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EFFECTS OF SELF- REGULATED LEARNING ON STUDENT LEARNING OUTCOMES IN BLOCKLAYING, BRICKLAYING AND CONCRETING IN TECHNICAL COLLEGES IN SOKOTO STATE

Aliyu, A. A., Kareem, W. B., Abdulkadir, M., Kagara, A. B., Ibrahim, D., Bala M, M. & Lawali A. B.
Department of Industrial and Technology Education, School of Science and Technology Education, Federal University of Technology, Minna
Email: (**Tel:** +2348069479909)

Abstract: *The study determined the effects of self-regulated learning on student learning outcomes in Blocklaying, Bricklaying and Concreting (BBC) in Technical Colleges in Sokoto State. Four research questions and four null hypotheses were formulated to guide the study. The study adopted a quasi-experimental non-control group pretest and posttest design. 65 BBC TC II students in all the four Technical Colleges in Sokoto State was used as a total population for the study. A simple random sampling technique was used to assign two colleges to experimental group I and two technical colleges to experimental group II. Blocklaying, Bricklaying and Concreting Achievement Test (BBCAT), Blocklaying, Bricklaying and Concreting Student Learning Motivation (BBCSLM) and Blocklaying, Bricklaying and Concreting Interest Inventory (BBCII) were the instruments used for data collection. The instruments were subjected to face validation by three experts from the Department of Industrial and Technology Education, Federal University of Technology Minna. The reliability coefficient of BBCAT was 0.79 using Kuder-Richardson 20 (K-R20) formula, while that of BBCSLM and BBCII were 0.86 respectively using Cronbach Alpha formula. The experiment exercises were carried out in eight weeks period during which, five topics in BBC trade was covered. The pre-test was administered to all the students involved in the research by the first week of the research work before both groups were exposed to the treatments. Data generated was analyzed using Statistical Package for the Social Science (SPSS) version 26. Analysis of covariance (ANCOVA) was used to test the hypotheses while mean was used to answer the research questions. Based on the analyses, it was revealed that self-regulated learning and lecture methods were effective in improving students' achievement in BBC trade but self-regulated learning was more effective than lecture method with the mean gain of 38.92. The study also revealed that self-regulated learning and lecture methods were effective in improving students' motivation in BBC trade but Self-regulated learning was more effective than lecture method with the mean gain of 1.94 among others. Based on the findings, the study recommended that BBC trade teachers should adopt self-regulated learning approach in teaching BBC course contents in order to improving students' achievement in the trade. Also it was recommended among others that the National Board for Technical Education should incorporate self-regulated learning method into the teaching of BBC trade in order to regularly improve students' motivation in the trade subject.*

Keywords*: Self-regulated learning, Student learning Outcomes, Blocklaying, Bricklying, Concreting, Technical Colleges*

Introduction

Technical, Vocational Education and Training (TVET) is an aspect of education which prepares individuals with the competencies, knowledge and attitude necessary for effective employment in recognized occupation. According to Abdullah (2023), TVET is an educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupation in various sectors of economic life". Specifically, Federal Republic of Nigeria (FRN) (2014) explained that the objectives of TVET shall be to: provide trained manpower in the applied sciences, technology and business particularly at craft, advanced craft and technical level, provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development, and give training and impart the necessary skills to individuals who shall be self-reliant economically. In Nigeria, one of the institutions that offer TVET at intermediate level is technical college.

Technical Colleges are educational institutions established in Nigeria with the primary objective of training and producing skilled technicians to meet the workforce demands of various industries such as automotive, electronics, energy, electronics, manufacturing, and construction. These industries play a crucial role in the overall national development of the country, and to effectively contribute to this development, industries require a workforce that is well-qualified and properly trained (Aliyu, 2023). Technical Colleges ensure that these industries have access to a competent workforce capable of driving innovation, productivity, and sustainable growth within the nation by providing specialized education and training in a wide array of trades such as carpentry, automobile mechanics, electrical/electronic technology, and Blocklaying, Bricklaying, and Concreting (BBC) among others.

The BBC trade is one of the TVET programmes offered in technical colleges in Nigeria. It aims to equip the graduates with skills in the application of the uses of blocks/bricks, building tools, and concreting as applicable or used in the construction industries (Ayonmike *et al.,* 2015). The BBC graduates are required to be able to carry out various building operations with sufficient skills and mastery. According to National Business and Technical Education Board (NABTEB) (2006), graduates of BBC are expected to be able to identify the basic principle of manufacture, properties, and application of various types of brick/block, tools, and equipment in BBC trades, mix various types of cement, aggregates, and mortars, carry out simple leveling and setting out, construct simple drainage system, understand the principle of roof construction, construction of concrete ground floors and walls. The programme equips trainees with indispensable knowledge and skills to competently execute all aspects of blockwork, brickwork, and concrete tasks (David and Jude, 2017).

It is however worrisome to note that most of the graduates of BBC produced in various technical colleges nationwide do not have adequate specific skills required for the job within the construction industry. Okwelle and Ojotule (2018) argued that the attainment of these objectives appears to be far-fetched from the reality as most graduates of this programme cannot undertake the expected practical tasks upon graduation and thus unemployable. Parents and government are in total agreement that their huge investment in education is not yielding the desired result. Teachers also complain of students' poor achievement in both internal and external examinations

This may further be evident from their poor performance in the national examinations such as National Business and Technical Examination Board (NABTEB). Jimoh *et al.* (2022) identified defective teaching methods as one among the factors responsible for poor performance of students in BBC trade in NABTEB examinations. Lkama and Dabo (2019) argued that teaching methods adopted by technical teachers is another factor responsible for student failure in NABTEB. The authors further attributed this to the over dependency in the use of conventional teaching methods such as lecture method. The lecture method is characteristic of the conventional teaching in which the teacher does it all alone. Lecture method of teaching enhances quick content coverage and its effectiveness depends on the verbal skills of the teacher (Farauta, 2022).

The lecture method is also known to have merits, such as knowledge, factual information are carefully transmitted to allow students gain a good understanding of a subject; it is less expensive compared to the inquiry methods. Farauta (2022), further explained that lecture method has several short comings which include passive learning by the students which make them weak and disinterested and others. The author also attributed the lecture method to the least dedicated teacher whose main interest is in content coverage and not content mastery. The consequence of the use of this lecture method in teaching vocational trades such as BBC in technical colleges is that students are unable to partake fully and retain their learning and apply it to new situation (Okwelle and Ojotule, 2018). Lecture method which the teachers combine discussion, explanation and manipulation to enhance students' understanding of the concept being taught. Osuyi and Anthony (2018) defined lecture teaching method as an instructional approach used in technical and training colleges aimed at achieving the psychomotor and cognitive objectives of learning. It

is a traditional classroom strategy used in technical and training colleges to achieve psychomotor and cognitive objectives (Eze *et al.*, 2020). Using the appropriate methods of teaching allows trainers and teachers to offer enjoyable and productive classroom experiences for students. Researches and technology development have given rise to the adoption of new methods of teaching which have the potential of efficiently meeting learning needs of BBC. This may be achieved through the adoption of one among them which is self-regulated learning strategy.

Self-regulated learning strategy refers to students' ability to understand and control their learning. It is the ability to monitor and control one's own behaviour, emotions, or thoughts, altering them in accordance with the demands of the situation (Kadivar *et al.,* 2012). Self-regulated learning strategy is an active, constructive process whereby learners set goals for their learning and attempts to monitor, regulate and control their cognition, motivation and behaviour guided by their goals and contextual features in the environment (Tang, 2012). It is an act of learning that is guided by meta-cognition (thinking about one's thought), strategic action (planning, monitoring and evaluating personal progress against standards) and motivation to learn taking the process of control and evaluating one's own learning and behaviour. In particular, self-regulated learners are cognizant of their academic strength and weaknesses and they have a repertoire of skills they appropriately apply to tackle the day to day challenges of academic tasks (Akudo, 2018). This is unlike the lecture method of teaching which may likely have an age on the students' learning outcomes

Learning outcomes are statements that describe the knowledge or skills students should acquire by the end of a particular assignment, class, course, or programme, and help students understand why that knowledge. Akir *et al.* (2012) explained that learning outcomes is the measurable skills, abilities, knowledge or values that students should be able to demonstrate as a result of a completing a course. Learning outcome are essential knowledge, attitudes and skills which a learner has achieved and can demonstrate at the end of a course or programme. Learning outcomes are the achievement of the learner and minimum performances that must be achieved to successful completion of a course or programme (Wigfield, 2023). Learning outcomes in the context of the study measure the potential applications of knowledge and skills acquire by students in general BBC class. Students learning outcomes mostly depends on students' achievement.

Achievement is the action of accomplishing something. Academic achievement of students therefore is the translation of the students' performance in achievement test into scores obtained in a cognitive test. Students' academic achievement refers to students' performance or attainment in a subject (Adegunle, 2016). Additionally, student achievement can describe the level of achievement of students in terms of knowledge, skills and experience of learning formulated by learning objectives for the school curriculum (Abuhassna *et al.,* 2020). The test results were followed by students reflects to the extent to which students can achieve learning goals in each subject in educational institutions, thus increasing students' achievement illustrates that the quality of education is getting better. Likewise, declining student achievement might be as a result of lack of motivation.

Motivation is the internal or external drive that prompt individuals to take action, pursue goals and engage in certain behaviours. Cherry (2022) sees motivation as the biological, emotional, social, and cognitive forces that initiates, guides, and maintains goal-oriented behaviours Operationally, motivation is that which can be biological and/or environmental that assists learners' desire in achieving their goal. It helps to improve the persistence, achievement and engagement level of a learner in a course of study. For this reason, Rohana (2021) argued that motivation element in education cannot be neglected. The two forms of motivation are intrinsic and extrinsic motivation. Intrinsic motivation is related to the inner force of behaviour, such as want or desire. People who are intrinsically motivated do things due to their innate interest for self-satisfaction and fulfilment (Rohana, 2021). On the contrary, extrinsic motivation refers to the desire that is externally motivated. It comes out of factors such as family expectations and pressures, educational

environment and teachers, and workplace responsibilities. Thus, lack of motivation might decreases students learning interest.

Interest is a zeal or willingness of participating in activity from which one derives some pleasure. According to Abuhassna *et al.* (2020), interest refers to the level of curiosity, enthusiasm or engagement that a student has toward a particular subject, topic or activity. Interest in this study is the tendency of BBC students to become absorbed in knowledge and practice of BBC. Interest plays a crucial role in the learning process of students as it can influence their motivation, persistence and overall academic success. This is why Akudo (2018) revealed that students who are interested in a subject are more likely to engage in learning activities, participate in discussions and persist through challenges Ezenwafor *et al.* (2020) added that interest does not come as a result of force; it is as a result of an individual`s eagerness to learn. Therefore, interest as an affective behaviour can be aroused and sustained in teaching and learning through appropriate teaching method. There is need for technical teachers to stimulate students' interest in learning without which students' achievement will be minimal let alone of retention.

Retention is the ability to retain and consequently remember items/things learned or experienced by an individual at a later time. Retention has to do with the ability to remember and apply previously learnt behaviour (Igboko and Ibeneme2016). Retention of learning in the study is the process by which new information is transferred from one short term to long term memory. It is a learning that lasts beyond the initial unit or lesson and it is assessed with a test administered in two or more weeks after the learner has been taught and tested. Thus, the ability to retain learnt skills for a long period of time will ensure that trained BBC trade students remain relevant. This can be achieved through effective adoption of relevant teaching method. Amuthavalli and Sivakumar (2014) opined that the continued use of the chalk-and-talk traditional teaching (lecture) methods to teach in our schools may not provide students with valuable skills and may also lead to students not retaining knowledge. Hence, it is against this background that the study was designed to determine the effects of self-regulated learning strategy on student learning outcomes in BBC trade in technical colleges in Sokoto State, Nigeria.

Statement of the Problem

Developing cognitive and psychomotor skills in BBC trade is crucial for sustainable economic growth. BBC trade programme in technical colleges aim to produce skilled craftsmen for construction operations (Adegunle, 2016). However, students often underperform due to factors such as teachers' insensitivity to trade-specific needs, inadequate resources, and likely also poor teaching methods (Ezenwafor *et al.*, 2020). Despite significant investments in Nigeria's education sector, mass failures in public examinations, especially in science and technology fields like BBC, persist annually.

A review of National Business and Technical Examination Board (NABTEB) Chief Examiner's reports from 2019 to 2023 have shown that students' performance in BBC trade is on a continuous decline. Therefore, the average failure rate in the BBC trade in the said duration. Was 51.13%, 43.14%, 47.07%, 30.56%, and 50.01% respectively. BBC students' abysmal poor academic performance in NABTEB examination has been attributed to poor teaching methods among others. The lecture method most commonly used in Nigerian secondary and technical schools has made students to resort to memorization of BBC contents as a result of their passive involvement in the teaching and learning process. The students in the lecture method classroom are not given the opportunity to set goals for their learning and attempts to monitor, regulate and control their cognition. This calls for the adoption of alternative teaching methods that are guided by metacognition (thinking about one's thought), strategic action (planning, monitoring and evaluating personal progress against standards) and motivation to learn taking the process of control and evaluating one's own learning and behaviour. Self-regulated learning strategy could be alternative method as it gives students opportunity to set goals for their learning and attempts to monitor, regulate and control their cognition. The question here is: what is the effect of self-

regulated learning strategy on student learning outcomes in BBC trade in technical colleges in Nigeria?

Purpose of the Study

The main purpose of the study is to identify the effects of self-regulated learning and lecture methods on students' learning outcomes in BBC in technical colleges in Nigeria. Specifically, the study sought to investigate the:

1. Effect of self-regulated learning and lecture methods on students' achievements in BBC trade
2. Effect of self-regulated learning and lecture methods on students' motivation in BBC trade
3. The effect of self-regulated learning and lecture methods on students' interest in BBC trade.
4. Effect of self-regulated learning and lecture methods on students' retention in BBC trade.

Research Questions

The following research questions guided the study.

1. What are the effects of self-regulated learning and lecture methods on students' achievements in BBC trade?
2. What are the effects of self-regulated learning and lecture methods on students' motivation in BBC trade?
3. What are effects of self-regulated learning and lecture methods on students' interest in BBC trade?
4. What are the effects of self-regulated learning and lecture methods on students' retention in BBC trade?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance to guide the study:

1. There is no significant difference between the mean achievement scores of students taught BBC trade using self-regulated learning and lecture methods
2. There is no significant difference between the mean motivation scores of students taught BBC trade using self-regulated learning and lecture methods
3. There is no difference between the mean interest scores of students taught BBC trade using self-regulated learning and lecture methods
4. There is no difference between the mean retention achievement scores of students taught BBC trade using self-regulated learning and lecture methods

Methodology

The study adopted quasi-experimental research design. This study was conducted in Sokoto State. The State is located in North-West geopolitical zone of Nigeria. The targeted population for the study was 65 BBC students of TC II in four technical colleges in Sokoto State for 2024/2025 academic session. There was no sampling for the study. Three instruments were used for data collection. This includes: Blocklaying, Bricklaying and Concreting Achievement Test (BBCAT), Blocklaying, Bricklaying and Concreting Motivation (BBCSLM) Questionnaire and Blocklaying, Bricklaying and Concreting Interest Inventory (BBCII). The researcher developed two groups of lesson plans for the topics chosen for the study. The instruments, BBCCAT, BBCSLM and BBCII and the two sets of lesson plans were subjected to face validation by three experts from Department of Industrial and Technology Education, Federal University of Technology Minna. A trial testing of BBCCAT, BBCSLM and BBCII were carried out to determine their internal consistency. A one-day intensive training programme was prepared for the teachers (research assistants) on how to use both the self- regulated learning and lecture method lesson plans. The research was carried out in four stages as follows; pre-test, treatment, posttest and retention test. The researcher with the aid of four research assistants physically administered the BBCCAT, BBCSLM and BBCII to all TC II bricklaying, blocklaying and concreting trade students to collect data for the study. The Statistical

Package for Social Science (SPSS) version 26.0 was used to analyze the data that was gathered for the study. Descriptive and inferential statistics was used to analyse the data. The Descriptive statistics of Mean and Standard Deviation were used to answer research questions one to four. While inferential statistics of Analysis of Covariance (ANCOVA) was used to test the four null hypotheses at 0.05 level significance. Decision on the null hypotheses formulated for the study were based on comparing the significant value with P-value at 0.05 level of significance. The null hypotheses were accepted when the P-value is greater than 0.05 level of significance (P> .05). On the other hand, the null hypotheses were rejected if the P-value is less than 0.05 level of significance (P< .05) which indicates that there was significant difference in the mean responses of the groups of respondents.

Results

Table 1: Summary Statistics of Students' Pretest and Posttest Scores Taught BBC with Self-Regulated Learning and Lecture Methods

Teaching Method	N	Pretest score $\overline{X}$	Posttest score $\overline{X}$	Mean gain $\overline{X}$
Self-Regulated Learning	35	20.68	59.60	38.92
Conventional Method (Lecture)	30	17.50	52.49	34.99

Table 1 shows that the treatment group taught BBC with self-regulated learning had a mean score of 20.68 in the pretest and a mean score of 59.60 in the posttest making a pretest, posttest mean gain in the treatment group taught with self-regulated learning to be 38.92. The treatment group taught BBC with lecture method had a mean score of 17.50 in the pretest and a posttest mean of 52.49 with pretest, posttest mean gain of 34.99. With these results, both self-regulated learning and lecture methods are feasible to enhance students' achievements in BBC, but the impact of self-regulated learning on students' achievements in BBC is greater than that of lecture method.

Table 2: Summary Statistics of Students' Motivation Scores Taught BBC with Self-Regulated Learning and Lecture Methods

Teaching Method	N	Pretest Score $\overline{X}$	Posttest Score $\overline{X}$	Mean Gain $\overline{X}$
Self-Regulated Learning	35	2.38	4.32	1.94
Conventional Method (Lecture)	30	2.14	3.95	1.81

Table 2 shows the motivation scores of students on BBC using with self-regulated learning and lecture methods. Data on self-regulated learning had motivation scores (pre-test 2.38 and post-test 4.32) with motivation difference of 1.94. Data on lecture method had motivation scores (pre-test 2.14 and post-test 3.95) with motivation difference of 1.81. From these results, each teaching methods indicated significant increase in motivation of the students but self-regulated learning method had the highest mean gain, which indicates that the BBC students were more motivated to learn when taught using self-regulated learning.

Table 3: Summary Statistics of Students' Interest Inventory Scores Taught BBC with Self-Regulated Learning and Lecture Methods

Teaching Method	N	Pretest Score $\overline{X}$	Posttest Score $\overline{X}$	Mean Gain $\overline{X}$
Self-Regulated Learning	35	2.30	4.28	1.98
Conventional Method (Lecture)	30	2.40	4.18	1.78

Table 3 shows the interest inventory scores of students on BBC using with self-regulated learning and lecture methods. Data on self-regulated learning had interest inventory scores (pre-test 2.30

and post-test 4.28) with interest inventory difference of 1.98. Data on lecture method had interest inventory scores (pre-test 2.40 and post-test 4.18) with interest inventory difference of 1.78. From these results, each teaching methods indicated significant increase in academic interest of the students but self-regulated learning method had the highest performance, indicates that students' interest in BBC was on the high when taught using self-regulated learning method.

Table 4: Summary Statistics of Students' Retention Scores Taught BBC with Self-Regulated Learning and Lecture Methods

Teaching Method	N	Posttest Score $\overline{X}$	Retention Test $\overline{X}$
Self-Regulated Learning	35	59.60	50.24
Conventional Method (Lecture)	30	52.49	46.50

Table 4 shows the retention scores of students taught BBC using self-regulated learning and lecture methods. The data shows that self-regulated learning had achievement score of 59.60 in the post-test and 50.24 in the test for retention of learning. Data on lecture method had achievement score of 52.49 in the post-test and 46.50 in the retention test. From the results both self-regulated learning and lecture methods indicated significant increase in retention of learning. Students taught with self-regulated learning retained their lessons better than those taught with lecture method.

Table 5: Analysis of Covariance (ANCOVA) Showing the Result of Hypothesis One

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	385.220[a]	2	124.508	13.664	.004
Intercept	5245.119	1	4201.949	220.420	.001
Pretest	82.604	1	82.604	4.105	.045
Strategy	165.480	1	185.512	7.480	.007
Error	3258.738	63	22.715		
Total	162248.000	66			
Corrected Total	4082.074	65			

***Significant at F<0.05**

Table 5 shows that with respect to the achievement mean scores of students taught BBC using self-regulated learning and those taught with lecture method, an F-ratio of 7.480 was obtained with associated exact probability value of .007. Since the associated probability value (.007) is less than 0.05 set as level of significance for testing the hypothesis, this means that the null hypothesis (H_{O1}) which stated that there is no significant difference between the mean achievement scores of students taught BBC trade using self-regulated learning and those taught with lecture method is rejected. Inference drawn is that there is a significant difference between the mean achievement scores of students taught BBC using self-regulated learning and those taught with lecture method. This result showed that students' academic achievement improved in BBC when taught using self-regulated learning than students taught using lecture method.

Table 6: Analysis of Covariance (ANCOVA) Showing the Result of Hypothesis Two

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	0.92[a]	2	101.658	.264	.003
Intercept	70.110	1	3484.419	220.443	.001
Pretest motivation	.089	1	.089	.529	.007
Strategy	. 004	1	. 004	.016	.008
Error	34.805	63	13.715		
Total	2728.117	66			
Corrected Total	34.205	65			

***Significant at F<0.05**

Table 6 shows that with respect to the motivation mean scores of students taught BBC using self-regulated learning and those taught with lecture method, an F-ratio of 0.529 was obtained with associated exact probability value of .007. Since the associated probability value (.007) is less than 0.05 set as level of significance for testing the hypothesis, this means that the null hypothesis (H_{O2}) which stated that there is no significant difference between the mean motivation scores of students taught BBC trade using self-regulated learning and those taught with lecture method is rejected. Inference drawn is that there is a significant difference between the mean motivation scores of students taught BBC using self-regulated learning and those taught with lecture method. This result showed that self-regulated learning resulted in an improvement of students' motivation in BBC more than students taught using lecture method.

Table 7: Analysis of Covariance (ANCOVA) Showing the Result of Hypothesis Three

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	0.85[a]	2	101.658	.322	.001
Intercept	69.108	1	3802.710	340. 833	.002
Pretest motivation	.095	1	.095	.611	.001
Strategy	. 003	1	. 003	.016	.004
Error	32.100	63	.668		
Total	2384.043	66			
Corrected Total	32.105	65			

***Significant at F<0.05**

Table 7 shows that with respect to the interest mean scores of students taught BBC using self-regulated learning and those taught with lecture method, an F-ratio of 0.661 was obtained with associated exact probability value of .001. Since the associated probability value (.001) is less than 0.05 set as level of significance for testing the hypothesis, this means that the null hypothesis (H_{O3}) which stated that there is no significant difference between the mean interest scores of students taught BBC trade using self-regulated learning and those taught with lecture method is rejected. Inference drawn is that there is a significant difference between the mean interest scores of students taught BBC using self-regulated learning and those taught with lecture method. This result showed that self-regulated learning improved students' interest in BBC more than lecture method.

Table 8: Analysis of Covariance (ANCOVA) Showing the Result of Hypothesis Four

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	388.306[a]	2	101.658	22.764	.002
Intercept	3484.419	1	3484.419	110.420	.001
Posttest	173.513	1	173.513	12.408	.005
Strategy	.680	1	.680	.047	.827
Error	1180865.738	63	13.715		
Total	146641.000	66			
Corrected Total	4782.074	65			

***Significant at F<0.05**

Table 8 shows that with respect to the retention mean scores of students BBC using self-regulated learning and those taught with lecture method, an F-ratio of 12.408 was obtained with associated exact probability value of .005. Since the associated probability value (.005) is less than 0.05 set as level of significance for testing the hypothesis, this means that the null hypothesis (H_{O4}) which stated that there is no significant difference between the retention mean scores of BBC students taught using self-regulated learning and those taught with lecture method is rejected. Inference drawn is that there is a significant difference between the mean retention scores of students taught BBC using self-regulated learning and those taught with lecture method. This result showed that students' retention improved in BBC when taught using self-regulated learning than lecture method.

Discussion of Findings

The findings of this study as regards research question one revealed that the two methods (self-regulated learning and lecture) significantly increased academic achievement of the students in BBC trade but the students taught with self-regulated learning had the highest performance in the achievement test. The significant effect of the instructional approach showed that the F-calculated (F-cal) value of 7.480 is significant at .007 which is less than 0.05 level of significance to show that there was significant difference in the scores of students taught BBC trade using self-regulated learning and lecture methods.

In conformity with this finding, Yigzaw and Fentle (2013) in their study of the impact of students' self-regulated language learning on their reading achievement in Ethiopian high schools revealed that self-regulated learning significantly impacted high school students' reading performance. The finding of this study is also in agreement with the findings of Nwafor *et al.* (2015) who investigated the effect of self-regulated learning approach on junior secondary school students' achievement in basic science. They revealed in their study that self-regulated learning strategy enhanced higher students' achievement in basic science than the conventional method. The finding also agrees with findings of Oruc and Arslan (2016) which revealed that self-regulated learning significantly increased the reading comprehension and metacognitive thinking skills of the students in the experimental group. Contrary to this findings, the study of Ejelue (2017) revealed that there was no significant difference between the mean cognitive scores of students taught biology using self-regulated learning and peer learning. This variation in findings might be due to the fact that the study involved two similar methods of learning, that is self-regulated learning and peer learning. However, findings from other researchers affirm the result of this study regarding the effects of self-regulated learning and lecture methods on students' achievement in BBC trade.

Findings of the study on hypothesis one revealed that there is a significant difference between the mean achievement scores of students taught BBC using self-regulated learning and those taught with lecture method. The finding is in line with the findings of Akudo (2023), which revealed that there was a significant difference between the mean achievement scores of students taught Chemistry using self-regulated learning strategy and those taught using the lecture method, in favour of self-regulated learning. The finding also agrees with findings of Ateş-Akdeniz (2023), which revealed that was a significant difference between the mean academic achievement scores of students taught a design studio course using self-regulated learning and those taught with lecture method, in favour of self-regulated learning. The uniformity of the discussed findings and the current one shows that self-regulated learning plays a major in improving the achievement of students in BBC trade.

Finding on research question two revealed that self-regulated learning and lecture methods were effective in improving students' motivation in BBC trade but self-regulated learning was more effective than lecture method. The finding of this study conforms to the findings of Oruc and Arslan (2016) which revealed that self-regulated learning significantly increased the reading comprehension and metacognitive thinking skills of the students in the experimental group. The finding also agrees with findings of Oruc and Arslan (2016) which revealed that self-regulated learning was effective in improving students' motivation in reading comprehension and metacognitive thinking skills than teacher-centred approach like lecture method. The finding also resonate with the findings of Olakanmi and Gumbo (2017) which revealed that self-regulated learning improves students' interest and motivation in chemistry and therefore should be included in secondary science classrooms than lecture method. The finding also agrees with the findings of Ejelue (2017) which revealed that self-regulated learning resulted in the improvement of student motivation in had more impact on high school students' reading performance.

The finding of this study on hypothesis two showed that there was a significant difference between the mean motivation scores of students taught BBC using self-regulated learning and lecture methods. This finding is in line with the findings of Ejelue (2017) revealed that there was

significant difference between the motivation scores of students taught biology using self-regulated learning and peer learning. The finding of this study also conforms to the findings of Oruc and Arslan (2016) which revealed that self-regulated learning significantly increased students' motivation in reading comprehension and metacognitive thinking skills. Similarly, the study of Olakanmi and Gumbo (2017) which revealed that there was significant difference on the motivation scores of students taught chemistry using self-regulated learning and lecture method. The conformity of all these findings with the current finding shows that self-regulated learning actually tend to improve students motivation to study, which thereby lead to improving their academic achievement and retention.

The finding on research question three revealed that self-regulated learning and lecture methods were effective in improving students' interest in BBC trade but self-regulated learning was more effective than lecture method. This finding tend agree with the findings of Ateş-Akdeniz (2023), who in the study of the impact of self-regulated learning on students' performance in studio design course revealed that self-regulated learning approach improved students interest and performance in studio design course. The finding also align with the findings of Akudo (2023) who revealed that self-regulated learning strategy had positive effect on chemistry students' achievement and attitude in senior secondary schools in Delta North Senatorial District which thereby led to improving students motivation in studying Chemistry. However, the finding do agree with the findings of Ejelue (2017) which revealed that peer learning positively improved students interest in Biology than self-regulated learning in Onitsha Education Zone. This discrepancy could be as a result of fact that the study considered peer learning which involves students learning from and with each other. Another reason could be as a result of the different subject areas considered in the two studies.

The finding of this study on hypothesis three revealed that there was a significant difference between the mean interest scores of students taught BBC trade using self-regulated learning and lecture methods. The finding agrees with findings of Ateş-Akdeniz (2023) which revealed that there was a significant difference between the mean interest scores of students taught a design studio course using self-regulated learning and those taught with lecture method, in favour of self-regulated learning. Similarly, the study of Olakanmi and Gumbo (2017) which revealed that there was significant difference on the mean interest scores of students taught chemistry using self-regulated learning and lecture methods. The finding also aligns with the findings of Akudo (2023), which revealed that there was a significant difference between the mean interest scores of students taught Chemistry using self-regulated learning strategy and those taught using the lecture method, in favour of self-regulated learning. The uniformity of these findings give credence to the findings of this study on hypothesis three regarding the interest of BBC students taught BBC trade using self-regulated learning and lecture methods.

The finding on research question four revealed that self-regulated learning and lecture methods were effective in improving students' retention in BBC trade but self-regulated learning was more effective than lecture method. The finding concords with the findings of Oruc and Arslan (2016) which revealed that self-regulated learning was effective in improving students' retention in metacognitive thinking skills than teacher-centred approach. The finding also aligns with the findings of Nwafor *et al.* (2015) which revealed that self-regulated learning strategy improved students' retention in basic science than lecture method. Additionally, Akudo (2023) revealed that self-regulated learning improved senior secondary schools retention on chemistry and lecture method in Delta North Senatorial District. However, contrary to this findings, Ejelue (2017) revealed that self-regulated learning had less impact in improving students' retention in Biology than peer learning in Onitsha Education Zone. This disagreement could be as a result of collaborative nature of peer learning which involves students learning and sharing ideas together. By sharing ideas and learning collaboratively, students tend to learn and retain more.

The finding of this study on hypothesis four revealed that there was a significant difference between the mean retention scores of students taught BBC using self-regulated learning and those taught with lecture method. This finding is in support with the findings of Olakanmi and Gumbo (2017) which revealed that there was significant difference on the mean retention scores of students taught chemistry using self-regulated learning and lecture methods. The finding also agrees with the findings of Ateş-Akdeniz (2023) which revealed that there was a significant difference between the mean retention scores of students taught a design studio course using self-regulated learning and those taught with lecture method. The finding also resonate with findings of Olakanmi and Gumbo (2017) which revealed that there was significant difference in the mean retention scores of students taught chemistry using self-regulated learning and lecture method. These findings give credence to the findings of this on hypothesis four regarding the mean retention scores of students taught BBC using self-regulated learning and lecture methods. This affirms that self-regulated learning tend to improve BBC students retention than lecture method.

Conclusion

Based on the findings and discussions of this study, the following conclusions were made:

Since there was a significant effect of self-regulated learning and lecture method on students' achievement, motivation, interest and retention in BBC trade, the study concludes that both self-regulated learning and lecture methods are viable in improving students' achievement motivation, interest and retention in BBC trade. The study also concludes that the effect of self-regulated learning on students' achievement, motivation, interest and retention in BBC trade is higher than that of lecture method in technical colleges in Sokoto State. This is because in self-regulated learning, students take control of their own learning process and pace to reduce stress and make the learning more engaging. The self-regulated learning provides opportunities for physical activity, which enhances focus and retention of the concept taught. The conclusion drawn here is that both self-regulated learning and lecture methods are viable in improving achievement, motivation, interest and retention in BBC trade in technical colleges.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. BBC trade teachers should adopt self-regulated learning approach in teaching BBC course contents in order to improving students' achievement in the trade.
2. National Board for Technical Education should incorporate self-regulated learning method into the teaching of BBC trade in order to regularly improve students' motivation in the trade subject.
3. Government and stakeholders in education should improve on the provision of facilities and equipment necessary for teaching BBC with self-regulated learning to improve students' interest in BBC trade.
4. Administrators of technical colleges should organize seminars to educate BBC students and teachers on how to appropriately deploy self-regulated learning method in improving students' achievement and retention in BBC trade.

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