VOL. 05 NO. 8,
AUGUST, 2024
E-ISSN 3026-8893
P-ISSN 3027-1061



African Scholar Publications & Research International
www.africanscholarpub.com

Journal of Education Research and Library Practice (JERLP)

Effect of Scaffolding Teaching Strategy on Students' Academic Achievement in Science Education in Kogi

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Abstract

This study was designed to investigate the effect of Scaffolding teaching strategy on students' academic achievement in science education in Kogi State. Two research questions and two null hypotheses guided the study. The study adopted quasi-experimental design of pre-test, post–test non randomized control group. The sample consisted of 149 (SS)II science and technology education students selected through multi-stage sampling technique. The instrument used for data collection was Science Education Achievement Test (SEAT) validated by Three experts. The reliability coefficient obtained was 0.86 using Kudder Rechardson20 (KR-20) formula. Data collected were analyzed using mean and standard deviation for research questions and analysis of covariance (ANCOVA) at 0.05 level of significance for the hypotheses. The results revealed that students taught science education with Scaffolding Teaching Strategy (STS) achieved significantly higher than those taught with Traditional Lecture Teaching Method (TLTM).Gender and achievement level do not significantly influence the mean achievement score of students taught Science Education using STS. The study recommended among others that curriculum planners should integrate STS in the teaching and learning of Science Education in secondary schools.

KEY WORDS: Scaffolding Teaching Strategy, Traditional Lecture Teaching Method, Academic Achievement and Science Education

Introduction

Science Education is the process of inculcating science knowledge to students in order to equip them with fundamental scientific skills and to foster positive attitudes towards science. The primary focus of science education in Nigeria has been the search of relevant content and new methods of science teaching and learning which should be alternatives to the colonial heritage. Achor (2016) opined that Science education has become an enterprise on which developing nations depend in order to be self-sufficient in the training of technological personnel and to sustain a viable economy and that Nigeria in the twenty first century continues to look forward to science education to bring about industrialization and physical transformation. Hence science education is therefore receiving an increasing attention in educational sectors all over the world, Nigeria inclusive. Science education is the bedrock of human development. Many of the developed nations were able to achieve the status of development through science education. Therefore, there is need for adequate and equal participation of students to acquire the knowledge of science education through the use of efficient and quality instructional strategies.

In order to guarantee quality instruction at all levels of education, emphasis has been on the use of appropriate teaching strategies that can enhance effective classroom interaction that can help students acquire qualitative and right knowledge of subject matter, and having equal opportunities for participating intelligently in making rational decisions for their own wellbeing academically (Abuh, 2021).this calls for the use of Scaffolding teaching strategy that is student centered teaching strategy instead of using conventional method that have been found to be deficient in creating permanent and meaningful learning in students for effective academic achievement in science education

Despite the important place of science education (Physics, Chemistry, Biology and Mathematics) in secondary school curriculum, academic achievement of secondary school students in science education subjects like physics, chemistry, Mathematics and Biology in west African senior school certificate examination (WASSCE) has remained consistently poor (Chief examiners Report, 2016-2023). This phenomenon has remained a source of concern to the researchers, parents/guidance, educational administrators and the nation at large. Achievement is the feeling of getting things done as we desired or getting things that we expected. Okafor (2018) described achievement as the act of accomplishing or finishing something well, something accomplished successfully especially by means of exertion, skill, practice or perseverance. Academic achievement is determined by

the level of accomplishment of given task evaluated by the teachers through achievement Test, Assignment e.t.c. Okorocha (2019) describes Academic achievement as the scholastic standing of students at a given moment which states individual's intellectual abilities. Achievements in science and technology education therefore identifies how well or bad students have accomplished a given task or test in science subjects. Thus achievement in science education may not necessarily take place unless teachers form solid foundation for solid instruction through effective use of teaching strategies that are students centered and activity oriented techniques. Science education researchers have come up with many strategies and methods for teaching science and science educatin inclusive, namely; problem solving method, inquiring based teaching /learning approach, analogies as advance organizer, collaborative approach among others (Osomoye,2016). Despite all these efforts, the problem of poor achievement in science education subjects (physics,chemistry, Biology and Mathematics) has continued to be noticed in the public examinations like WASSEC. Therefore, more efforts should be undertaken to improve the situation.

According to Abuh (2021) the use of traditional Lecture method whereby the teacher talks about the subject while the students read about the subject is the major cause of poor performance in science education. Conceptually, traditional lecture teaching method is the method of instruction whereby the teacher dominates the teaching-learning process, projects himself as a repository of knowledge and doles out information uninterruptedly to the passive recipient of knowledge. In the traditional method, communication' flows in one direction, from the teacher to the learners; hence it is a teacher's centered method. Many teachers make use of traditional teaching approach. This is probably because the method allows for a wider coverage of content within a short period of time and teaching large number of students at the time. Despite these advantages, it does not always produce positive learning outcomes in many secondary school students. That is to say, students should be given opportunity to communicate reason and develop self confidence to learn through the activity- oriented teaching strategies.

Teaching strategy is seen as the overall plan or large scale of pattern of activities geared towards achieving a goal and guarding the goal. A good strategy guarantees a positive change in behavior, which is evidence that meaningful learning has taken place. The learner is at the centre of the teaching and learning process. Hence, learner centered strategies are mostly needed in the teaching and learning of science education. Learner-centered method is the type of teaching strategy that places the learner in the center of all teaching activities (Achor, 2017). This method devotes more time to students' participation and recognizes the fact that no learning is effective unless the child is personally involved in the learning situation. The child must be

constantly participating in order to help his or herself and the group activities, engage in the discussion, asking questions, seek solutions, and generally take part in the activities. This is possible only with instructional strategy that is student centered like scaffolding technique that will help students to explain and be actively involved in the teaching and learning process.

Scaffolding refers to the process by which a teacher, an instructor or a more knowledgeable peer assists a learner, altering the learning tasks so that the learner can solve problems or accomplish task that would ordinarily be impossible for him/her and to learn from the experience (Reiser,2018) .Scaffolding is a teaching strategy where the teacher or the gifted students lend academic support to the slow learners through discussion and interactions with the slow learners, it is a teaching learning process designed to promote a deeper level of learning as the teacher pair up gifted and knowledgeable students with the slow learners or students during classroom instruction or activities . Scaffolding is derived from mother –child observation and has been applied to many other contexts, such as computer education (Hadwin & Azeuedo, 2016). The term is used to describe certain kinds of support which learners receive in their interaction with parents, teachers and other "mentors" as they learn more new skills, concepts or levels of understanding. It is a term which helps to portray the temporary but essential nature of the mentors as the learner advances in knowledge and understanding.

In education, teachers are regarded as builders. They can use gifted and fast learners as scaffolds to build up slow learners. The gifted students therefore lend academic support to the slow learners through discussions and interactions with the slow learners on what the teacher taught previously in class. This is because students learn very fast and better with each other as the interaction stabilizes their emotional state. In applying this process of scaffolding as a strategy for teaching and learning of physics, the teacher should note the background knowledge of the child, breakdown the process into manageable bits, so that it will not be too tasking for the learner and assist the students in the acquisition of such skills. The use of scaffolding as a teaching strategy helps to boost the overall achievement of students in the class, it aids meaningful learning of science education concepts and finally helps boost the average performance of students in the class.

Using Scaffolding teaching strategy to teach science education demands students' involvement in teaching and learning processes.. By so doing, the students are not only observing but are directly involved in the process. The involvements in process bring about increase in academic achievement of students, hand on practical in and intelligibility in concepts learning. Questions and answers are easily gotten or derived among the students as they pose difficult questions and abstract concepts in the subject matter to each other wherein teacher compliment their answers by giving them correct

one. If the potentials of scaffolding teaching or instructional strategy are fully and carefully utilized as against traditional breeding patterns, the academic achievement of students in science education could improve and discrepancy in gender bias in academic achievement in the discipline could be verified.

Gender is the state of being male or female in relation to the social and cultural roles that are deemed ethical for men and women. The issue of gender will be considered in this study because achievement in science education can be gender based. Sometimes, the subject a male child finds fascinating may not be fascinating to the female child. Also teaching and learning techniques which may enhance male child achievement in science education may seen too hard to the female. Oguniyi (2016) found a differential academic achievement as a result of gender. Mbellomize (2017) observed that male students out performed females in examination. Gender differences in achievement have been examined for some time resulting in a substantial body of literature. (Jegede & Iyang (2014); Okeke (2014); Osakwe(2014); mordi& Njoku (2017). Umeoduagu, (2018); Talabi, Emiolat and Ogunkola (2018), and Akinsola (2019) Pointed out that there is no significant difference in students' academic achievement in various subjects including science and technology subjects form an integral part. However Awotala and Akinsola (2019); Adeneye and Amosun (2021) in their study found significant difference in students' achievement with either, male or female girl child performing better.

Generally speaking, no alliance opinion has been reached concerning which gender performs better than the other hence the need for further studies on gender parity and disparity in science education achievement. However, it is worthy to note that when science education subjects like physics, Chemistry, Biology and Mathematics are delivered using proper teaching strategies, learning increases but with improper instructional strategies the reverse is the case. Based on this assumption, no mode of instructional strategy is ineffective in itself but every subject requires its own proper and effective instructional strategy.

This study is suggesting the scafforlding strategy as instructional strategy that may guarantee that learners participate actively in their learning. It is against this background that the study seeks to examine the effect of scaffolding teaching mode instructional strategy on students' academic achievement in science education in secondary schools, which may lead to improved achievement in the subject. From literature, study conducted by Adekunle (2015) found that there is significantly higher posttest mean achievement scores of students taught science education related subjects with Scaffolding and collaborating teaching approach. Similarly study by Uduafemwe, Numwo, Emmanuel and Owodunni (2018) revealed that Scaffolding and discussion strategies are effective in improving students achievement in Basic Electronics and likewise Okorocha and Nwachukwu (2020) revealed that students taught Technology

education using Scaffolding and concept –mapping effectively improve students achievement in Basic Sciences. However the study by Ahmed (2018) findings revealed that there is no significant differences in the mean achievement of students taught basic science using Scaffolding and discussion approach, Hence this study is put forward to identify possible impacts of Scaffolding teaching strategy on student's academic achievement in science education in Kogi East Education Zone of Kogi State.

Statement of the Problem

It is worrisome to both scientist and educational researchers of the plight that bedevil the study of science education in Nigeria which kogi East education zone is inclusive, as declining trends of students academic achievement is noted. This might be that students are not taught with teaching modes that were dialogically oriented and all inclusive to discover knowledge on their own and gain experience for themselves.

Effective teaching strategy that can enhance students' academic achievement in science education requires active involvement of the parties involved. It is however believed that applying teaching strategy specifically scaffolding teaching strategy as an alternative instructional strategy could make teaching and learning active, interactive, and attractive and useful in achieving the desired output. Hence, the statement of the study put in question form is what are the impact of Scaffolding teaching strategy on students' academic achievement in science education in kogi East Education zone of Kogi State.

Purpose of the Study

The purpose of this study was to determine the impact of Scaffolding teaching strategy on students' academic achievement in science education. Specifically this study is designed to determine the:

1. Difference between the mean achievement scores of students taught science education with Scaffolding Teaching Strategy (STS) and Traditional Teaching Method (TTM)
2. Difference between the mean achievement scores of male and female students taught Science Education with scaffolding teaching strategy (STS) and traditional teaching method (TTM)

Research Questions

The following research questions guided the study:

1. What are the differences between the mean achievement scores of students taught Science Education with Scaffolding Teaching Strategy (STS) and Traditional Teaching Method (TTM)?

2. What are the differences between the mean achievement scores of male and female students taught Science Education with scaffolding Teaching Strategy (STS) and Traditional Teaching Method (TTM)?

Hypotheses

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

$H1^0$, There is no significance difference between the mean achievement scores of students taught Science Education with Scaffolding Teaching Strategy (STS) and Traditional Teaching Method (TTM).

Ho 2 there is no significant difference between the mean achievement scores of male and female students taught Science Education with scaffolding Teaching Strategy (STS)) and Traditional Teaching Method (TTM)?

Methodology

A quasi experimental design adopted for this study was both a pretest and posttest non randomized control group. The area of the study is kogi East education zone of kogi state. The population comprised 2250 (1220 males and 1030 females) students in the 38 public secondary schools in kogi east education zone of kogi state .sample size was 149 Senior Secondary Two (SS2) students selected through multi-stage sampling technique. This is because it enable the researcher to sample the students in the nine local government areas in Kogi East Education Zone including co-educational schools with laboratory and qualified science education teachers. The breakdown includes, random sampling technique was used in selecting three local government areas out of the nine LGA in kogi East Education zone, from this sampling technique Ankpa, Idah and Olamaboro local government areas were selected. Purposive sampling technique was employed in selecting six (6) schools (two each) out of the sampled local government areas in kogi East Education zone. Purposive sampling was used because the six schools enjoy common characteristics which are not in other schools. These characteristics are a well equipped laboratory, experienced teachers in science education subjects, available two intact classes made of male and female science education students (co-educational school). Stratified random sampling technique was used to assign three schools each to each of the two groups or strata (experimental group and the control group). One intact class in each of the six schools was used for the study. Therefore in this study random sampling, purposive sampling and stratified random sampling techniques were used in the sampling process.

Experimental groups were taught using scaffolding teaching Strategy (STS), while the control groups were taught using Traditional Teaching Method (TTM) .One instrument was used for data collection namely Science Achievement Test (SAT). Lesson plan were written for each of the teaching strategies which served as

instructional tools used during teaching and learning process in the classroom .Three experts from prince Abubakar Audu University (PAAU) Anyigba, Kogi State validated the instrument. The reliability co-efficient value of 0.86 was obtained using the kudder –Richardson 20 formula (k-R 20). Three intact classes were allotted to each of the strategy from the six sampled schools, experimental groups were taught STS while control groups were taught with the TTM. mean and standard deviation were used to answer the research questions while the hypotheses were tested using analysis of covariance (ANCOVA). The null hypothesis (H^0) is rejected at p value less than 0.05.

Experimental procedures

The lesson on each of the strategy was prepared in conjunction with the ideas and experiences of other teachers who are regarded as expert in Science and Technology Education. The lesson plan was prepared collaboratively by the selected science education teachers. Thus, the experimental procedure is discussed under four stages

stage1 – Briefing research assistants; there were two weeks briefing for the six teachers that were selected for the study and teaching from different schools. The three local government areas were used, one out of the two schools selected from each of LGA serve as the training centre in each of local government areas. On the first day in each of the designated training centre, the researcher went to meet the research assistants at the scheduled time, with copies of scheme of work, lesson plans, work sheet and hand them over to the research assistants. The researcher explained the meaning of the science and technology education concepts in the study, objectives of the study to the research assistants. He therefore briefly told the research assistants on what they were expected to do in the study, the day of the study, time and therefore pleaded with them to adhere strictly to the rules of the study for better results.

Step 2: pretest administration: Before teaching proper in the three groups of the study, the research participants were given a pretest. The test was administered with the help of the research assistants who are teachers of the sampled schools. the scripts were marked by the researcher and scores recorded.

step3: Teaching of participants: The trained research assistants who are science and technology experts in the sampled schools were allowed to teach the students in both the experimental groups & the control groups using lesson plans and work sheets prepared by the researcher. The control groups were taught without any teaching technique, STS. The Traditional teaching method was use by the teacher to teach the students in a control groups which is mainly conventional lecture method. In the experimental groups the students were taught using STS. In each of the groups including the control groups the students were taught twice a week in line with the school time table. The researcher and the four other participating teachers a part from the two teachers teaching the control groups taught these groups. As the teachers were teaching the researcher was around to observe and ensure that the research assistants implement the procedures of each of the strategies appropriately in accordance with their specifications.

For Scaffolding Teaching Strategy, the procedures are:

Steps 1: time for selection of topic/ task- The teacher selects the task or topic based on the lesson plan and interacts with the students in order to identify gifted students
Step11: time to pair up gifted or knowledgeable students with the slow learners. The teacher pair-up students (those that are sharp),fast learners and understanding the task or topic given, with the slow learners. In the process the gifted students interact with the slow learners.
Steps111: Time to discuss among pairs to a larger group- The teacher allow gifted students from the [pair-up groups to interact or discuss among themselves as the teacher modifies and perfect the process of learning the given task and evaluate the students based on the objectives of the study.
The questions in the work sheet were used for evaluation after each lesson delivery in order to evaluate the level of achievement of the lesson objectives.
Step 4: post test administration: After the teaching period, posttest was administered to the participants in all the groups (control group, experimental groups) to ascertain if there is any knowledge gained. The scripts were marked by the researcher and the scores recorded. Intact classes were used in this study to control initial group differences and the three groups were located at different schools far away from each other to avoid possible mass contacts between students groups among others.
For traditional teaching method no technique was involved.

Results
Relevant findings in the this study were presented in tables according to the research questions and hypotheses

Research question one:
What are the differences between the mean achievement scores of students taught Science Education with scaffolding teaching Strategy (STS), and Traditional Teaching method (TTM)

Table1: Mean and Standard Deviation of Achievement Scores in Pre-test and Post –test of the Treatment Groups

Groups	N	Mean pretest Score	SD pretest Score	Mean posttest Score	SD posttest Score	Mean Gain Score
STM	50	33.62	9.34	53.50	11.95	19.88
TTM	48	32.49	7.86	48.40	8.14	15 .91

Data in Table1 shows STS has mean gain score of 19. 88 and TTM mean gain score is 15.91. This shows that the students in STS groups achieved higher than those in TTM group. Thus the two groups did not achieve equally. Also from Table1 STS groups has the highest standard deviation score of 9.34 in pretest and 11.95 in posttest showing that score from that group is less homogenous when compared to the TTM group (TTM). In general, the table reveals that standard deviation score for each group is very high in both pretest and post test.

Research Question two

What are the differences between the mean achievement scores of male female students taught Science Education with Scaffolding Teaching Strategy (STS)) and Traditional Teaching Method (TTM)

Table2: Mean Achievement Score of Male and Female Students Taught With STS and TTM

Group	N	MEAN Pretest Score	SD pre-test Score	Mean post test score	SD posttest score	Mean Difference
STS						
Male	30	30.40	7. 10	60. 80	10.11	
Female	21	29.50	8.30	57.20	12.60	3.60
TTM						
Male	30	\ 31. 10	7.70	52.50	11.70	
Female	20	30 .60	8.60	50.40	14.00	2.40

Data in Table 2 indicates that the mean achievement score of male students (60.80) is higher than the
mean achievement score of their female (57.20) counter parts taught Science and Technology education using STS with mean difference of 3.60. Also, male students taught Science education using TTM had mean achievement score of (52.50) while the female students had 50.40 given a mean difference of 2.10 in favor of the male students. Table2 further reveals that female students had higher standard deviation (SD) score before teaching than their male counterpart in the two strategies. In general male students achieved higher than their female counterparts when taught with STS and TTM

Hypothesis one: There is no significant different between the mean achievement scores of taught Science Education with STS and TTM

Table 3: ANCOVA Test of Significant Difference Between the Mean Achievement Scores of Students in the Treatment Groups

Source	Type 111 sum Of squares	df	Mean square	F	Sig	partial Eta square
Corrected model	16583.2960	17	975.488	37.374	. 000	.850
Intercept	171 64 .068	1	17164.068	657.299	. 000	. 836
Pre-test	268.964	1	268.964	10.824	. 001	. 082
Method	846.276	2	423.138	16.687	. 000	. 216
Gender	121.122	1	121. 122	4.032.	. 037	. 0.37
Method *Gender	30 .283	2	15.142 .	612 .	. 544	. 010
Error	2995.673	121	24.758			
Total	413116.000	139				

Corrected Total	18599	138	

Tables3 reveals that significant difference exists between the achievement scores of students taught Science Education with Scaffolding teaching mode (STS) and Traditional teaching mode (TLTM). F (2,121) = 16.687, 43 p= 0.000 < 0.05. Thus there is a significant difference between the posttest mean achievement scores of students taught physics with STS and TLTM. To obtain the direction of the difference a post-hoe multiple comparisons was conducted and summarized in Table4.

Table4: Scheffe POst hoe Multiple Comparism of Posttest Mean (Achievement)

Dependent Variable	(I) Method	(j) method	MEAN difference (i-j)	STANDARD Error	sig	95% confidence lower Bound	interval upper Bound	
Posttest	STM		8.32085*	3.06234	.002	3.2857	13.4421	STS
	TTM		12.20655*	3.41069	.000	6.3131	18.1010	STS
	STM		4.56450	3.56308	.032	3.4450	10. 6710	
	TTM		-8.42072*	3.06324	. 000	-13.2032	-3.3156	TTM
	STM		-12.20543	3.41069	.0310	-10.1001	3.2014	
	TTM		-4.67560.	3.56308	.000	-18.6618	-6.2144	

The mean difference is significant at the 0.05 level

Data in Table4 reveals that significant difference exist between the achievement scores of students taught science education with STS and those taught with TTM in favour of STS groupwhere P=.002 < 0.05. Table 4 also reveals that a significant differences exist between the achievement scores of students taught Technology education with STM and these taught with TLTM in favour of STS group where P= .0320 <0.05. Table 4 equally shows there is a significant difference between the achievement scores of students taught with STM and those taught with TTM in favour of those taught Science and Technology education with STS where P= .0310 < 0.05. This shows that the STM is more effective than TTM.

Hypothesis two: there is no significant difference between the mean achievement scores of Male and female students Taught science and technology education with Scaffolding Teaching Strategy (STS) and Traditional Teaching Method (TTM)

Table5: ANCOVA Test of Significant Difference Between the Mean Achievement Scores of Male and Female Students Taught With STS and TTM

Source	Type 111 sum Of squares	DF	mean square	F	Sig	partial Eta Squared
Corrected model	13561. 4530	12	1,130.12	42.671.	.000	.836
Intercept	16777.367	1	16777.367	714.610	.000	.861
Pretest	124.577	1	124.577	5.611	.33	.046
Method	132. 1.56	1	132.156	6.141	.026	.051

Gender	40.122	1	40.122	1.712	.215	.018
Method* gender	10.302	1	10.302		.376	.526 .004
Error	2414.328		9425.684			
Total	32986.000	107				
Corrected total	140974	106				

From the result of the ANCOVA test as shown in Table5, the statement of hypothesis is rejected, implying that there is significant difference in the mean achievement scores of male and female students taught physics using both STS and TTM (1,94) = 1.712, P=0.215>0.05.
This shows that the achievement of students in relation to both STS and TTM is influenced by gender of the students.

Discussion

The result of the study revealed that students taught Science and Technology Education with STS achieved more than those taught with TTM showing that STS is very effective on students achievement in Science and Technology Education .That is to say that use of student centered approach in lesson delivery was very effective .It could also be seen that the group of teachers who cooperatively plan the lesson and incooperated the students into the teaching process really did a good work and the interaction between teacher –student and student - student was supper also students were not given the chances to be part of the lesson modification in TTM as seen in STS. The finding equally revealed that there is significant differences between the post test mean achievement scores of students taught Science and Technology Education with STS and TTM. The post hoe multiple comparism revealed that STS is more effective than TTM..The findings of the study are in line with Okorocha and Nwachukwu (2020) who reported that the STS is more effective in enhancing students' achievement in financial accounting when compared to the conventional teaching method. The findings of the study concur with the findings of Adekule (2015) who found that students taught with scafforlding strategy obtained significantly higher posttest mean scores than those taught using conventional strategy. Also the findings is in line with Uduafemhe, Numwo, Emmanuel and Owodunni(2018) finding that STS approach is effective in improving students achievement in basic electronics than TTM Approach.The finding is also in agreement with Ahmed (2018) that there was significant influence in the Geometry achievement test of students exposed to Scaffolding and Traditinal Teaching Method strategies in favour of the students taught with Scaffoding Teaching strategy.
This study further revealed that there is significant difference in the mean achievement scores of male and female students taught Science and Technology Education using both scaffording teaching Strategy and traditional teaching method .That is to say that gender and achievement level significantly influence the mean achievement scores of students taught Science and Technology Education using the two Strategies. scaforlding teaching and traditional teaching strategies .The finding is in agreement with that of Uduafenhe, Numwo, Emmanuel and Owodunni (2018) that there is

statistically significant difference between the mean scores of male and female students when taught Basics electronics using two modes approaches scafforlding and traditional instructional approaches. The findings equally concur with that of Joda (2019) that gender has significant influence on student's achievement in biology when exposed to scafforlding and traditional teaching strategies. The finding is also in line with Ogunkola (2018) which revealed no significant differences between the posttest mean scores of male and female students exposed to scaffolding instructional strategy. The finding equally lends support to the study of Ogoke and Okegbo (2021) that there is significant differences in the mean achievement scores of male and female students taught mathematics using both plan lesson mode and revised planed lesson mode, is influenced by the gender, of the students, however, the finding is contrary to the finding of Adekunl;e (2015) who found that there is no significant difference in the mean achievement scores of students when taught with scaffolding teaching strategy and traditional teaching method in biology in favour of the male students

Conclusion

Based on the findings, the researcher concluded that Scaffoding Teaching Strategy (STS) is effective in enhancing students' achievement as a collaborative teaching strategy that encourages students participation in the process of teaching and learning. Hence, Scaffolding Teaching Strategy is more effective than traditional teaching Strategy in the teaching and learning of science and technology education.this is because scaffolding teaching strategy is a student centered teaching strategy where learning is being initiated by the learner rather than traditional teaching strategy that is teacher centered and not being gender friendly.

Recommendation

Based on the findings, the following recommendations were made:

1. Science and Technology Education teachers should adopt the use of STS in the teaching so as to allow the students participate in the activities of the classroom
2. Genders differences in Science and Technology Education classroom should be reduced using STS.
3. Curriculum planners should integrate the use of STS when revising Science and Technology subjects(physics, Chemistry and Biology) curriculum for secondary schools

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