

# Effects of Demonstration Teaching Method on Students Academic Performance in Electrical Installation and Maintenance Works in Technical Colleges in Edo State

By

**Ogbebor Samuel Osamede**

08078180039

[Ogbebor@aauekpoma.edu.ng](mailto:Ogbebor@aauekpoma.edu.ng)

**Dr (Mrs) Jane Itohan Oviawe**

08055601983

[Janeoviawe@aauekpoma.edu.ng](mailto:Janeoviawe@aauekpoma.edu.ng)

Department of Vocational and Technical Education

Faculty of Education

Ambrose Alli University

## Abstract

*This study investigated the effect of demonstration teaching method on the academic performance of electrical installations and maintenance works students in technical colleges in Edo State. The aim was to find out if there is difference in the performance mean scores of electrical installations and maintenance works students taught with demonstration teaching method and those taught with lecture teaching method. Two research questions were raised and their corresponding hypotheses formulated to guide the investigation. Quasi experimental design was adopted for the study. The population of the study comprised all one hundred and twenty-seven (127) technical students currently in vocational 11 offering electrical installations and maintenance works in the six (6) technical colleges in Edo State. The sample was made up of 61 vocational 11 electrical installations and maintenance works students in the 2022/2023 session. Purposive sampling technique was used to select the sample. The instrument used for the study was student's achievement test titled Electrical Installation and Maintenance Works Achievement Test (EIMWAT). The data were collected with the instrument administered on the sampled students and analyzed using t-test and ANOVA statistics. The study established that there was a significant difference in the performance means scores of students taught with demonstration teaching method and those taught with lecture teaching method. It was also revealed that there was no significant difference between students taught demonstration method with respect to gender. Based on the findings, it was recommended that government should provide equipment's and facilities to enhance learning via demonstration teaching method in technical colleges. It was also recommended that parents should encourage their wards to study electrical installations and maintenance works irrespective of their gender.*

*Keywords: Academic performance, Demonstration teaching method, Electrical installation and maintenance work, lecture teaching method and Technical education.*

## Introduction

Technical and vocational education is used as a comprehensive term referring to those aspects of the 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 occupations in various sectors of economic and social life. (N.P.E., 2004).

The goals of technical and vocational education are to;

1. Provide trained manpower in the applied science, technology and business particularly at craft, advanced craft and technical levels.
2. Provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development.
3. Give training and impart the necessary skills to individual who shall be self-reliant economically.

The range of courses in the technical colleges are; mechanical trades, computer craft practice, building trades, textile trades, printing trades, beauty culture trade, business trades and electrical engineering trades. According to the National Board for Technical Education Programme (NBTE, 2012). Electrical/electronic offers trade in; appliances maintenance and repairs, instrument mechanics and radio, television and electronics work, electrical installation and maintenance works. Electrical installation and maintenance work is concerned with the movement of electrons through conductor in an electric circuit. It consists of both domestic and industrial installation, installation of electrical machines and repairs. Its aims and objectives is to equip the individual with the knowledge and understanding of;

1. Safety rules and regulation in electrical installation and maintenance work.
2. Electrical installation tools, materials and accessories
3. Wiring of buildings
4. Installation of electrical machines and repairs
5. Rewinding of electrical machines
6. Entrepreneurship skill in electrical installation and maintenance works.

The different methods that can be used in the teaching learning process include; lecture, discussion, individual method, demonstration, laboratory/experimental field trip, assignment, play way, peer teaching method, role playing, project, discovery teaching method etc. it has been observed that lack of instructional materials and facilities that are necessary in teaching electrical

installation and maintenance work has made the technical teachers adopted lecture teaching method which is control method and might not be able to adequately impact the necessary knowledge and practical skills on Electrical installation and maintenance work students. This teaching method which does not encourage students' active participation in the teaching and learning processes might be responsible for the poor academic performance of students in Electrical Installation Maintenance works over the years.

The lecture teaching method is usually a talk, or verbal presentation to a group of students by a teacher or guest speaker. (Ughamadu, 2006). This method of teaching allows the teacher to deal with a very large number of students at the same time. It leads to easy coverage of the syllabus or course outline. It is economical in terms of time and efforts. It helps the students or learners to develop and impose the ability to listen attentively, critically and with appreciation. However, it is not appropriate for teaching at the primary and secondary schools in that real teacher-students interaction is necessary for pronounced learning to take places, the slow learners are at disadvantage. It does not allow students to develop their own initiative.

Ughamadu (2006), defines demonstration method of teaching as a method of teaching that involves showing by offering examples of how something works or the steps involved in a process. In science, demonstrations are very useful in repeating experiments the students have already performed. This usually acts an excellent review with limited time and for a particular topic. Demonstration teaching methods saves time. Also, materials are conserved or economized. Demonstration teaching method can be useful in introducing a lesson and also to climax a lesson. Demonstration is an attention - inducer and a powerful motivator when used to introduce a lesson (Abdullahi, 2008). In teaching situations involving dangerous materials and fragile equipment's. Teaching still takes place as the teacher demonstrates. It allows the teacher to use activities that may be dangerous for students to carry out themselves. Demonstration by the teachers is useful to show how to use apparatus so as to prevent breakages and accidents.

Electrical installation and maintenance work is a practical subject that students could learn better when exposed to demonstration method because it brings the real-life situation into the classroom thereby motivating and inducing the student attention to learn with the available infrastructural materials and facilitates. The students could have the benefit of seeing, hearing and doing, that could facilitate their knowledge, understanding and improve their psychomotor skills in

electrical installation and maintenance works. This could result to improved academic performance of students in electrical installation and maintenance works.

### **Statement of the Problem**

Electrical installation and maintenance works is a course which involves a lot of practical demonstration using instructional facilities and materials for improved academic performance of the students. It has been observed that the absent of instructional facilities and materials in technical colleges has forced most electrical installation and maintenance works teachers to used lecture teaching method rather than demonstration teaching method in imparting the necessary knowledge, understanding and practical skills to their students. This might be responsible for the poor academic performance in electrical installation and maintenance works in National Technical Certificate Examination (NTCE). What is not yet clearer to the researcher is the teaching method that would enhance students' performance in Electrical Installation and Maintenance works in technical colleges in Edo State, if technical teachers continue to use lecture teaching method to teach EIMW in technical colleges as it is the current practice, students might not improve on the academic performance in NTC examination. Also, students might not acquire the skills needed for employment.

Could the use of demonstration teaching method improve students' academic performance in EIMW? The researcher wishes to experiment on the use of demonstration teaching method if it will improve students' performance in Electrical Installation and Maintenance Works (EIMW).

### ***Purpose of the Study***

The main purpose of this study is to find out the effects of demonstration's teaching method on students' academic performance in electrical installation and maintenance works in technical colleges. Specifically, the study determined

1. Difference in the performance means scores of students taught electrical installation and maintenance works with demonstration teaching method and lecture teaching method.
2. Difference in the performance means scores of male and female students taught electrical installation and maintenance works with demonstration teaching method.

### ***Research Question***

The following research questions were raised to guide the study:

1. What is the difference in the performance mean scores of students taught electrical installation and maintenance works with demonstration teaching method and lecture teaching method?
2. What is the difference in the performance mean scores in electrical installation and maintenance works with students taught with demonstration teaching method with respect to gender

### ***Research Hypotheses***

The following hypotheses were formulated and tested at 0.05 level of significance:

$H_{01}$ : There is no significant difference in performance mean scores in electrical installation and maintenance works between students taught with demonstration teaching method and lecture teaching method.

$H_{02}$ : There is no significant difference in the performance mean scores of students taught with demonstration teaching method with respect to gender.

### **Method of Study**

The study adopted the quasi-experimental design involving two groups (experimental group and the control group) plus pre-test and post-test. The experimental group (E) was taught with demonstration teaching method while the control group (C) was taught with lecture teaching method. Pre-test was carried out before the experiment and post-test was administered after the experiment on the two groups. The study was carried out in Edo states. The population of this study comprised all vocational II students of electrical installation and maintenance works in the six (6) technical colleges in Edo state. The sample size used for this study was sixty-one (61) VOC II electrical installations and maintenance works students in 2022/2023 academic session. Purposive sampling technique was used to select a sample size of 61 students from two schools based on the number of electrical installation and maintenance works students (48 males and 13 females) both, the two intact classes were randomly assigned to the experimental and control groups. The instrument used for data collection was Electrical Installation and Maintenance Work Achievement Test (EIMWAT) containing 30 objective questions based on the curriculum content for National Technical Certificate (NTC) II students. Each item has four options and each correct answer has 1 point while each incorrect answer has 0 point. The test items covered final sub circuit, conduit wiring, ducts and trucking system. The instrument was validated by three experts; two in technical education and one in educational measurement and evaluation from Ambrose Alli

University, Ekpoma. Test-re-test method was used to establish the reliability of the instrument whereby it was administered to an intact class of 26 NTC II electrical installation and maintenance work trades students of Government Science and Technical College, Asaba, Delta State twice within an interval of two weeks. The two sets of scores were correlated with the Pearson Product Moment Correlation formula and a reliability coefficient of 0.60 was obtained. The pre- test was then administered to the study sample after which the items on the instrument were re-organized before administering the post-test at the end of the experimental period.

The pre-tests and post-tests scores of the groups were collected and used in the analysis. Data were analyzed with the arithmetic 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 with the statistical package for social sciences (SPSS). The mean difference between the pre- test and post-test scores of the experimental and control groups was used to answer the research questions. Where the calculated F-value was equal or greater than the F-table value at 0.05 level of significance, the null hypothesis was rejected but where the F-calculated was less than F-table value, the null hypotheses was upheld.

**Research Question 1.** What is the difference in the performance mean scores of students taught electrical installation and maintenance works with demonstration teaching method and lecture teaching method?

**Table1. Performance mean achievement of student in the experimental group and control group.**

Groups	Method	Pretest	Post test.	Mean Gain	% Mean Gain.
Experimental	DTM	Mean 23.39	69.23	45.84	66.21
	N	40			
Control		SD .9.45	11.64		
	LTM	Mean 26.10	37.15	11.05	24.27.
	N	21	52		
	SD	9.23	9.28		

**Key: DTM = Demonstration Teaching Method**  
**LTM = Lecture Teaching Method**

## Results

Table 1 shows that the pre-test and post-test performance mean scores of the experimental group are 23.39 and 69.23 with a mean difference of 45.84 while the control group's pre- test and post-test performance mean scores are 26.10 and 37.15 with a mean difference of 11.05. This means that the demonstration teaching method (DTM) was more effective than the lecture teaching method (LTM) since the mean difference of the group taught with it is greater than that of the group taught using LTM.

### Research Question 2:

Table 2: Performance mean scores of students taught with demonstration teaching method with respect to gender.

					Pretest	Posttest				
<b>Performance gain</b>										
Group	Gender	N	Mean	SD	Mean	SD	Mean	SD	Mean	SD
DTM	Male	32	23.08	10.35	66.15	12.50	43.07	14.44		
	Female	8	23.69	8.86	72.31	10.26	48.62	12.74		

**Key: DTM = Demonstration Teaching Method**

### Result

**Table 2.** Shows that the pre-test and post-test performance mean scores of students taught with respect to gender. Male performance mean scores of pretest and posttest are 23.08 and 66.15 with a mean difference of 43.07 and SD =14.44 while the Female performance mean scores of pre-test and post-test are 23.69 and 72.31 with a mean difference of 48.62 and SD =12.74. This means that the demonstration teaching method (DTM) is effective in the teaching of electrical installation and maintenance works students with respect to gender because no much difference between mean and SD of performance gain.

### Research Hypothesis 1

$H_{0i}$ : There is no significant difference in performance mean scores in electrical installation and maintenance works between students taught with demonstration teaching method and those taught using lecture teaching method.

**Table3.ANCOVA table for students' for post-test mean scores by teaching methods.**

Source	DF	Sum of squares	Mean square	F-cal	F-tab	Sig	Remarks
Teaching	1	1622.4	1622.4	202.27	3.84	0.00	Rejected
Error	121	1909.6	8.023				
Total	122	26386					

**Table 3** Shows that the F-calculated value of 202.207 is greater than F- table value of 3.84 for 1 df numerator and 121 denominator at 0.05 level of significance  $F(1,239) = 3.84$  and  $p < 0.05$ . This shows that there is a significant difference in the mean performance in electrical installation and maintenance works test between students taught with DTM and those taught with LTM. The null hypothesis of no significant difference between the two groups was therefore, rejected

### Research Hypothesis 2

There is no significant difference on the mean performance scores of electrical installations and maintenance works students taught with demonstration teaching method with respect to gender. Data collected in respect of hypothesis 2 are analyzed and presented in table 4

**TABLE 4: SUMMARY OF ANCOVA ON THE DIFFERENCE BETWEEN THE PERFORMANCE MEAN SCORES OF STUDENTS TAUGHT WITH DEMONSTRATION TEACHING METHOD BASED ON GENDER.**

**Dependent Variable: Post test.**

Source	1	Type III sum of squares.	DF	Mean Square	F	P-Value.
Corrected Method		340.76 <sup>b</sup>	2	170.38	1.29	.30
Intercept		14612.02	1	14612.02	110.41	.30
Pre-test		94.61	1	94.61	.72	.41
Gender		235.85	1	235.85	1.78	.20
Error		3043.86	37	132.34		
Total		128000.00	40			
Corrected Total		3384.62	39			

a. Group = GTS

b. R Squared = .101 (Adjusted R Squared = .022)

**Table 4** showed the summary of ANCOVA on the difference between the performance mean score of students taught electrical installation and maintenance works with the demonstration teaching method based on gender. The result showed that no significant difference exists between

the performance mean score of students taught with the demonstration teaching method when analyzed based on gender ( $F_{1, 23}=1.78$ ,  $p = 0.20$ ,  $p>0.05$ ). The null hypothesis two was retained at a probability level of 0.05 since the p-value is greater than 0.05.

### Discussion of finding

It was observed from the finding that demonstration teaching method has a significant improvement on the performance of the students when compare to lecture teaching method in electrical installation and maintenance work. This is so because of the treatments given to the group which is totally difference from the control group. The results of this study is in accordance with (Onyeka & Okoye, 2023) that the students who were taught with the demonstration teaching method achieved higher, and that there was no significant difference in students' achievement scores based on gender. The results agreed with the findings of Adamu (2020) the result of the regression analysis indicates that the demonstration method has a positive effect on the performance of mathematics students in secondary schools in Makurdi Metropolis, Benue State, Nigeria. Also, the study by Ehiwario (2019) revealed that there exists a significant difference in the learning outcome between students taught with demonstration and those taught with lecture methods of instruction in favor of those taught with demonstration. Giridharan and Raju (2016) in their research work revealed that the demonstration strategy was found to be significantly better than the lecture strategy with regard to students' academic achievement. Likewise in consonance with the present study is the study carried out by Emmanuel (2019) whose results reveal that the demonstration method significantly improved students' performance.

The result in table 2 revealed that the female students who were taught in the experimental group using the demonstration teaching method does not achieve better than the male students who were taught using the same concept in that same group. When subjected to statistical analysis, the result in table 4 showed that no significant difference exists between the achievement mean score of the male and the female students taught with the demonstration teaching method ( $F_{1, 23}=1.78$ ,  $p>.05$ ). As a result of this,  $H_{02}$  was therefore retained at a probability level of 0.05 since the p-value is greater than 0.05. This finding is in agreement with the findings of Umar, Tudunkaya & Muawiya, (2019), Ulelu (2015), Ehiwario, (2019) their result revealed no significant difference in the academic achievement of male and female students taught with the demonstration method. Also, the study of Emmanuel (2019) revealed that, there is no significant difference between the performance

of boys and girls when taught probability using the demonstration method. However, research findings of Effiong and Nse (2014) showed that the male students taught using a practical approach performed significantly better than the female students which do not agree with the findings of the present study.

## Conclusion

Based on the findings of this study, it was concluded that the use of the demonstration teaching method enhanced the academic performance of students in Electrical Installation and Maintenance Works more than the lecture teaching method. It was also found that there was no significant difference in students performance scores based on gender using the demonstration teaching method.

## Recommendations

The following recommendations were made by the researchers:

1. Electrical installation and maintenance works teachers should ensure the active hands-on participation of students during electrical installation and maintenance works classroom instruction.
2. Electrical installation and maintenance works teachers should use the demonstration teaching method in teaching electrical installation and maintenance works since it improves academic performance and is not gender biased.
3. Instructional materials that will aid the use of demonstration teaching method should be provided for both teachers and students in electrical installation and maintenance works.
4. Parents should encourage their wards to study electrical installations and maintenance works irrespective of their gender.

## References

- Akpan E. T., Charles-Ogan G. I., Onyeka E. C. & James, D. D. (2022) Application of GeoGebra in Model Based Learning and approach on Mathematics students' performance in fraction in Uyo. Trends in Academic Development, 3(2), 40-54
- Adamu G. (2020) Effect of teaching methods on the performance of mathematics students in public secondary schools in Makurdi metropolis, Benue state, Nigeria. Int. Jr. of Mathematical Sciences & Applications 10 (1) 2 – 17

- Emmanuel I. S (2019) Effects of demonstration and expository methods of teaching on secondary school students and their achievement in mathematics in Akwa Ibom State  
<https://projectsolutionz.com.ng/effects-of-demonstration-and-expository-methods-of-teaching-on-secondary-school-students-and-their-achievement-in-mathematics-in-akwa->
- Giridharan K. & Raju R. (2016) Demonstration and Lecture Strategies and Impact of Teacher Effect on Academic Achievement in Engineering Education. *International Journal of Educational Sciences* 14(3):174-186.
- Ehiwario, S. O. A. A (2019) The effect of demonstration method on the teaching and learning of mathematics in secondary schools in Ika South Local Government  
<https://www.semanticscholar.org/paper/the-effect-of-demonstration-method-on-the-teaching-by-Ehiwario/0687656984a8ea41455f6239c35826daa68889c9>
- Onyeka, E. C. & Charles- Ogan, G.I. (2021). Effects of Geotrigmetric Set on students' academic performance and retention in Mathematics in Rivers State Nigeria. *Nigeria Journal of Curriculum Theorists & Educational Technologists*; 6 (1), 78-92. Students' Academic Performance in Solid Geometry. *International Journal of Science and Research (IJSR)*: 11 (12), 1- 6
- Ulelu, V. (2015). Effect of geotrigmetric set on the performance and retention of students in geometry. *Journal of Development in Academic Research*, 4(2), 78-84.
- Umar, T.O., Tudunkaya, M.S. & Muawiya, H.U. (2019) Effect of ethno- Mathematics teaching approach on performance and retention in trigonometry among secondary school students in Zaria Local Government Area Kaduna State Nigeria. *Abacus. The journal of the Mathematical Association of Nigeria*, 44(1), 104-111.
- National Business and Technical Examinations Board (NABTEB) (2007). Educational Trust Fund (ETF), Intervention in TVET Syllabus Engineering trades Examinations Based on National Board for technical Examination Modular Curriculum
- National Board for Technical Education (NBTE).(2012).Curriculum for Technical colleges (Revised). Kaduna:NBTR Press.
- NPE (2004). National policy and education. Lagos: Federal Government press.
- Ughamadu, K. A. (2006). Curriculum Concepts Development and Implementation Lancel Publishers: Anambra State.
- Onyeka, E.C; & Okoye, G. N; (2023). Effectiveness of demonstration teaching method on students academic achievement in mathematics in River state, Nigeria. *African Journal of educational Management, Teaching and Entrepreneurship studies(AJEMATES)*. Vol.8(2)  
<https://lajemates.org>.