effects of school location on students' performance in Biology.

Methodology

The research design for the study was pre-test, post-test control group quasi-experimental research design (one experimental and one control group).The design investigated the effects of the independent variables on the dependent variables. The pre-test was conducted to establish performance of students in both experimental and the control groups prior to the treatment. This equally ascertained the homogeneity between the two groups. Post-test was administered after the treatments in order to measure possible improvement on students' academic performance in all the groups. The population of the study consisted of 12,585 Senior Secondary Two (SS II) students of Biology from 210 public secondary schools in the 16 Local Government Areas (LGAs) of Ekiti State.

The sample for the study consisted of 159 SS II students were selected using multistage sampling procedure. The first stage involved the selection of One Local Government Area using simple random sampling technique. In stage two, four public secondary schools were selected from the Local Government Area through stratified random sampling technique using location (rural and urban) as the basis of stratification. This implied that, two schools were selected from urban and two schools from rural. In stage three, SS II intact class of each of the four schools was used for the study. The study made use of an instrument, Biology Performance Test (BPT). The data collected were analyzed using descriptive and inferential statistics. The research question was answered using mean, standard deviation and bar chart. The hypotheses were tested using inferential statistics. Hypotheses 1 and 2 were tested using t-test. All the hypotheses were tested at 0.05 level of significance.

Results

Research Question 1: What is the performance of students before and after treatments in Biology?

Table 2: Mean and Standard Deviation Showing Students' Performance in Biology before and after Treatment

Group	***N***	***Before Treatment***		***After Treatment***		***Mean Difference***
		Mean	***SD***	***Mean***	***SD***	
Experimental	86	21.7	9.93	57.2	10.21	35.5
Control	73	19.5	9.25	26.8	6.16	7.2
Grand Mean	***159***	***20.7***		***43.2***		***22.5***

Table 1 shows that before the treatment, the mean scores of students' performance in the experimental group was 21.7 while the mean scores of the control group was 19.5. The grand mean total of both groups was 20.7, suggesting that the knowledge of Biology concept in both groups were homogenous prior to the treatment. However, upon their exposure to the treatment, the grand mean total of both groups increased to 43.2 while the students taught with scaffolding had greater mean scores of 57.2 compare with the mean scores of students taught conventional methods which was 26.8. With the highest

mean difference of 35.5, it could be adjudged that scaffolding had the greater potential impact on enhancing student's performance in Biology than the conventional method with mean difference value of 7.2. This further depicted in Figure iii

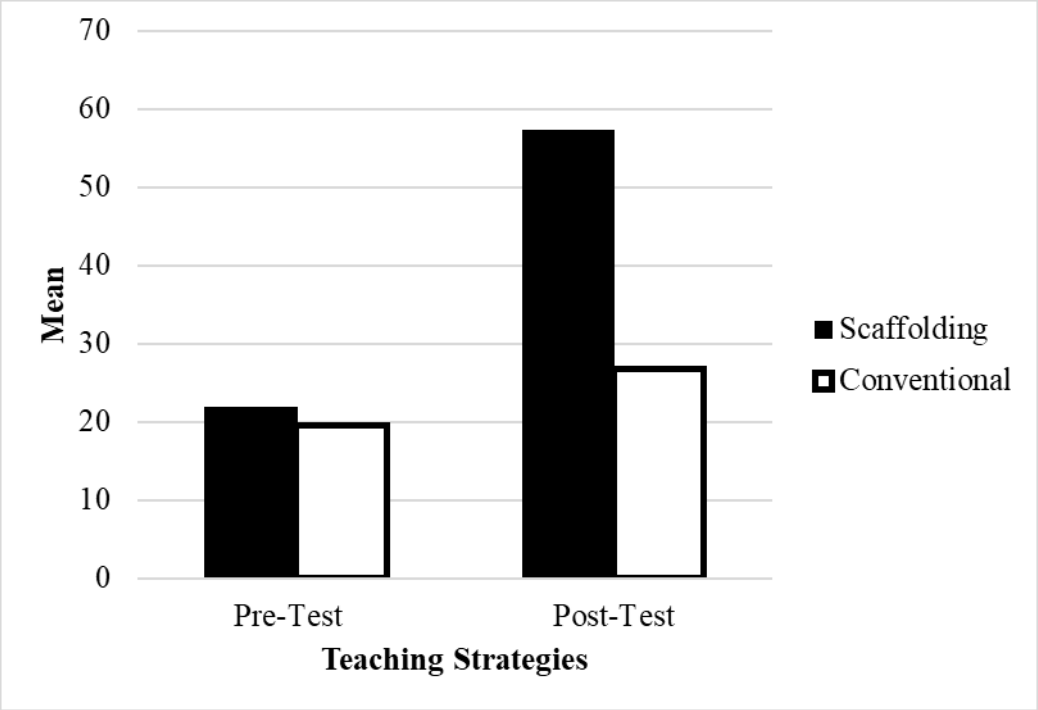

Fig i: Students' Performance in Biology before and after Treatment

Hypothesis 1: There are no significant effects of gender on students' performance in Biology.

Table 2: ANCOVA Showing Effects of Gender on Students' Performance in Biology

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*P-value*
Corrected Model	38047.484	4	9511.871	144.149	.000
Intercept	35174.480	1	35174.480	533.058	.000
Group	31600.808	1	31600.808	478.900	.000
Gender	19.048	1	19.048	.289	.592
Group * Gender	61.444	1	61.444	.931	.336
Error	10161.880	154	65.986		
Total	345333.333	159			
Corrected Total	48209.364	158			

P>0.05

Table 2 shows the effect of treatment and gender on performance in Biology. The result showed that the interaction effect between treatment and gender was not statistically significant, F (1, 154) = 0.931, p = .336. Similarly, there was no statistically significant main

effect for gender, F (1, 154) = 0.289, p = .592. However, based on the analysis, the null hypothesis was not rejected. This implied that, there was no significant effects of gender on students' performance in Biology. That is gender has no effect on students' performance in Biology.

Hypothesis 2: There are no significant effects of school location on students' performance in Biology.

Table 3: ANCOVA Showing Effects of School Location on Students' Performance in Biology

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*P-value*
Corrected Model	37999.298	4	9499.824	143.287	.000
Intercept	34358.431	1	34358.431	518.234	.000
Group	33798.195	1	33798.195	509.783	.000
Location	8.817	1	8.817	.133	.716
Group * Location	14.620	1	14.620	.221	.639
Error	10210.066	154	66.299		
Total	345333.333	159			
Corrected Total	48209.364	158			

P>0.05

Table 4 shows the effect of treatment and school location on performance in Biology. The result showed that the interaction effect between treatment and school location was not statistically significant, F (1, 154) = 0.221, p = .639. Similarly, there was no statistically significant main effect for school location, F (1, 154) = 0.133, p = .716; Hence, the null hypothesis was not rejected. In another word, there was no significant effects of school location on students' performance in Biology. This implied that different in location of students' does not affect students' performance in Biology.

Discussion

The study examined effects of scaffolding instructional strategy on performance among secondary school students in Ekiti State. It was revealed that the performance mean scores of students in pre-test for the experimental and control group were not statistical difference. Hence the two groups were homogenous at the beginning therefore any variation noted was as a result of the treatment.

The findings from this study showed that there was no significant difference in the performance mean scores of students in the experimental and control groups before treatment in Biology. This indicates that there were no significant differences in the baseline knowledge of Biology between the experimental and control groups. Therefore, any changes observed in the post-treatment scores can be attributed to the
treatment.

Another finding is that there was significant effect of scaffolding and conventional methods on performance mean scores of students in Biology in favour of scaffolding. This revealed that the use of scaffolding in teaching Biology resulted in significantly higher scores

compared to the conventional teaching method. Students that were taught using scaffolding seems to have developed higher thinking skills which enable them performed better than their counterparts in the conventional group this is in line with the submission of Clare (2015), which stated that students developed higher thinking skills when scaffolding occurred by an expert (teacher) or peer of higher capability The findings indicate that scaffolding can be an effective approach for improving student performance in Biology. This is in agreement with the finding of Mohammed (2019) which asserted that students taught with scaffolding instructional strategy were more effective than the lecture method of teaching students in Biology. Also, the finding corroborates the findings of Adieze (2016) and Jibrilla (2017), who found out that students taught using scaffolding instructional strategy significantly performed better than the students in the lecture method. .In a classroom interaction it is essential to use learner centred approaches like scaffolding strategy to enhanced effective teaching and learning this will motivate the students to develop interest in the subject.Therefore, incorporating scaffolding techniques into Biology instruction may lead to more comprehensive and meaningful learning outcomes for students.

Consequently, David (2013) asserted that experience and social interaction play significant roles in learner's cognitive growth using scaffolding techniques as opposed to those that are taught using conventional method. This implies that students who were exposed to scaffolding strategies not only showed improved academic performance in Science but also demonstrated higher levels of engagement and motivation in the subject due to active participation of students during classroom instruction on scaffolding strategy, these findings highlight the importance of incorporating scaffolding techniques in science education to enhance students' attitudes and cognitive development. Also, there was significant effect of scaffolding and conventional methods on retention mean scores of students in Biology.

Another finding is that there was no significant effects of gender on students' performance in Biology. This reveals that gender does not play a role in determining students' success in Biology. These results challenge traditional stereotypes and highlight the importance of creating an inclusive learning environment where all students can thrive regardless of their gender. The findings is in agreement with Boris (2015) who found out that there is no gender difference on students' academic performance. Meanwhile, in contrast, Lawal (2011) stated that male students achieved significantly better than female students in different Science subjects while Christine (2012) and Amoo (2011) in their studies were of a different view that performances of female students in Science subjects were better than that of their male counterparts.

Similarly, the finding of the study revealed that there was no significant effects of gender on students' retention in Biology. It was showed that gender does not play a significant role in determining students' ability to retain information in the field of Biology. This finding agrees with the findings of Ani, Obodo, Ikwueze and Festus (2021) who observed that gender has no significant effect in the achievement of students. Also the finding supported the findings of Onuh and Okigbo (2020) which showed that gender has no influence on academic performance interest and retention of the students in science subjects. But in disagreement with findings of Wangu (2014), Kashu (2014), Anih and Egbo (2015)

who observed that gender has significant effect on students' achievement as male students did better than the female students in Science.

The finding also revealed that there was no significant effects of school location on students' performance in Biology, where the students lives does not have any influence on the performance when exposing to series of instructional strategy such as scaffolding, This showed that the quality of education in Biology is consistent across different school locations. The finding was in agreement with Onah and Ugwu (2010) who found that school location does not influence physics performance of students in secondary school. . In contrast Ogunleye and Adepoju (2011) showed that location of a school has an important role to play in the educational attainment of students in the school. In addition, Owoeye and Yara (2011) in their study revealed that the mean performances of students from urban and rural locations in Biology are not statistically different, this support the submission of Okorie and Ezeh (2016) that there is no difference in academic achievement of students because of location,Hence students performance in Biology does not depend on school location.

Conclusion

Based on the findings of this study, there were homogeneity prior to the beginning of the experiment in the two groups, that is, scaffolding and conventional method. The improvement recorded after the treatment could not have been by chance. It was thus concluded that the use of scaffolding instructional strategy have significant positive effect on the performance of students in Biology after treatment. It was equally concluded that students' gender and location had no effects on students' performance and retention in Biology when taught using scaffolding instructional strategy.

Recommendations

The following recommendations were made based on the findings of this study:

1. Irrespective of the school location, scaffolding instructional strategy should be incorporated into the teaching approach by Biology teachers' in secondary school to enhance students' performance.
2. Workshops, seminars, training and professional development opportunities should be organized for Biology teachers, to enlighten them on the use of scaffolding approach in teaching Biology.
3. Teachers should focus on creating an inclusive classroom environment that encourages equal participation and provides equal opportunities for all students, regardless of their gender.

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