

# Effect of Demonstration Teaching Method on Students' Academic Achievement and Retention in Auto Mechanics Trade in Technical Colleges in Delta State

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## **Abstract**

*The study investigated the effect of demonstration teaching method on students' academic achievement and retention in auto mechanic trade in technical colleges in Delta State. Two research questions and two hypotheses guided the study. The study employed a quasi-experimental research design. The population for the study was 379 National Technical Certificate (NTC) II students in the six technical colleges in Delta State. The sample size of the study was 134. The purposively sampling technique was used to sample two technical colleges based on the availability of instructional materials and qualified instructors. The instrument for data collection was a 30-item 'Auto Mechanic Achievement Test' (AMAT). A reliability index of 0.86 was obtained using Kuder Richardson 21 (K-R21) formula. Research questions were answered using mean, while the hypotheses were tested at 0.05 level of significance using analysis of covariance (ANCOVA). The result of the study revealed that demonstration teaching method had significant effect on students' achievement and retention than those taught with the conventional lecture method. The study recommends that teachers should integrate demonstration teaching method in the teaching of auto mechanic trade students in technical colleges*

**Keywords:** *effect; demonstration teaching method; students' achievement and retention.*

## **1.0 Introduction**

### **1.1 Background to the Study**

Auto mechanics trade in technical college is designed to produce auto mechanics craft men that are competent to carryout preventive maintenance, general repairs and overhauling of various automobile units and components (NBTE, 2001). According to the NBTE, graduates of the programme also called craftsmen or master craftsmen on completion of their programme are opened to three options: Secure employment in the industry; set up individual business and become self-employed, lastly pursue further education in advance craft/technical institutions such as polytechnics, colleges of education (technical) and universities.

In pursuance of these goals, FGN (2013) recommend that technical teachers should adopt instructional approach that enhances academic achievement of technical college students. However studies from various scholars such as (Eze & Osuyi 2018; Eze, Ezenwafor & Obidile 2016; Ndinechi & Obidile 2010; & Tella 2010) revealed that the convectional lecture method is the most commonly used method of teaching in most technical colleges. The literature reviewed on convectional lecture methods from various scholars such as (Eze & Osuyi 2018; Eze, Ezenwafor & Obidile 2016; Ndinechi & Obidile 2010 & Tella 2010) revealed that the lecture method has advantages and disadvantages. According to them, the advantages are: (a.) A teacher can take a large number of students at a time. (b.) A lot of

grounds can be covered by the teacher. (c.) The method makes it possible to disseminate large quantity of information to the students in a short period of time. (d.) The lecture method is economical in terms of time and staff needs. (e.) Lecture well prepared can be repeated, thus saving the lecturer's time and energy.

Contrary to the advantages convectional lecture method, according to Eze and Osuyi (2018) is teacher-centered method; the technique is instruction centered and does not challenge the teacher's ability. For example the teachers could be ill prepared, presentation could be dull and less challenging, teacher may not create the opportunity for creativity and self-discovery for learners to rationalize and explore knowledge. Furthermore the method may not promote excellence and hard work, it could lead to failure. They highlighted some of the characteristics of convectional lecture method by pointing out that the lecture method is also the telling method. The method pre-supposes that the teacher is an embodiment of knowledge and that the learner is blank. With this assumption, the teacher proceeds to dish out what he knows to the pupils. This method makes students to be passive listeners and does not demand an active involvement of students physically, psychologically, and intellectually. The consequence of this is that the students are unable to retain their learning and to apply it to new situations. This is far below what is required in this current complex technological dispensation. Therefore, the need to adopt instructional approach such as the demonstration teaching method which is student centred.

Demonstration teaching method refers to the type of teaching method in which the teacher is the principal actor while the learners watch with the intention to act later. Here the teacher does whatever the learners are expected to do at the end of the lesson by showing them how to do it and explaining the step-by-step process to them (Adekoya & Olatoye, 2011). Daluba (2013) described it as a display or an exhibition usually done by the teacher while the students watch with keen interest. Daluba further added that, it involves showing how something works or the steps involved in the process. Demonstrations provide a multi-sensory means to describe a concept, idea, or product that may otherwise be difficult to grasp by verbal description alone (Cabibihan, 2013). The act of demonstrating readily helps to kindle more natural interactions between the students and the teacher.

In demonstration teaching method, according to Dorgu (2015), the role of the teacher is to illustrate how to do something or illustrate a principle first by explaining the nature of the act verbally, followed by demonstrating the act in a systematic manner and later the students repeat the act. Demonstration is useful mostly in imparting psychomotor skills and lessons that require practical knowledge. The gains of using demonstration method in teaching lies in the fact that it bridges the gap between theory and practice, enables learners to become good observers and generate their interest; students see immediate progress as a result of a correct effort and it enables the teacher to teach manipulative and operational skills. It is a method of teaching concepts, principles of real things by combining explanation with handling or manipulation of real things, materials or equipment (Akinbobola & Ikitde, 2011).

The demonstration teaching method according to McCabe (2014), is an attention inducer and a powerful motivator in lesson delivery. It gives a real-life situation of course of study as students acquire skills in real-life situations using tools and materials; it helps to motivate students when carried out by skilled teachers and it is good in showing the appropriate ways of doing things. It is against this backdrop that researchers, such as Daluba (2013), Vincent and Akpan (2014), Amaechi and Thompson (2016) as well as Osuyi and Ainetor (2018), recommend that demonstration teaching method be used for teaching within vocational education community.

Although the demonstration method is a wonderful way to explain things to students, it however seems not to be yielding the desired result in auto mechanic trade in technical colleges. This is because there is still persistent high failure rate among technical college students especially in auto mechanic trade, therefore the need for the study to investigate if the demonstration teaching method is used for teaching of students in auto mechanic trade.

### **1.1 Statement of the Problem**

The persistent poor academic achievement of students in auto mechanics trade in technical colleges in Nigeria has been a major concern to researchers. However studies have reveal that the use of effective instructional method in technical colleges will enhance students' academic achievement. This demands that teachers in technical colleges would adopt instructional methods that would improve the academic achievement of students in auto mechanics technology in technical colleges. To achieve this, various researchers have recommended that student centred instructional method be used in modern days teaching and learning process, Therefore, the need for the study to determine the effect of demonstration teaching method on students academic achievement and knowledge retention.

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

The purpose of the study was to determine the effect of demonstration teaching method on students' academic achievement and retention in auto mechanics technology. Specifically, the study determined:

1. The academic achievement mean scores of auto mechanic students in technical colleges taught using demonstration teaching method and those taught using convectional teaching method
2. The retention mean scores of auto mechanic students in technical colleges taught using demonstration teaching method and those taught using convectional teaching method

### **1.3. Research Questions**

The following research questions guided the study.

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1. What is the difference between the academic achievement mean scores of students taught auto mechanics using demonstration teaching method and those taught using convectional teaching method?
2. What is the difference between the retention mean scores of students taught auto mechanics using demonstration teaching method and those taught using convectional teaching method?

### **1.4. Null Hypotheses**

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

1. There is no significant difference between the academic achievement mean scores of students taught auto mechanics using demonstration teaching method and those taught using convectional teaching method.
2. There is no significant difference between the retention mean scores of students taught auto mechanics using demonstration teaching method and those taught using convectional teaching method.

### **1.5 Significance of the Study**

The findings of this study revealed the effects of demonstration teaching method in the teaching of auto mechanics students. Therefore, the findings of this study would be of immense

benefit to auto mechanics teachers, auto mechanics students, curriculum planners, automobile industries and educational researchers.

The findings of this study would guide the auto mechanics teachers in employing effective teaching method in order to enhance students' achievement and knowledge retention in auto mechanics. The findings of this study would be beneficial to auto mechanics students because it would enable them have an in-depth understanding of their role in the learning process by actively participating in the learning process. Also the findings would enhance the students' academic achievement and help them to retain more knowledge of auto mechanic concepts for further advancement. Automobile industries around the world would equally benefit from the findings of this study because it would provide them with graduates who would be able to acquire and retain relevant knowledge and workplace skills required for the advancement of automobile industries.

Curriculum planners would benefit from the findings of this study because it would enable them to develop and integrate more effective teaching methods that could enhance students' academic achievement. More so, knowledge of the finding of this study will not only enable the curriculum planner to recommend effective teaching methods, but also plan and conduct an in-service training in respect of such methods.

Finally, educational researchers would benefit from the findings of this study when carrying out similar research and reviewing related literature. It would provide empirical data which could serve as a reference point for further researches on demonstration teaching method.

### **1.6 Scope of the Study**

The study will focus on the effect of demonstration teaching method on students' academic achievement, retention, and interest of auto mechanics. The study will be delimited to NTC II auto mechanics students in technical colleges in Delta State, Nigeria. The independent variables of the study will be delimited to two groups (demonstration and convectional teaching methods). Teaching in both groups will cover the following areas of automobile instruction: identification of engine parts, dismantling of engine unit, coupling of engine unit, identification of vehicle transmission parts, dismantling and coupling of vehicle transmission system.

### **2.0 Method**

The study adopted the quasi-experimental research design. Specifically, the pre-test post-test non-equivalent control group experimental design was used. The study was conducted in the six technical colleges in Delta State. The population of this study was 379 NTC II students studying automobile mechanics in all the six technical colleges in Delta State. The sample size of the study was 134 NTC auto mechanics students. The purposive sampling technique was used to sample two schools from the six technical colleges that form the population. The instrument for data collection was Auto Mechanics Achievement Test (AMAT). The instrument was validated by three experts. Two of the experts were from Technology and Vocational Education Department and one expert from Measurement and Evaluation unit of Educational Foundation Department all in Nnamdi Azikiwe University, Awka. The reliability of the instrument was determined using Kuder–Richardson 21 (K-R21) formula and reliability coefficient of 0.75 was obtained.

### **2.1 Research Procedure**

Researchers sought and obtained permission from the authorities concerned for the involvement of their colleges, teachers and students in the study. The study lasted for nine weeks (one week for pretest and briefing of teachers involved, six weeks for treatment and two

weeks extra for the retention test). The researchers used the first week to brief the teachers on the method to be used before the commencement of the experiment. After briefing the teachers involved in the exercise a pre-test was administered to both groups (experimental and control groups) by the regular auto mechanics' teachers in the participating colleges to determine the initial abilities of the students prior to the experiment. Teaching commenced on the second week and end on the seventh week. The teaching was conducted during the normal lesson periods of the schools using intact classes. The regular auto mechanics teachers taught their classes using the time-table of their various schools.

The experimental group was taught using demonstration teaching method while the control group was taught using the convectional lecture method. The primary focus of the teaching process was concentrated on identification, functions and coupling of the various components of the vehicle engine and vehicle transmission system. At the end of the treatment, a post-test was administered on both groups using AMAT test items by the auto mechanics teachers and their assistants. The exercise provided a post-test data for each of the dependent variables. The AMAT was re-administered as retention test after two weeks interval, but with the original test questions reshuffled. The researchers marked the students' responses of the test and statistically analyzed the data. The data collected was analyzed using mean scores and analysis of covariance (ANCOVA). The mean was used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the null hypotheses at 0.05 level of significance. In the test of the null hypotheses using ANCOVA, when the p-value was less or equal to the level of significance (0.05), the null hypothesis was rejected. Also when the p-value was greater than the level of significance (0.05), the null hypothesis was not rejected.

### 3. Results

**Table 1 Achievement Mean Scores of Students Taught Auto mechanics Technology Using Demonstration Teaching Method and Convectional Teaching Method.**

Groups	N	Pre-test	Post-test	Mean Difference
		X	X	XD
Experimental	68	32.25	56.79	22.84
Control	66	27.46	33.95	

Table 1 shows control and experimental groups post-test mean achievement scores of 33.95 and 56.79 respectively with a mean difference of 22.84. The result shows that after treatment, the students in the experimental group achieved higher than those in the control group.

**Table 2 Retention Mean Scores of Students Taught Auto Mechanics Technology Using Demonstration Teaching Method and Convectional Teaching Method.**

Groups	N	Post-test	Delay Post- test	Mean Difference
		X	X	XD
Experimental	68	56.79	65.48	32.80
Control	66	33.95	32.68	

Table 2 shows control and experimental groups delay post-test retention mean scores of 32.68 and 65.48 respectively with a mean difference of 32.80. The result shows that after treatment, the students in the experimental group retain higher than those in the control group.

**Table 3. Analysis of Covariance (ANCOVA) for Test of Significance between the Mean Scores of Experimental and Control Groups in the Achievement Test**

Source	Type III sum of squares	Df	Mean square	F	P -value	Decision
Corrected model	14871.582	1	14871.582	132.778	.000	
Intercept	1389.473	1		12.406	.000	S
Group	14871.582	1	1389.473	132.778	.000	
Error	12544.357	112	14871.582			
Total	264153.000	114	112.003			
Corrected Total	27415.939	113				

Table 3 shows that at 0.05 level of significance and 1 df, the p value is 0.000 which is lower than the level of significance 0.05. This means that there was significant difference between the post-test academic achievements mean scores of students taught auto mechanic technology using demonstration teaching method and those taught using conventional teaching method. The null hypothesis was therefore rejected.

**Table 4 Analysis of Covariance (ANCOVA) for Test of Significance Between the Mean retention Scores of Students Taught in Experimental and Control Group**

Source	Type III Sum of squares	df	Mean Square	F value	P-	Decision
Corrected Model	4065.173a	1	4065.173	11.998	.001	
Intercept	52437.667	1	52437.66	154.768	.000	S
Groups	4065.173	1	7	11,998	.001	
Error	37949.353	112	4065.173			
Total		114	338.816			
Corrected Total	319858.000	113				
-	42012.526					

Data in Table 4 show that at 0.05 level of significance and 1 df, the p-value is 0.001 which is also lower than the level of significance 0.05. This means that there was significant difference in the retention mean scores of students taught auto mechanic technology using demonstration teaching method and those taught using conventional teaching method. The null hypothesis was therefore rejected.

#### 4. Discussion of Results

The study revealed that students who were taught auto mechanics technology using demonstration teaching method achieved higher post-test scores than those taught using convectional teaching method. This could be as a result of activities that were incorporated in demonstration teaching method, which may have strengthened the cognitive ability of students. This result is in line with the findings of Daluba (2013), Vincent and Akpan (2014), Amaechi and Thompson (2016) as well as Osuyi and Ainetor (2018) which reported respectively that demonstration teaching method had significant effect on post-test achievement scores of students.

Also the study revealed that students taught using demonstration teaching method retained better what they have learnt over a period of time than those taught with convectional teaching method. This means that the demonstration teaching method used in teaching the students was significant on students' retention. This finding is in line with Ozden, and Gultekin, (2008) and Eze, Ezenwafor and Obidile (2016) which found that, students who were taught using demonstration teaching method were able to retain the concepts than those students taught using convectional teaching method. This could be as a result of activities and experiences involved in demonstration teaching method which made the students to develop their own knowledge meaning and retain the concept taught.

#### 5. Conclusion

Based on the findings of the study, it was concluded that demonstration teaching method helps students to obtain higher academic achievement and knowledge retention than convectional teaching method. This means that demonstration teaching method is an effective method for improving students' academic achievement and knowledge retention in auto mechanics technology and therefore should be adopted in the teaching and learning of auto mechanics technology.

#### 6. Recommendations

Based on the findings of this study, the following recommendations were made:

1. Demonstration teaching method should be formally adopted as a method of instruction in technical colleges.
2. Teachers of auto mechanics technology should acquire the knowledge and skills for using demonstration teaching method through in-service training, conferences, seminars and workshops.
3. School administrators should encourage auto mechanics teachers to use demonstration teaching method by providing opportunities for in-service training to equip them with competencies needed in it.
4. Education stakeholders and relevant professional associations such as Nigerian Association of Teachers of Technology (NATT), Association of Vocational and Technical Educators of Nigeria (AVTEN) should sponsor further research on the efficacy of demonstration teaching method on other technology subject areas so as to arrest the declining academic achievement of students in technology colleges.

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