



Effect of Cooperative Learning Instructional Strategies on Students Academic Achievement and Interest in Basic Electricity in Technical Colleges in Niger State

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ABSTRACT

The study investigated the impact of the cooperative learning instructional strategy on the academic achievement and interest of Basic Electricity students in Technical Colleges. A quasi-experimental research design with a pre-test and post-test was used, involving 284 students (130 in the experimental group and 154 in the control group). Four research questions and six hypotheses guided the study, with data collected using the Basic Electricity Achievement Test (BEAT) and Basic Electricity Interest Inventory (BEII). The BEAT was validated by experts and tested for reliability, yielding a reliability coefficient of 0.73 (test-retest) and 0.95 (internal consistency). Findings showed that students taught using the cooperative learning strategy performed better and showed greater interest than those taught using conventional methods. Additionally, boys in the experimental group outperformed girls in cognitive achievement. The study recommended that Technical College teachers adopt cooperative learning strategies for teaching Basic Electricity and that the Niger State government provide necessary tools and equipment for effective implementation.

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INTRODUCTION

Basic Electricity is one of the technology subjects offered at senior technical colleges in Nigeria. Basic Electricity curriculum content in technical college is designed to provide students with the knowledge of the key concepts in Basic Electricity, to promote their understanding of the world around them. The curriculum also aims at developing broad applicable of technical skills such as problem solving, communication, critical thinking and objective reasoning abilities, to enable them prepare for work place and self-sustainability in the world economy (Federal Government of Nigeria (FGN), 20013). With these objectives of the curriculum in mind, students are expected to be useful and productive members of the society. Unfortunately, technical colleges' students tend to fall short of these expectations due to improper ways of teaching the subject at technical college level (Eze, *et al*, 2021). Ogbu

(2020) attributed this trend to basic electricity teachers who emphasize theoretically presentation of technological concepts at the expense of the practical aspects which are weightier and more rewarding. Laboratory practices in most colleges involve adherence to explicit directions to arrive at expected outcomes. This does not give room for acquisition of skills by students who may not be opportune to pursue courses in Basic Electricity or other related technology subject areas.

The study of Basic Electricity has been impeded by a lot of bottlenecks right from the primary school through technical college to the tertiary level of education (Ogbu (2020). Similarly, Akinpade, *et al.* (2020) reported that the Nigeria technology education is seriously faced with a lot of problems such as lack of facilities/equipment, lack of qualified teachers and improper use of instructional materials. In the same view, Usoro *et*

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al. (2018) noticed that contrary to the spirit of science and technology, science and technology teachers still teach without the necessary activities needed for proper understanding of the concepts. Usoro *et al.* observed that unsatisfactory performance of students in technology subjects and their inability to transfer what is learnt in the class to similar situation, outside the classroom is a reflection that they do not understand science and technology concepts. This may not be unconnected with the teaching methods adopted in our schools and colleges.

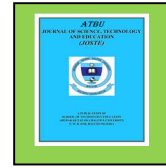
Over the years, teaching methods based on behavioral learning theory has been used to teach vocational subjects in the technical colleges irrespective of the fact that technological advancement in industry requires that students be equipped with workplace basic skills such as thinking skills, problem solving and collaborative work skills which will make them adaptable to changes in work places. Furthermore, Ogbu (2020) asserted that lecture and demonstration strategies used in teaching technology subjects are content driven and certainly not learner-centered, because students are not given enough opportunities to participate in the class activities. These strategies which are predominately used in teaching technology are based on behavioral learning theories which according to Amaechi and Thomas, (2016) emphasize knowledge transmission from the teacher to passive students and encourage rote memorization of facts. The consequence of the use of these strategies in teaching Basic Electricity and other technology subjects at technical colleges is that students are unable to retain their learning and apply it to new situation.

Lecture strategy which is one of the conventional strategies that allows a great deal of information to be passed to the learner and favors handling of large classes. In spite of this advantage, the lecture strategy does not stimulate students' innovation, inquiry and scientific attitudes. It encourages students to cram facts which are easily forgotten (Bashir, 2018). This strategy of teaching could also account for poor performance of technical college students in Basic Electricity examination. However, there is still a

need to search and incorporate modern instructional strategies which the advanced world has long accepted into the classrooms. The need to inculcate in the Basic Electricity students, the necessary skills that will improve their academic performance in Basic Electricity called for effective instructional strategies. The consideration according to Russo (2018) to facilitate learning and make teaching more effective and efficient will make teacher to adopt instructional strategies that will enhance knowledge assimilation and skill acquisition in students of which the use of cooperative learning strategy affords.

Cooperative learning is an instructional strategy in which students work in group toward achieving common goal. It suggests a way of dealing with students which respect and highlights individual group members' abilities and contribution (Pande & Bharathi, 2020). According to Pusca and Northwood (2018) students working together are engaged in the learning process instead of passively listening to the teacher. Pairs of students working together represent the most effective form of interaction. When students work in group, valuable problem solving skills are developed by formulating ideas, discussing the ideas, receiving immediate feedback and responding to questions and comments by their partners. The interaction of students during classroom teaching and learning process could lead to higher academic achievement and interest in Basic Electricity.

Achievement according to Puput *et al.* (2020) is also defined as the extent or degree of attainment of students in tasks, courses or programmes to which they were sufficiently exposed. Therefore, achievement is the extent to which a person has achieved something, acquired certain information or mastered certain skills usually as a result of planned instruction or training. Some research attributed poor achievement of students in science and technology to the strategies adopted by the teachers in teaching the subjects. Ahmad and Ombuguhim, (2020) stated that poor performance and academic achievement in science and technology is attributed to poor environmental stimulation and probably teaching strategy



adopted in a giving instruction. Mbah (2022) remarked that achievement is dependent upon several factors among which are instructional strategies, the learning environment, motivation for stimulating students' interest in learning and the learners.

Interest involves a sense of concern with and curiosity about something, for instance, students having an interest in technology subjects. Okolo (2017) defined interest as a social construction developing within the dynamic relationship between the individual and the situation. Students' interest in learning are associated with students' anxiety to learn. Interest is fundamental in any individual's choice task. It consists of feelings and tendencies towards concrete matter. A characteristics feature of interest is a manifestation of a different preference toward actions, events or career plans. A student's interest in academic achievement will induce him to behave and act in a certain way towards his studies. Therefore, the use of cooperative learning instructional strategy is important to provide rich environment that will motivate, strengthen achievement and stimulate interest of male and female students in basic electricity in technical college.

Gender issue has assumed prominence in technology and technology education. Gender is a sense of awareness of being male or female. It is a behavioural pattern and attitude perceived as masculine or feminine within a culture (Colman, 2020). Ahmad and Ombuguhim, (2020) remarked that disparities exist between male and female students' performance in technology and technology education. Nnamani and Oyibe (2016) stated that gender issue is an important factor in educational setting and could be a militating factor to academic achievement of learners in basic electricity. However, Amatobi and Amatobi (2020) argued that there is no biological evidence that boys have innate superior intellectual abilities over girls. Therefore, if differences in achievement exist, they must be caused by other factors such as gender, location and instructional material. This is in line with Puput et al. (2020) assertion that instructional strategies are known to produce different effects on learners. Anigbogu (2019)

indicated that traditional learning-teaching approach based on behavioural learning theory do not adequately equip students with higher-order thinking skills, collaborative and problem solving skills, but cooperative learning theory does. Perhaps, if thinking skills, oral discourse, collaborative work instructional techniques are used during instruction to teach basic electricity in the technical colleges, it will assist in developing students' thinking skills, cooperative work skills and problem solving abilities which in turn may help them improve their achievement and interest. This is why the study is posed to determine the effect of cooperative learning instructional strategies on students' academic achievement and interest in basic electricity in technical colleges.

Statement of the Problem

In spite of the huge investment by the successive Nigerian governments on science and technology education which are aimed at improving the image and performance of students in science and technology, the performance of students in Basic Electricity at technical college level has never been encouraging in Niger State specifically. National Business and Technical Examination Board (NABTEB) results show that average failure rate in Basic Electricity in the years 2019, 2020, 2021, 2022 and 2023 were 44%, 33%, 52%, 48% and 37% respectively (NABTEB, 2024). How to improve students' performance in technological based subjects has been one of the problems confronting technology educators and technology teachers alike. The rate of failure of students in the technology subjects is still very high and most students prefer studying social sciences and art subjects. Ogbu (2020) has observed that some of the factors responsible for the high failure rate of technical college students include poor infrastructural facilities, poor quality of teaching staff and poor teaching in technical colleges. Moreover, it has been discovered that the persistent poor academic achievement and low interest of students in technology and other related subjects is as a result of lack of instructional materials and teaching strategies adopted by teachers (Anigbogu, 2019).

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Technological advancement and process has push students to the center stage in education and the teacher's role is to act as facilitator, guide and coach. This advancement also places emphasis on students as active participants in the process of finding, organizing, analyzing, and applying information in novel situations to solve problems. It therefore, falls upon the teacher to constantly recreate the instructional process and offer a variety of choices for approaching information and tasks in order to meet learners' ever-changing needs. Hence, there is need for flexibility in the use of teaching methods in field of Science and Technology in our technical colleges, so as to enable the students of technical college acquire adequate knowledge and skills in technology especially in Basic Electricity and achieve better performance in examination and for further studies. Therefore, the problem of this study is: can cooperative learning strategy produce significant effect on the academic achievement and interest of Basic Electricity students in technical colleges?

Aim and Objectives of the Study

The main aim of this study is to determine the effect of cooperative learning instructional strategies on students' academic achievement and interest in Basic Electricity in technical college. Specifically, the study sought to determine the effect of:

1. Cooperative learning instructional strategy on students' academic achievement in Basic Electricity.
2. Cooperative learning instructional strategy on students' interest in Basic Electricity.
3. Gender on academic achievement of students studying Basic Electricity when taught using cooperative learning instructional strategy

Research Questions

The following are the research questions for this study;

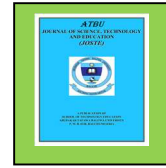
1. What is the effect of cooperative instructional strategy on students' academic achievement in Basic Electricity?

2. What is the effect of cooperative learning instructional strategy on students' interest in studying Basic Electricity?
3. What is the effect of gender on academic achievement of students in Basic Electricity when taught using cooperative learning instructional strategy?

RESEARCH METHODOLOGY

The design of the study was quasi-experimental research. Specifically the research made use of pre-test, post-test non-equivalent control group design and the study was carried out in Niger State. There are seven (7) NBTE accredited Technical colleges offering Basic Electricity in the state. The population of this study comprised 1054 (995 males and 59 females) year II students of Basic Electricity in all the 7 technical colleges that offer the course in Niger State. A multi stage cluster sampling was used to select two classrooms and each classroom contains 284 students. Therefore, the sample for the study was 284 subjects which comprised of 130 (117 males and 13 females) for the experimental group and 154 (134 males and 20 females) for the control group. Simple random sampling was used to select two technical colleges that will be given the treatments (cooperative learning strategy). The colleges selected for cooperative learning strategy are Government Technical College Kontagora and Government Technical College Eyagi Bida, while the colleges selected for conventional group are Government Technical College New Bussa and Federal science Technical College Shiroro,

The instrument used for this study comprised of two distinct instruments developed by the researcher such as Basic Electricity Achievement Test (BEAT) and Basic Electricity Interest Inventory (BEII). The BEAT instrument was validated by three experts for both the face validity and content validated while BEII were only face validated. The validation of these instruments BEAT and BEII was done by two professionals in measurement and evaluation and one professional Basic Electricity Educators from Ibrahim Babangida University, Lapai and Federal University of Technology, Minna respectively. The BEAT and BEII items was subjected to a trial



testing to ascertain the reliability of the instrument. The researcher administered the instrument to TCII students of a Government Science Technical College Garki, Federal Capital Territory, Abuja. One intact stream consisting of 40 students was used. The school has some degree of similarities with schools in Niger State. The Basic Electricity Interest Inventory was also trial tested using forty (40) students in the same class to ascertain the interest rate of students in basic electricity. The BEAT was scored out of 20 (1 mark each) while the BEII was scored based on a 4-point scale.

The scores obtained from the trial testing were used to determine the internal consistency and reliability coefficient of the instrument. The internal consistency of BEAT was determined using Kuder Richardson formula 20 (K-R 20) and test of stability using Test Retest. BEAT and BEII was administered on a random sample of 40 equivalent basic electricity students in Government Science technical college and the internal consistency reliability coefficient of BEAT was 0.73. This index is relatively not quite low or too high. Also test retest was used to further determine the reliability coefficient of BEAT test items. The test was administered again after a week interval and the scores were used to determine the reliability (stability) of BEAT. The reliability was found to be 0.95. The internal consistency of BEII was determined from the data collected from trial testing using Cronbach Alpha (α). The internal consistency reliability coefficient was found to be 0.92. The Basic Electricity teachers administered the pretest to the treatment groups and control groups in their respective schools. In the pretest, the Basic Electricity Achievement Test and the Basic Electricity Interest Inventory on both the control groups and experimental groups respectively. Objective answer sheets were provided for the students to fill in the correct answers for the Basic Electricity Achievement Test. The students ticked (\checkmark) to indicate the degree to which they agree or

disagree with statement in the Basic Electricity Interest Inventory. The researcher marked the answer sheets of the BEAT to obtain the students' scores on the cognitive achievement before the treatment while the interest inventory was also scored by the researcher to determine each of the student's interest before the treatment. The exercise provided baseline data on each of the two dependent variables (Achievement and Interest of each treatment) before the treatment.

During the posttest, Basic Electricity teachers administered the posttest to the treatment group and control groups in their respective schools. In the posttest, the Basic Electricity Achievement Test and Basic Electricity Interest Inventory were administered on the treatment and control groups. Objective answer sheets were provided for the students to fill in the correct answers for the Basic Electricity Achievement Test. The students were asked to tick (\checkmark) to indicate the degree to which they agreed or disagreed with the statements in the Basic Electricity Interest Inventory. The researcher marked the answer sheets of the BEAT and BEII to obtain the students' scores on cognitive achievement after treatment while the BEII were scored by the researcher to determine each of the student's interest after treatment. The exercise provided post treatment data for each of the two dependent variables (Achievement and Interest of each of the treatments) after the treatment. Data collected for the study were analysed as follows: Mean and Standard deviation were used to answer all the research questions. Hypotheses formulated for the study were tested using analysis of covariance (ANCOVA) at $p < 0.05$ level of significance.

RESULTS

Research Question 1: What is the effect of cooperative learning instructional technique on student's academic achievement in Basic Electricity?

Table 1: Mean of Pretest and Posttest Scores of Experimental and Control Groups in the Academic Achievement Test

Group	N	Pretest	Posttest	Mean Gain
		\bar{X}	\bar{X}	
Experimental	130	4.27	18.75	14.48
Control	154	4.41	14.88	10.47

The data presented in Table 1 shows that the experimental group had a mean score of 4.27 in the pretest and a mean score of 18.75 in the posttest, making a pretest, posttest mean gain in experimental group to be 14.48. The control group had a mean score of 4.41 in the pretest and a posttest mean of 14.88 with a pretest, posttest mean gain of 10.47. With this result, the students in the experimental group performed better in the

achievement test than the students in the control group. Hence, cooperative learning instructional technique is effective than the conventional teaching method on students achievement in Basic Electricity

Research Question 2: What is the effect of cooperative learning instructional technique on student's interest in studying Basic Electricity?

Table 2: Mean of Pretest and Posttest Scores of Experimental and Control Groups in the Interest Inventory

Group	N	Pre-test	Post-test	Mean Gain
		\bar{X}	\bar{X}	
Experimental	130	62.79	80.05	17.26
Control	154	63.10	76.58	13.48

Table 2 shows that the experimental group had a mean score of 62.79 in the pretest and a mean score of 80.05 in the posttest making a pretest, posttest mean gain in experimental group to be 17.26. The control group had a mean score of 63.10 in the pretest and a posttest mean of 76.58 with a pretest, posttest mean gain of 13.48. With this result, the experimental group interest is higher than the interest of the students

in the control group. Therefore, cooperative learning instructional technique is effective and even effective than the conventional teaching method in stimulating students' interest in Basic Electricity

Research Question 3: What is the effect of gender on academic achievement of students studying Basic Electricity?

Table 3: Mean of Pretest and Posttest of Male and Female Students Taught Basic Electricity in the Achievement Test

Gender	Cooperative learning Techniques				Conventional Method			
	N	Pretest	Posttest	Mean Gain	N	Pretest	Posttest	Mean Gain
				\bar{X}				\bar{X}
Male	117	4.37	17.03	12.66	134	4.25	14.50	10.25
Female	13	4.54	14.45	10.91	20	4.33	14.61	10.28

The data presented in Table 3 shows that male students taught Basic Electricity with cooperative learning technique had a mean score of 4.37 in the pretest and a mean score of 17.03 in the posttest making a pretest, posttest mean

gain in the male students taught with cooperative learning technique to be 12.66. Meanwhile, female students taught Basic Electricity with cooperative learning technique had a mean score of 4.54 in the pretest and a posttest mean of 14.45 with a

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pretest, posttest mean gain of 10.91. Also, male students taught with conventional method had a mean score of 4.25 in the pretest and a mean score of 14.50 in the posttest making a pretest, posttest mean gain in the male students taught with conventional method to be 10.25. Meanwhile, female students taught Basic Electricity with conventional method had a mean score of 4.33 in the pretest and a posttest mean of 14.61 with a pretest, posttest mean gain of 10.28. With these results male students taught Basic Electricity had higher mean gain scores than female students in the Achievement Test. Thus, there is an effect attributable to gender on the achievement of students taught Basic Electricity.

FINDINGS OF THE STUDY

The following findings emerged from the study based on the data collected and analyzed and hypotheses tested

1. Cooperative learning instructional technique is more effective than the conventional teaching method on students' achievement in Basic Electricity.
2. Cooperative learning instructional technique is more effective than the conventional teaching method in stimulating students' interest in Basic Electricity.
3. It was found out that there is an effect of gender on the achievement of students taught Basic Electricity in favour of male students.

DISCUSSION OF THE FINDINGS

Findings on the effect of Cooperative learning instructional strategy on Students Academic Achievement in Basic Electricity revealed that the main effect of cooperative learning instructional technique (14.48) on students' achievement in Basic Electricity is higher than the main effect of conventional technique (10.47). At the same time, Analysis of covariance was used to test the first hypothesis, the calculated F-value (124.336), Significance of F (0.000) and confidence level of (0.05) there was a statistically significant difference between the main effect of (cooperative learning technique and conventional method) on students achievement in

Basic Electricity confirming that the difference between the main effect of Cooperative learning instructional technique and conventional method was statistically significant. The implication of this finding is that cooperative learning instructional technique (Small Group and Interpersonal Skills, Group Interdependence, Individual Accountability, Group Processing and Face-to-Face Interaction) is more effective than conventional method in enhancing students' achievement in Basic Electricity. The findings that cooperative learning instructional technique has positive effect on students achievement is similar to the finding of Ogbu (2020) who in their study found out that the adoption of cooperative learning instructional approach in the teaching of Turkey physics students improved the students achievement in physics than the students taught with traditional instructional method. A possible explanation for the effectiveness of the cooperative learning instructional techniques is the students' active involvement in learning process using cooperative learning strategies through eye to eye contact, team work and collaborative activities by the students. In learning, providing opportunities to interact with course material through the use of cooperative skills tends to change the course from teacher-centred approach to one that is more student-centred, and focused on the cognitive development and construction of knowledge in the students (Mbonyirivuze, *et al.*, 2019). Hence, one means of constructing knowledge is to create meaning by doing and interacting. Creating support for knowledge construction within the students is a critical component to the success of developing self-motivated, intellectually stimulated learners. Duhu and Ibanga (2020) argued that students can learn to think better if schools concentrate on teaching how to do so, through the use appropriate instructional techniques, which will promote intellectual growth and fosters academic achievement/performance gains in our rapid technological changing world.

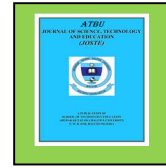
Findings on the effect of Gender on interest of students studying Basic Electricity when taught using Cooperative learning instructional strategies revealed that mean scores of cooperative learning technique on students'

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interest in Basic Electricity is higher than the mean scores of conventional method. Analysis of covariance presented in Table 6 confirmed that the difference between the main effects of cooperative learning instructional technique (17.26) and conventional method (13.48) in students' interest inventory was significant. The significant difference is attributed to the treatment given to the treatment groups assigned to cooperative learning instructional technique. This finding indicates that cooperative learning instructional technique is more effective in stimulating students' interest in Basic Electricity than the conventional method. Onyekwere (2021) asserted that the degree of understanding by students depends on several interacting variables such as learning materials, student's interest, school environment and teaching techniques. He therefore emphasized that teacher should be endeavour to adopt instructional technique that are capable of stimulating students interest.

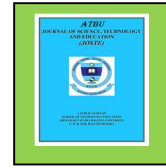
Finding on the effect of gender on academic achievement of students studying Basic Electricity revealed that male students had a higher mean score (12.66) in the Basic Electricity achievement test than female students (10.91). At the same time, Analysis of covariance was employed to test the second hypothesis, Table 5, at the calculated F- value (3.674), significance of F (0.025) and confidence level of (0.05), there was a significant difference between the main effects of gender (male and female) on students' achievement in Basic Electricity which confirmed that the difference between the achievement of male and female students in Basic Electricity was statistically significant favouring boys. The obvious implication of this finding is that there was an effect attributable to gender on achievement of students in Basic Electricity. This finding is similar to findings of several other studies that had been conducted on gender effects on achievement of male and female students in sciences and other fields. For instances, one of the important discoveries emerging from studies involving the effect of inquiry based instructional approach on academic achievement was the revelation of gender differences favouring boys. This also affirms Abdullahi, *et al.* (2021) that it has been

documented that disparity exists between male and female students' performance in sciences and other related fields, and in some cases boys had an edge over girls in academic achievement.

Generally, boys were consistently found to perform better than girls on vocational and technical achievement tests suggesting that boys generally possess greater vocational and technical skills than girls. Male advantages in vocational and technical skills have been established in studies by Oludipe (2019) where the trends of gender differences were found to be stable and consistent. Thus, in studies where differences in achievement were evident males typically had stronger vocational and technical skills than girls. The identified gender effect on achievement in Basic Electricity was responsible for the significant gender effect found on students' achievement in Basic Electricity. Thus, the superiority of male in vocational skills had responsible for their improved achievement in Basic Electricity. However, analysis of covariance was used to test hypothesis three, Table 5. At the calculated F-value (1.00), significance of F (0.305) and confidence level of (0.05), there was no interaction effect of treatment given to students and their gender with respect to their mean scores on Basic Electricity Achievement Test.

CONCLUSION

This study has found out that cooperative learning instructional technique is more effective in improving students' achievement and interest in basic electricity than conventional technique. Also the study revealed that, there was an effect attributable to gender on students' achievement and interest in Basic Electricity. However, the study found out no interaction effects of cooperative learning instructional techniques and gender on achievement and interest of Technical College students in Basic Electricity. This simply means that the effectiveness of cooperative learning instructional techniques on students' interest and achievement in Basic Electricity does not depend on the levels of gender. Hence, irrespective of nature of sex, learners will record improved performance in their interest and achievement in Basic Electricity when



cooperative learning instructional technique is employed for teaching Basic Electricity. These results therefore showed that cooperative learning instructional technique is a viable teaching method for Basic Electricity. Furthermore, this study has also found out that there was an interaction effect of students' gender with respect to their mean scores on Basic Electricity achievement test and interest inventory. This simply means that cooperative learning instructional technique is more effective in improving students' achievement and interest in Basic Electricity regardless of Gender. It is hoped therefore, that if cooperative learning instructional technique is taken into consideration in the teaching of Basic Electricity in Technical Colleges, the craftsmen trained will graduate with Basic Electricity skills in strong problem solving, creative thinking, collaborative work, and independent decision making skills which will make them adaptable to the present and envisaged changes in the electronics industries occasioned by technological advancement. Consequently, the craftsmen will be able to improve on their learning and pass their NABTEB examinations with better grades, contribute their own quota to industrial development of this nation, and become employers of labour instead of hoping solely on paid employment. Based on the findings, it was recommended that technical college teachers should adopt the use of cooperative learning instructional technique to teach Basic Electricity

RECOMMENDATIONS

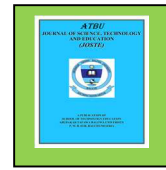
Based on the findings of this study, the subsequent discussion and their implications, the following recommendations are made:

1. Technical College teachers in Niger State should adopt the use of the cooperative learning instructional technique to the teaching of Basic Electricity.
2. National Board for Technical Education (NBTE) should consider review of curriculum for Basic Electricity with a view to incorporating cooperative learning instructional technique into the teaching of Basic Electricity

3. Government should provide tools and equipment needed to teach the state- of the-art of basic electricity and implement the cooperative learning instructional approach in the Technical Colleges
4. Training should be organized for Niger State Technical Teachers especially basic Electricity Teachers on the advantages of adopting cooperative learning instructional technique to the teaching of Basic Electricity.
5. Workshops, seminars and conferences should be organized by Niger State Ministry of Education and administrators of Technical Colleges in the State to enlighten technical teachers and improve their knowledge and skills on the use of cooperative learning instructional techniques for improving students' achievement and interest in Basic Electricity.

REFERENCES

- Abdullahi, S.M., Hasssan A.M., Bashir, B & Umar I.Y. (2021). Effect of Task Instruction on Foundary Students' Academic Performance in Polytechnics in North-central Nigeria. *International journal of industrial technology, engineering and education*, 2(1), 66-73.
- Ahmad, T. A., & Ombuguhim, S. U. (2020). Effect of Self-Regulatory Learning Strategy on Students' Achievement in Basic Science and Technology in Minna, Niger State. *Journal of Information, Education, Science and Technology*, 6(2), 122-131.
- Akinpade, O. A., Alawode, O. D. & Usman, G. A. (2020). Assessment of Workshop Facilities for Effective Teaching - Learning Delivery in Industrial and Technology Education Department. Federal University of Technology, Minna. *Journal of Information Education, Science and Technology*, 6 (1), 62-67.
- Amaechi, O.J, & Thomas, C.G. (2016). Strategies of effective teaching and learning Practica skills in technical and vocational training programmes in



- Nigeria. *International Journal of Scientific Research Engineering & Technology (IJSRET)*, 5(12), 598-603.
- Amatobi, V. E., Amatobi, D. A. (2020). The influences of gender and attitude differences to students' achievement in mathematics in Nigerian secondary schools: a case study of comprehensive Sec school Amurie-Omanze in South-Eastern Nigeria. *American Journal of Research Communication*. 8(2): 1-8.
- Anigbogu, M.A (2019), "Educating the girl child psychology", *News*, 1 (3), 17-18.
- Bashir, M. (2018). Adequacy and utilization of instructional materials for teaching electrical installation and maintenance work trade in Adamawa State technical colleges. *ATBU Journal of Science, Technology & Education (JOSTE)*, 6(2), 226-233.
- Coleman, E. (2020). *School factors and their Effects on Achievement*. Illinois Teacher May/June; 162-184
- Duhu, P.C. & Ibanga, I. J. (2020). Effects of Guided Discovery Method of Teaching on Students' Academic Achievement and Retention in Electrical Installation and Maintenance Work in Government Technical Colleges of Adamawa State. *Journal of Information, Education, Science and Technology*, 6 (2), 43-50.
- Eze, T.I., Nwalo, C.N. & Udu, D.A. (2021). Comparative analysis of project and demonstration teaching methods in improving students' academic achievement in basic electricity in technical colleges. *Asian Journal of Interdisciplinary Research*, 4(2), 34-45
- Federal Republic of Nigeria (FRN) (2013). *National Policy on Education* (6th edition). Lagos: National Educational Research and Development Council (NERDC) Press.
- National Business and Technical Examination Board (2024). *Chief examiners report*. Benin. NABTEB
- Nnamani, S.C. & Oyibe, O.A. (2016b). Gender and academic achievement of secondary school students in social studies in Abakaliki urban of Ebonyi State. *British Journal of Education*. 4(8), 72-83,
- Mbah, P. E. (2022). Effects of two instructional methods and some moderator variables on junior secondary school home economics students' academic achievement. *Unpublished PhD thesis, University of Benin*.
- Mbonyiryivuze, A., Yadav, L.L., & Amadalo, M.M. (2019). Students' conceptual Understanding of electricity and magnetism and its implications: A review. *African Journal of Educational Studies in Mathematics and Sciences*. 15 (2), 55-67.
- National Business and Technical Examination Board (NABTEB), (2024). *National business and technical examination board examiners reports*. Benin: NABTEB
- Ndioho, O. F. and Nbina, J. B. (2014). Effects of guided inquiry strategy on students' academic achievement and retention in biology. *asej-imsbiz journal* (3)1
- Nnamani, S.C. & Oyibe, O.A. (2016b). Gender and academic achievement of secondary school students in social studies in Abakaliki urban of Ebonyi State. *British Journal of Education*. 4(8), 72-83,
- Ogbu, J. E. (2020). *Development and Validation of Basic Electricity Interaction Categories*. *Ebonyi Technology and Vocational Education Journal* 4 (1), 191-202.
- Okolo, P. C. (2017). Perceived Causes of Students' Failure in Basic Science in Enugu State Junior Secondary Schools Unpublished Masters' Thesis presented to Department of Science Education, Faculty of Education. Enugu State University of Science and Technology. State", International



- Journal of Development and Sustainability*, (7)2, 666-678.
- Okeke, M.N. & Okey, K.O (2018). Impact of collaboration learning strategy on the academic achievement of senior secondary school chemistry students in Obio-Akpor local government area. *International Journal of Education and Evaluation* 4(2), 11-18.
- Oludipe, O. I. (2019). Gender Difference in Nigerian Junior and Senior Secondary Students' Academic Achievement in Basic Science. *Journal of Education and Social Research*, 2(1), 93-99.
- Oyekola, A.H. (2020). Effects of Flipped Classroom Instructions and Teaching Self-efficacy on Pre-service Teachers' Practice in Microteaching in Lagos. *Journal of Science, Technology, Mathematics and Education*, 16(2), 198-209.
- Onuebunwa, B. N. (2020). Sex Barriers, challenges and opportunities in Technical and scientific Advancement: A Challenge to women in the 21st Century. *Journal of women in colleges of Education (JOWICE)* 4: 159-163.
- Onwuegbu, O. I. (1979). *Discover teaching*. Enugu: Forth Dimension publishing co. Ltd.
- Onyekwere, P. E. (2021): *Child Development: Theory and Practice*. Lagos: T-Excel publishers.
- Pande, M., & Bharathi, S. V. (2020). Theoretical Foundations of Design Thinking—A Constructivism Learning Approach to Design Thinking. *Thinking Skills and Creativity*, 36, 100637. Doi: <https://doi.org/10.1016/j.tsc.2020.100637>
- Pusca, D. & Northwood, D. O. (2018). Design Thinking and its Application to Problem Solving. *Global Journal of Engineering Education*, 20, (1) 48-53.
- Puput Putri Kus S., Sri W., & Ashadi (2020). Effectiveness of analytical thinking-based module to improve students' learning outcomes using concept map. *Journal of Physics: Conference Series* 1511 (2020) 012110 IOP Publishing doi:10.1088/1742-6596/1511/1/012110, 1-9
- Russo, S. D. (2018) What Can Design Thinking Offer Writing Studies? *National Council of Teachers of English*.
- Usoro, A.D., Akpan, U.T. & Ikpe, S.A. (2018). Parameters in benchmarking technical colleges for quality educational goals in Nigeria. *Educational Research International*. 7(3): 53 61. Retrieved June 28, 2019, from <http://www.erint.savap.org.pk/PDF.>