



Effects of Computer Tutorial and Drills-Practice Methods on Students' Academic Achievement and Retention in Electrical Installation and Maintenance Work Trade in Technical Colleges in Gombe State, Nigeria

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ABSTRACT

The study determined the effects of computer based tutorial and drill-practice on students' achievement and retention in electrical installation and maintenance works. A quasi experimental specifically pre-test posttest control group research design was adopted in the study. The study was carried out in Gombe State using a random sample of 107 National Technical Certificate (NTC) II technical college students that are offering electrical installation and maintenance works. Three intact classes were used, two were used and experimental groups treated with computer tutorial and drill-practice method while the other class was used as control group taught using lecture method. The study was guided by six research questions and six null hypotheses tested at 0.05 level of significance. Electrical Installation and Maintenance Works Achievement Test (EIMWAT) was used as instrument for data collection. Research questions were answered using mean and standard deviation while hypotheses were tested using analysis of co-variance (ANCOVA). The findings revealed that students taught with computer tutorial and drill-practice performed better in their achievement and retention tests than those taught with lecture method. It was recommended among others that school administration should give emphasis on training of students on basic computer operation for them to be able to participate effectively while teachers intend to use computer based tutorial or drill-practice method.

Keywords: Computer Tutorial, Drills-Practice Methods, Students' Academic Achievement, Retention, Electrical Installation and Maintenance Work

INTRODUCTION

Globally speaking now a day national development is not longer solely depend on minerals resource available in a particular country, but the ability of that country to process the resources through modern technology. To be technological know-how, an educational programme to give training and impart necessary skills leading to the production of craftsmen, technicians and other skilled personnel who has to be emphasized. According to Ilojeme and Okorieocha (2021) in Nigeria technical education is one of such educational programmes that provide the youth with the opportunity to acquire skills and knowledge for effective nation building. These skills are acquired in technical colleges. As stipulated in the National Policy on Education, Technical Colleges are established on the philosophical foundations of Technical

and Vocational Education and Training (TVET), and principal training institutions mandated to provide vocational education and training to equip graduates as well as prepare them for gainful employment in public and private industrial sectors (Federal Republic of Nigeria [FRN], 2013). Technical College is now known as Government Science and Technical College (GSTC) in most of the States in Nigeria including Gombe State. It is a post basic specialized institution of learning where trades and modular courses are offered in addition to general education and science subjects (Eze, & Osuyi, 2018).

The trades are classified into construction trade, engineering trades and miscellaneous trades. Electrical installation and maintenance works is of the engineering trades available in technical college (National Board for Technical Education, 2015). Electrical installation and maintenance works trade is designed to impart knowledge and practical skills in different aspects of the trade areas such as house wiring (conduit & surface), coil winding and rewinding, electrical gadgets repairs, installation and maintenance of electrical machines among others (Ohanu, Shodipe, Chukwu, & Chukwuma, 2020). The students upon graduating are expected to be academically sound to be able to apply the knowledge and skills acquired from the concepts of the trade. However, they can only apply it if they academically achieve/perform and retain better.

According to Eze and Osuyi (2018) academic performance of students in Electrical installation and maintenance works is the measure of their achievement in both theory and practical which could be determined by an achievement test which should cover the three domains of learning, namely: cognitive, psychomotor and affective. Academic achievement represents the outcome that indicates the extent to which a person has accomplished specific goals that were the focus of activities in instructional environments, specifically in schools (Eze, Onwusa & Nwaosa, 2020; Osuafor & Onoh, 2022). Retention on the other hand, is a process of transferring information from short term memory to long term memory. Retention comes in before recall. It is recall that reveals how much the students have retained during teaching and learning. (James, 2011). Eze, Ezenwafor and Obidile (2016) contended that a student's academic achievement and retention depends on several factors such as, learning environment, instructional methods and teaching strategy, teachers' attitude and enthusiasm, as well as students' attitude and background.

Teaching strategy is a major determinant of students' achievement in implementation process of instructional delivery (Aniodoh and Egbo, 2013; Etiubon & Etiubon, 2021). Similarly, Lkama and Dabo (2019) opined that the overall successes of knowledge and skill acquisition in technical college depend to a large extent, on effective implementation of its curriculum and appropriateness of teaching method. These are determinants in effective curriculum implementation. Consequently, Faremi (2014), observed that the lecture method which is teacher-centered is the main teaching methods employed by technical teachers for implementing the curriculum. It is a method commonly used by technical teachers including EIMW teachers, probably because they are not aware or familiar with modern teaching particularly computer-based teaching methods (Eze, & Osuyi, 2018). Lecture approach is a teacher-centred strategy that involves only the teacher doing most of the teaching activities while the students are either passive listeners that are minimally involved in the lesson (Etiubon & Etiubon, 2021). This method of instruction seems to be absolute and responsible for poor performance among EIMW students in technical colleges and probably that is why NABTEB chief examiner in his report after May/June 2017 marking exercise suggested that technical teachers should consider other teaching methods in teaching technical subjects (NABTEB, 2017).

It is an undeniable fact that application of technology is common in every aspects of human life and generally when the word technology is mentioned people think of advancement through invention or innovation of existing practice or idea in various sectors of the human life. The classroom has not been exempted from this general thinking and the lack of integrating it into the classroom practice stirs feeling towards a practice as antiquated, ineffective and clumsy (Idowu, 2021). Integration of technology into classroom brought the issue of Computer Assisted Instruction which refers to the use of computer in teaching and learning (Anusiuba, Egbo, & Nweke, 2019). According to Anusiuba, Egbo and Nweke (2019) through computer assisted instruction, a student can move onto more demanding educational activities before the rest of the class without disrupting anyone else's learning and simultaneously,

another student can repeat certain learning activities as often as advisable. Among the types of computer assisted instruction, Salaman, Budiman, and Ambyar (2020) noted that there are tutorial and drill-practice types.

The tutorial method is a type of programmed learning, using Stimulus-Response theory of learning (Ozofor, 2015). Shamsideen (2015) defined computer tutorial instructional method as a self-paced, self-contained, and structured-content instructional unit that uses hyperlink for videos and allows students to learn content without any teaching material except the computer. It is the use of computer for learning that allows the interaction of learners with the computer in a manner that ensures thorough learning and mastery of a specific concept compared to traditional teaching (Etiubon & Etiubon, 2021). This type of instruction provides information, generally new information to students in much the same manner as human teacher or tutor might, it typically uses text and graphic to represent contents (Osuafor & Onoh, 2022). One of the advantages of this type of instruction is its ability to adjust content presentation order according to the learner's responses to the questions, dynamism of presentation and record keeping (Eze, Onwusa & Nwaosa, 2020)

On the other hand, Drill-Practice method, this method of instruction according to (Ozofor, 2015) is developed following the Gestalt theory of learning. The Drill-Practice method involved four levels of control: content selection, Display selection, conscious cognition and meta-cognition. In a computer drill-practice design, questions are presented on computer screen for students to respond, when they responded the computer will then informs the student whether the answer is correct, if the student is right, another problem would be given to solve, but if the students' respond was wrong, he would be corrected by the computer (Mudasiru & Adedeji, 2010). Describing the computer based drill-practice method of instruction, Rathakrishnan, Raman and Haniffa (2018) stated that teachers and students are in touch with learning tasks, engage in creative information sharing, announce upcoming events, share contents of homework, note-taking, remind themselves of to-do-list, capture feedbacks, scores and upload activities for further studies. This instructional package entails acquisition of knowledge or skill through systematic training by multiple repetitions, rehearse and practice that involves repetition of specific skills (Laleye & Ogunboyede, 2023). For a better students' academic achievement and retention, it seems that these two computer-based instructional strategies can have the prospects to challenge the frequently used teaching method to teach contents of electrical installation and maintenance trade in technical colleges.

Statement of the Problem

Teaching and learning of electrical installation and maintenance works required the use of right instructional methods that are technologically up to date. But a visit to technical colleges in Gombe State revealed that most electrical installation and maintenance works teachers seem to be using teacher-centred teaching methods specifically lecture method. This method of instruction being used over the years according to Eze and Osuyi (2018) has inadequately equipped the students for National Technical Certificate examination hence the persistent poor performance of students in electrical installation and maintenance works over the years. The persistence use of teacher-centred method by electrical installation and maintenance works teachers may lead to production of incompetent graduate that can't either be employed, self-employed or further their studies. This prompted the researcher to investigate the effectiveness of computer-based tutorial and drill-practice on students' academic achievement and retention in electrical installation and maintenance works in technical colleges.

Purpose of the study

The main purpose of this study is to determine the effect of computer tutorial and drill-practice teaching methods on the academic achievement and retention of electrical installation and maintenance works students in technical colleges in Gombe State. Specifically, the study intended to;

1. Determine the mean achievement scores of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and those taught with lecture method
2. Determine the mean achievement scores of students when taught Electrical Installation and Maintenance Works Trade using computer drill and practice and those taught with lecture method.

3. Determine the mean achievement scores of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and drill and practice.
4. Determine the mean retention scores of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and those taught with lecture method.
5. Determine the mean retention scores of students when taught Electrical Installation and Maintenance Works Trade using computer drill and practice and those taught with lecture method
6. Determine the mean retention scores of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and drill and practice

Research Questions

1. What is mean achievement score of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and those taught with lecture method?
2. What is mean achievement score of students when taught Electrical Installation and Maintenance Works Trade using computer drill and practice and those taught with lecture method?
3. What is mean achievement score of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and drill and practice?
4. What is mean retention score of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and those taught with lecture method?
5. What is mean retention score of students when taught Electrical Installation and Maintenance Works Trade using computer drill and practice and those taught with lecture method?
6. What is mean retention score of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and drill and practice?

Research Hypothesis

The following null hypotheses were tested at 0.05 level of significance:

1. There is no significant difference in the mean achievement score of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and those taught with lecture method
2. There is no significant difference in the mean achievement score of students when taught Electrical Installation and Maintenance Works Trade using computer drill and practice and those taught with lecture method
3. There is no significant difference in the mean achievement score of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and drill and practice
4. There is no significant difference in the mean retention score of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and those taught with lecture method
5. There is no significant difference in the mean retention score of students when taught Electrical Installation and Maintenance Works Trade using computer drill and practice and those taught with lecture method
6. There is no significant difference in the retention score of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and drill and practice

METHODOLOGY

The design of the study is quasi-experimental research design. Specifically, the design is pretest-posttest control group design. The study was conducted in technical colleges in Gombe State which is located in the North-East zone of Nigeria. The population of the study comprised 219 National Technical Certificate (NTC) II students of electrical installation and maintenance works trade from five technical colleges that are offering the trade. A sample size of 107 students was drawn from three schools, one intact class from each school. Purposive sampling technique was used based on availability of computer facilities to support the experiment. Simple random sampling was used to assign two intact classes to experimental

groups and one intact class to control group. Electrical Installation and Maintenance Works Achievement Test (EIMWAT) was used as data collection instruments, a 50 items multiple options objectives test developed by the researcher. The computer tutorial and drill-practice package were also developed by the researcher with the assistance of a professional programmed developer. Both the achievement test and instructional package were validated by three experts from technology education and computer science department, Modibbo Adama University Yola. The instrument yielded a reliability index of 0.78 established using test-retest method.

During the experiment which lasted for nine (9) weeks, the following procedures were observed;

- i. In the first week the researcher visited the schools to obtain permission and orientation for the participating research assistants.
- ii. Students in experimental groups were given training on how to use computer, specifically use of internet, sending, receiving and replying through emails and website learning. This training was given in the second week.
- iii. The pretest for both experimental and control groups was administered in the third week with the help of research assistants to determine the initial abilities of the students prior to the experiment
- iv. Experimental treatments were executed both for the experimental (tutorial and drill-practice methods) and control (lecture method) groups which lasted for three weeks. The teaching for each group covered three topics one topic per week. The topics covered are surface wiring, conduit wiring, and cable jointing.
- v. Post test was administered for all the groups in seventh week of the experiment
- vi. Retention test was administered two weeks after the post test administration, that is in the ninth week of the experiment to ascertain the retention level of the students

Data collected for the study were analyzed using mean and standard deviation to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. For the ANCOVA, when the p-value was less or equal to the level of significance (0.05), the null hypothesis was rejected. Alternatively, when the p-value was greater than the level of significance (0.05), the null hypothesis was not rejected. Statistical Package for the Social Sciences (SPSS) version 22 was used for the analysis.

RESULT AND ANALYSIS

Research Question 1: *What is mean achievement score of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and those taught with lecture method?*

Table 1: Mean and Standard Deviation for Pre-test and Post-test score of Students Taught with computer Tutorial and Lecture Techniques

Teaching Method	N	Pre-test		Post-test		Mean Diff. \bar{X}
		\bar{X}	SD	\bar{X}	SD	
Experimental Group (Computer Tutorial)	36	2.39	0.93	34.36	3.99	31.97
Control Group (Lecture Method)	31	2.23	0.99	18.32	3.66	16.09

Table 1 revealed the experimental group taught with computer tutorial method had post-test mean score of 34.36 with a standard deviation of 3.99 while the control group taught with lecture method had mean score of 18.32 with a standard deviation of 3.66. The mean gain of the experimental group is 31.97 while that of the control group is 16.09, this means that those taught with computer tutorial method performed better than those taught using lecture method.

Research Question 2: *What is mean achievement score of students when taught Electrical Installation and Maintenance Works Trade using computer drill and practice and those taught with lecture method?*

Table 2: Mean and Standard Deviation for Pre-test and Post-test score of Students Taught with computer Drill-Practice and Lecture Techniques

Group	N	Pre-test		Post-test		Mean Diff.
		\bar{X}	SD	\bar{X}	SD	\bar{X}
Experimental Group (Drill-Practice)	40	2.13	1.02	32.17	5.32	30.04
Control Group (Lecture Method)	31	2.23	0.99	18.32	3.66	16.09

Table 2 revealed the experimental group taught with computer drill-practice technique had post-test mean score of 32.17 with a standard deviation of 5.32 while the control group taught with lecture method had mean score of 18.32 with a standard deviation of 3.66. The mean gain of the experimental group is 30.04 while that of the control group is 16.09 this revealed that those taught with computer drill-practice method performed better than those taught using lecture method.

Research Question 3: *What is mean achievement score of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and drill and practice?*

Table 3: Mean and Standard Deviation for Pre-test and Post-test score of Students Taught with computer tutorial and computer Drill-Practice Techniques

Group	N	Pre-test		Post-test		Mean Diff.
		\bar{X}	SD	\bar{X}	SD	\bar{X}
Computer Tutorial Method	36	2.39	0.93	34.36	3.99	31.97
Computer Drill-Practice Method	40	2.13	1.02	32.17	5.32	30.04

Table 3 revealed the experimental group taught with computer tutorial technique had post-test mean score of 34.36 with a standard deviation of 3.99 while the control group taught with computer drill-practice method had mean score of 32.17 with a standard deviation of 5.32. The mean gain of the experimental group is 31.97 while that of the control group is 30.04 this revealed that those taught with computer tutorial method performed better than those taught using computer drill-practice method.

Research Question 4: *What is mean retention score of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and those taught with lecture method?*

Table 4: Academic Retention Score of Students Taught with computer Tutorial and Lecture Techniques

Method of Teaching	N	Retention Test		Mean Diff.
		\bar{X}	SD	\bar{X}
Computer Tutorial (Experimental Group)	36	30.61	2.02	14.42
Lecture Method (Control Group)	31	16.19	2.69	

Table 4 shows the mean and standard deviation of retention scores of students in experimental and the control groups. The mean retention score of 30.61 for the experimental group taught using computer tutorial is higher than that of control group using lecture method which is 16.19. This means that students taught with computer tutorial have higher retention ability that those taught with lecture method

Research Question 5: *What is mean retention score of students when taught Electrical Installation and Maintenance Works Trade using computer drill and practice and those taught with lecture method?*

Table 5: Academic Retention Score of Students Taught with computer drill-practice and Lecture Techniques

Method of Teaching	N	Retention Test		Mean Diff.
		\bar{X}	SD	\bar{X}
Drill-Practice (Experimental Group)	40	29.03	3.90	
Lecture Method (Control Group)	31	16.19	2.69	12.83

Table 5 shows the mean and standard deviation of retention scores of students in experimental and the control groups. The mean retention score of 29.03 for the experimental group taught using drill-practice is higher than that of control group taught using lecture which is 16.19. This means that students taught with computer drill-practice have higher retention ability that those taught with lecture method

Research Question 6: *What is mean retention score of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and drill and practice?*

Table 6: Academic Retention Score of Students Taught with computer tutorial and computer drill-practice Techniques

Teaching Method	N	Retention Test		Mean Diff.
		\bar{X}	SD	\bar{X}
Experimental Group (Computer Based Tutorial)	36	30.61	2.02	1.58
Control Group (Computer Based Drill-Practice)	40	29.03	3.90	

Table 6 shows the mean and standard deviation of retention scores of students in experimental and the control groups. The mean retention score of 30.61 for the experimental group taught using computer tutorial is higher than that of control group taught using computer drill-practice which is 29.03. This means that students taught with computer drill-practice have higher retention ability that those taught with computer drill-practice technique.

Research Hypothesis 1: There is no significant difference in the mean achievement score of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and those taught with lecture method

Table 7: Analysis of covariance (ANCOVA) of Academic Achievement scores of students taught Electrical Installation and Maintenance Works using computer tutorial and those taught using lecture method

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	4285.346 ^a	2	2142.673	143.081	.000
Intercept	6810.264	1	6810.264	454.768	.000
Pretest(Covariate)	.665	1	.665	.044	.834
Group	4262.375	1	4262.375	284.628	.000
Error	958.415	64	14.975		
Total	53871.000	67			
Corrected Total	5243.761	66			

Table 7 shows that the F value of pretest is 0.044 with p-value of 0.83 which is greater than 0.05 indicating that there is no significant different in the covariate. The F-calculated value for (1, 64) is 284.63 with p-value of 0.00. Since the p value of 0.00 is less than 0.05, the null hypothesis is therefore

rejected. Hence, there is significant difference between the mean achievement scores of students taught Electrical Installation and Maintenance Works using computer tutorials and those taught with lecture method.

Research Hypothesis 2: There is no significant difference in the mean achievement score of students when taught Electrical Installation and Maintenance Works Trade using computer drill and practice and those taught with lecture method

Table 8: Analysis of covariance (ANCOVA) of Academic Achievement scores of students taught Electrical Installation and Maintenance Works students using computer drill-practice and those taught with lecture method

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	2980.889 ^a	2	1490.445	64.576	.000
Intercept	6900.416	1	6900.416	298.974	.000
Pretest (covariate)	7.153	1	7.153	.310	.580
Group	2980.888	1	2980.888	129.153	.000
Error	1477.141	64	23.080		
Total	52227.000	67			
Corrected Total	4458.030	66			

Table 8 shows that the F value of pretest is 0.310 with p-value of 0.580 which is greater than 0.05 indicating that there is no significant different in the covariate. The F-calculated value for (1, 64) is 129.153 with p-value of 0.00. Since the p value of 0.00 is less than 0.05, the null hypothesis is therefore rejected. Hence, there is significant difference between the mean achievement scores of students taught Electrical Installation and Maintenance Works using computer drill-practice and those taught with lecture method.

Research Hypothesis 3: There is no significant difference in the mean achievement score of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and drill and practice

Table 9: Analysis of covariance (ANCOVA) of Academic Achievement scores of students taught Electrical Installation and Maintenance Works students using computer tutorial and those taught with computer drill-practice method

Source	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	112.071 ^a	2	56.035	2.493	.090
Intercept	12064.635	1	12064.635	536.840	.000
Pretest	21.520	1	21.520	.958	.331
Group	77.469	1	77.469	3.447	.067
Error	1640.561	73	22.473		
Total	85576.000	76			
Corrected Total	1752.632	75			

Table 9 shows that the F value of pretest is 0.958 with p-value of 0.331 which is greater than 0.05 indicating that there is no significant different in the covariate. The F-calculated value for (1, 73) is 3.447 with p-value of 0.67. Since the p value of 0.67 is greater than 0.05, the null hypothesis is therefore failed to be rejected. Hence, there is no significant difference between the mean achievement scores of students taught Electrical Installation and Maintenance Works using computer tutorial and those taught with computer drill-practice method.

Research Hypothesis 4: There is no significant difference in the mean retention score of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and those taught with lecture method

Table 10: Analysis of covariance (ANCOVA) of Retention scores of students taught Electrical Installation and Maintenance Works students using computer tutorial and those taught with lecture method

Source	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3462.367 ^a	1	3462.367	626.203	.000
Intercept	36489.471	1	36489.471	6599.481	.000
Group	3462.367	1	3462.367	626.203	.000
Error	359.394	65	5.529		
Total	42222.000	67			
Corrected Total	3821.761	66			

Table 10 revealed that the F-calculated value for (1, 65) is 626.203 with p-value of 0.00. Since the p value of 0.00 is less than 0.05, the null hypothesis is therefore rejected. Hence, there is significant difference between the mean retention scores of students taught Electrical Installation and Maintenance Works using computer tutorials and those taught with lecture method.

Research Hypothesis 5: There is no significant difference in the mean retention score of students when taught Electrical Installation and Maintenance Works Trade using computer drill and practice and those taught with lecture method

Table 11: Analysis of covariance (ANCOVA) of Retention scores of students taught Electrical Installation and Maintenance Works students using computer drill-practice and those taught with lecture method

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	2875.510 ^a	1	2875.510	245.007	.000
Intercept	35710.552	1	35710.552	3042.710	.000
Group	2875.510	1	2875.510	245.007	.000
Error	809.814	69	11.736		
Total	42637.000	71			
Corrected Total	3685.324	70			

Table 11 revealed that the F-calculated value for (1, 69) is 245.007 with p-value of 0.00. Since the p value of 0.00 is less than 0.05, the null hypothesis is therefore rejected. Hence, there is significant difference between the mean retention scores of students taught Electrical Installation and Maintenance Works using computer drill-practice and those taught with lecture method.

Research Hypothesis 6: There is no significant difference in the retention score of students when taught Electrical Installation and Maintenance Works Trade using computer tutorials and drill and practice

Table 12: Analysis of covariance (ANCOVA) of Retention scores of students taught Electrical Installation and Maintenance Works students using computer tutorial and those taught with drill-practice method

Source	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	69.202 ^a	1	69.202	7.587	.007
Intercept	66653.202	1	66653.202	7307.647	.000
Experiment_3	69.202	1	69.202	7.587	.007
Error	674.956	74	9.121		
Total	67356.000	76			
Corrected Total	744.158	75			

Table 12 revealed that the F-calculated value for (1, 74) is 7.587 with p-value of 0.07. Since the p value of 0.07 is greater than 0.05, the null hypothesis is therefore failed to be rejected. Hence, there is no significant difference between the mean retention scores of students taught Electrical Installation and Maintenance Works using computer tutorial and those taught with computer drill-practice method.

DISCUSSION OF FINDINGS

The finding revealed that the effect of computer tutorial instructional technique on students' cognitive achievement is higher than the effect of lecture teaching method on students' cognitive achievement. The electrical installation and maintenance works students taught with computer tutorial achieved higher in their achievement test than those taught with lecture method. The difference was also reflected in their retention test. The differences are statistically significant as revealed by the hypotheses result. This finding is in agreement with the findings of Egunjobi (2014) who reported a significant difference in the academic performance of geography students exposed to tutorial mode of computer assisted instruction and those exposed to conventional method. It is also in line with the investigation of Anusiuba, Egbo and Nweke (2019) revealed that computer-assisted tutorial instruction significantly improved students' achievement and retention in computer studies more than the conventional method of instruction.

Also. The study found that the electrical installation and maintenance works students taught with computer drill-practice teaching strategy achieved higher in their achievement and retention test than those taught with lecture method. The differences are statistically significant as revealed by the hypotheses result. This finding is similar to that of Salaman, Budiman and Ambyar (2020) whose in their study found that drill-practice type of Computer Assisted Instructional method has more effect than conventional method of teaching on students performance. It also affirmed the finding of Laleye and Ogunboyede (2023) investigated the effects of drill-and-practice instructional package as a treatment on students' performance in Mathematics and found that those taught with drill-and-practice had higher academic achievement compared to those taught with conventional method.

Another finding from the study indicated that the the electrical installation and maintenance works students taught with computer tutorial teaching strategy achieved higher in their achievement and retention test than those taught with computer drill-practice strategy. However, the difference in both achievement and retention test is not statistically significant. The lack of significant difference could be due to the fact that both instructional methods are computer based instructional strategies. The finding is consistent with the result of Ozofo (2015) who found that students performed better in solving mathematics problems and helps them retain what they learnt longer when the computer-based tutorial and drill-practice methods of instruction were used in teaching them. It is also in line with the finding of Etiubon and Etiubon (2021) study revealed that students taught Energy Transformation in Nature, a concept in science using computer tutorial achieved and retained higher than those taught with computer drill-practice and lecture methods.

CONCLUSION

The study found out that the use of computer based tutorial and drill- practice teaching methods are more effective compared to lecture method in improving the academic achievement and retention of electrical installation and maintenance works students in the technical colleges. Drawing from the findings of this study, it can be concluded that for electrical installation and maintenance works students to do well, computer based tutorial and drill- practice teaching methods should be employed in teaching electrical installation and maintenance works. This will motivate and promote the interest of the students in terms of achieving good results. Moreover, based on this study, there is a dare need for electrical installation and maintenance works teachers in the technical colleges to develop interest in using computer based tutorial and drill- practice teaching methods to teach the subjects in the classroom.

RECOMMENDATIONS

1. Emphasis by school administration should be given to training of students on basic computer operation for them to be able to participate effectively while teachers intend to use computer based tutorial or drill-practice method.
2. It is recommended that electrical installation and maintenance works teachers should be trained in the use of computer based tutorial and drill-practice instructional methods in the classroom so as to improve the academic achievement and retention of electrical installation and maintenance works students
3. In training the teachers, workshops, seminars and conferences should be organized by educational administrators of Technical Colleges to enlighten installation and maintenance works teachers and improve their knowledge and skills on the use of computer based tutorial and drill-practice instructional methods.

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