AJVAH
e-ISSN: 2735-1165
DOI: https://doi.org/10.53797/ajvah.v3i1.3.2022

A Quasi-Experimental Study on the Use of Models and Students' Interest in Auto Mechanics

Oyenuga, Oyetunde Anthony[1] & Olakotan, Olawale Olusegun[2*]

[1]Department of Industrial Technical Education, College of Vocational and Technology Education, Tai Solarin University of Education, Ijagun, Ogun State, NIGERIA

[2*]Department of Industrial Technology Education, Bamidele Olumilua University of Education, Science and Technology, Ikere-Ekiti, Ekiti State, NIGERIA

*Corresponding author email: olakotan.olusegun@bouesti.edu.ng

Available online 25 June 2022

Abstract: This quasi-experimental study focused on the use of models and students' interest in auto mechanics. Two research questions and two null hypotheses guided the study. The population of the study was 203 Year I auto mechanics students of Technical Colleges in Lagos State, Nigeria. Auto-Mechanics Interest Inventory (AMII) was the instrument used for the study. The reliability coefficient of the AMII was found to be 0.81 using test re-test and Pearson Product Moment Correlation Coefficients. Descriptive and inferential statistics were used for data analysis. The result of this study indicated a significant difference between the mean interest scores of male and female auto mechanics students when taught with models for hypothesis 1, and a significant difference between the mean interest scores of male and female auto mechanics students when taught with models for hypothesis 2. Based on these findings, the study recommended among others that the adoption of the use of models in teaching different aspects of auto mechanics by Technical College auto mechanic teachers would help in arousing students' interest and thus improve their academic performance and acquisition of skills.

Keywords: Quasi experiment, students' interest, auto mechanics, technical college and undergraduates

1. Introduction

The focus of teaching is to arouse students' interest and prepare them for learning without being coerced. As important as teaching is, students' readiness is of utmost importance to achieve the goals of education. From time immemorial, teachers have adopted several approaches to arouse students' interest in the teaching and learning process, many of those approaches have proven effective and thus contributed to students' successes across different subject areas. Therefore, a rethink on the adoption of one of such approaches remains the context of this study. This was intended to ensure whether the adoption of the use of models in teaching some concepts in auto mechanics will achieve similar results and thus arouse students' interest (Ahmad Mokhtar & Lakman, 2021).

Models are replicas of the real object which are borne out of the teacher's ingenuity to improvise for objects that would aid his teaching when the real objects are not at his reach. The intention behind the use of models in teaching is numerous, but few of the intentions as peculiar to Vocational and Technical Education (VTE) are availability and handy-ness. Models have a three-dimensional effect on the mind of the students and help explain abstract scientific concepts for effective comprehension of the teacher's teaching and learning materials (Karmintoro et al., 2021; Korsun, 2018; Chittleborough, 2013). Models are powerful strategies for teaching and learning that eliminate virtually all differences among students due to gender, race/ethnicity, and socioeconomic status (Behar-Horenstein, 2005). Based on this premise, Oyenuga (2010) averred that the use of models in auto mechanics especially at the technical college level play a significant role in improving students' interest and academic performance. There is no doubt, models have a significant effect on students cognitive, affective and psychomotor behavior since its usage create enabling environment that usually cut students' attention, help in retention, aids acquisition of skills, develop creativity and eventually arouse their interest.

Interest from time immemorial has been a driving force behind actualization of goals to the extent that students can defy all odds to accomplish specific tasks once they are interested. It must be noted that students pay rapt attention

*Corresponding author: olakotan.olusegun@bouesti.edu.ng

to specific things once the teacher has captured their interest and as a result are enthusiastic and active against odds (Kpolovie et al., 2014; Putrayasa et al., 2014)

From the foregoing, interest is seen to play a prominent role in the academic career of a student. However, one can deduce that students' interest in any subject is borne out of motivation and attitude exhibited by the teacher in the course of his teaching. On the other hand, students' morale and interest can be dampened if the attitude of teacher in the discharge of his/her duty is not fascinating. Various researches on gender issues have shown that there are no genetically gender-related differences among males and females. In fact, it has not been proved scientifically rather there is biological proof to show that females are inferior to males or vice versa. According to Okeke (2001), the perceived gender differences in the classrooms are not innate. Okeke associated the hypothesized differences to gender stereotype in the curriculum and instruction which is a reflection of such in the society in favor of the male. Oketch cited in Oke (2019) also posited that in Nigeria specifically, gender inequalities issues in Vocational and Technical Education (VTE) are predominant as there is overt low participation of female students than their male counterparts. In a study conducted by Oke et al. (2014), it was discovered that significant difference existed between males and females in the level of motivation given to them which however spur either of sets to be interested in a particular subject area than the other.

The Special attitude and interest theory propounded by Prosser & Quigley (1949) fits in the context of this study. Prosser's Special Attitude and Interest theory targeted class size, individualized instruction, instructional methods, and selection of learners among others. This implies that the instructional method adopted by the teacher in line with other considerations with respect to the group of students to be taught goes a long way with the outcome of the teachers' intent during the teaching and learning of auto mechanics.

Auto mechanics as noted by several scholars revolves around imparting recipients with the wherewithal to diagnose, service and conduct maintenance on automobiles accurately (Ariyo et al., 2021; Lemo & Fadairo, 2016; Audu et al., 2014; Federal Government of Nigeria, 2013; National Board for Technical Education, 2003). Ogbuanya & Usman (2020) posited that both availability and utilization of appropriate facilities and methods of instructional delivery are useful modalities in achieving the objectives of auto mechanics in Nigerian Technical Colleges. It must be noted that auto mechanic students are trained to acquire relevant knowledge, skills, and the right attitude for effective maintenance of modern automobiles. This is why Ogundola & Olakotan (2018) posited that there is need to equip auto mechanics students with ranges of new knowledge and skills required for troubleshooting, diagnosing, maintenance and repair. Therefore, it becomes imperative that these calibers of students whose onus is to ensure that automobiles used in Nigeria are in good service condition develop interest that would propel their relevance in the trade. Hence, this study becomes significant.

1.1 Problem Statement

Auto mechanics as one of the trades offered in the Nigerian technical colleges require a direct infusion of cognitive, affective and psychomotor domains. Reason why the adoption of best practices that have proven effective in addressing the three domains remains essential. In this wise, a quasi-experimental study on the use of models and students' interest will bring to fore the needed assurance in the adoption of effective instructional methods that would stimulate students' interest with resultant effect on skill acquisition and academic performance in auto mechanics.

1.2 Purpose of the Study

The purpose of this study was to determine the effects of models on auto mechanics students' interest. Specifically, the study sought to:

a. Find the mean interest scores of auto mechanics students.
b. Compare the mean interest scores of male and female auto mechanics students.

1.3 Research Questions

The following research questions guided the study:

a. Which of the group of students (experimental or control) indicates much interest in auto mechanics as shown by their mean interest scores?
b. Which of the gender (male or female) indicates much interest in auto mechanics by their mean interest scores?

1.4 Hypotheses

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

a. There is no significant difference in the mean interest scores of auto mechanics students taught with models and those taught without models.
b. There is no significant difference in the mean interest scores of male and female auto mechanics students when taught with models.

2. Methodology

The study employed quasi-experimental design. Specifically, the pretest, posttest, non-equivalent control group design was adopted for this study. According to Gall et al. (2007), quasi–experimental design can be used when it is not possible for the researcher to randomly sample the subject and assign them to treatment groups without disrupting the academic programs of the schools involved in the study.

The population for the study comprised all the 203 Year One auto-mechanics students in all the five technical colleges in Lagos State.

Purposive sampling technique was adopted and used to select four Technical Colleges offering Auto mechanics. However, the selected Technical Colleges were randomly assigned to control and experimental groups in their respective intact classes. In all, 153 auto mechanics students were the participants for the study.

Auto Mechanics Interest Inventory (AMII) was the instrument used for the study. AMII was validated by three experts and subjected to reliability test using test re-test and Pearson Product Moment Correlation Coefficient and a coefficient of 0.81 was obtained. The Two groups (experimental & Control) were subjected to a Pre-test and Post-test. Experimental conditions such as experimental bias and teachers' variability were controlled as appropriate.

The data collected from the administration of Pre-Test and Post-Test were analyzed using Mean (x) and standard deviation for the research questions. The decision rule in answering the research questions was based on the Mean gain score. If the Mean gain score of the Experimental Group is greater than the Mean gain score of the Control Group, it Meant that the treatment had an effect. The hypotheses formulated for the study were tested at 0.05 level of significance using Analysis of Covariance (ANCOVA). ANCOVA tool was appropriate because it controlled the initial differences across groups and also increased the precision, thus reducing error variance that might be due to the extraneous variables. For the hypothesis, if the probability value (p), for the group obtained after data analysis was less than or equal to the 0.05 alpha value at which it was being tested, the null hypothesis was rejected, which Meant that there was a significant effect of the treatment.

3. Results

The results were analyzed and presented based on the raised research questions and formulated hypotheses.

3.1 Research Question 1: Which of the Group of Students (Experimental or Control) Indicates Much Interest in Auto Mechanics by Their Mean Interest Scores?

The data presented in Table 1 shows that the experimental group had a mean interest score of 124.40 and standard deviation of 1.19 in the pre-test and a mean interest score of 145.26 and standard deviation of 1.68 in the post-test making a pre-test post-test gain in the experimental group to be 20.86. The control group had a mean interest score of 124.03 and a standard deviation of 1.09 in the pre-test and a post-test mean interest score of 139.15 and a standard deviation of 4.46 with a pre-test post-test gain of 15.12. With this result, the students in the experimental group showed more interest in auto mechanics than their counterparts in the control group.

Table 1: Mean and standard deviation of the pre-test and post-test interest scores of the experimental and control groups

Group	N	Pre-test		Post-test		Mean Gain
		$\overline{X}$	SD	$\overline{X}$	SD	
Experimental	76	124.40	1.19	145.26	1.68	20.86
Control	77	124.03	1.09	139.15	4.46	15.12

3.2 Research Question 2: Which of the Gender (Male or Female) Indicates Much Interest in Auto Mechanics by Their Mean Interest Scores?

The data presented in Table 2 revealed that the male group had a mean interest score of 124.49 and standard deviation of 1.23 in the pre-test and a mean interest score of 145.50 and standard deviation of 1.56 in the post-test making a pre-test post-test gain in the male group to be 21.01 while the female group had a mean interest score of 124.06 and standard deviation of 0.96 in the pre-test and a mean interest score of 144.26 and standard deviation of 1.75 in the post-test making a pre-test post-test gain of 20.20. This result showed that the male students were more interested in auto mechanics than their female counterparts.

Table 2: Mean and standard deviation of the pre-test and post-test interest scores of gender group exposed to experimental condition

Gender Group	N	Pre-test		Post-test		Mean Gain
		$\overline{X}$	SD	$\overline{X}$	SD	
Male	61	124.49	1.23	145.50	1.56	21.01
Female	15	124.06	0.96	144.26	1.75	20.20

3.3 Hypotheses 1: There is no Significant Difference in Mean Interest Scores of Auto Mechanics Students Taught with Models and Those Taught Without Models

The data presented in Table 3 revealed that the F-calculated value for the group is 118.075 with significance of F at .000, which is less than .05. The null hypothesis is therefore rejected at 0.05 level of significance. The result showed that there is a significant difference in the mean interest scores of auto-mechanics students taught with models and those taught without models.

Table 3: Analysis of covariance (ANCOVA) for test of significance between the mean interest scores of students taught with models and those taught without models

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Covariates	10.904	1	10.904	0.953	0.330
PRETEST	10.904	1	10.904	0.953	0.330
Main effects	1350.325	1	1350.746	118.075	0.000
GROUP	1350.325	1	1350.746	118.075	0.000
Explained	1437.540	2	718.770	62.831	0.000
Residual	1715.963	150	11.440		
Total	3153.503	152	20.747		

3.4 Hypothesis 2: There is no Significant Difference in the Mean Interest Scores of Male and Female Auto Mechanics Students when Taught with Models

Table 4 revealed that the F-calculated value for gender is 7.301 with significance of F at .009, which is less than .05. The null hypothesis is therefore rejected at 0.05 level of significance. The results showed that there is significant difference in the mean interest scores of male and female auto-mechanics students when taught with models.

Table 4: Analysis of covariance (ANCOVA) for test of significance between the mean interest scores of male and female auto mechanics students

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Covariates	0.869	1	0.869	0.328	0.569
Main effects	19.332	1	19.332	7.301	0.009
GENDER	19.332	1	19.332	7.301	0.009
Explained	19.426	2	9.713	3.668	0.030
Residual	193.963	73	2.648		
Total	212.737	75	2.836		

4. Findings and Discussion

Tables 1, 2, 3 and 4 showed the descriptive and inferential statistics of the study. The mean scores are representative scores of the group they represent while the ANCOVA provided premise for making deductions on their relevant tested hypotheses.

Table 1 showed the mean and standard deviation of the pre-test and post-test interest scores of the experimental and control groups. The result revealed that the students in the experimental group showed more interest in auto mechanics than their counterparts in the control group.

Table 2 showed the mean and standard deviation of the pre-test and post-test interest scores of gender group when exposed to experimental condition. The result showed that the male students were more interested in auto mechanics than their female counterparts.

Table 3 showed a significant difference between the mean interest scores of male and female auto mechanics students when taught with models, in favor of the use of models, giving a basis for rejecting the null hypothesis of no significant difference earlier formulated. This revealed the positive effects of different treatments given to the

experimental group on the students mean interest in the post-test. Although no treatment was given to the pre-test group before the test while treatment was given before the test in the case of the post-test.

Table 4 showed a significant difference between the mean interest scores of male and female auto mechanics students when taught with models, in favor of the male, giving a basis for rejecting the null hypothesis of no significant difference earlier formulated.

The findings of this study as revealed in the data analysis were corroborated by Karmintoro et al. (2021), Korsun (2018) and Chittleborough (2013). The scholars noted that models have three-dimensional effect on the mind of the students and help explain abstract scientific concepts for effective comprehension of the teacher's teaching and learning materials. Also, the findings of the study were supported by Oyenuga (2010) and Behar-Horenstein (2005). Oyenuga (2010) averred that the use of models in auto mechanics especially at the technical college level play a significant role in improving students' interest and academic performance, while Behar-Horenstein (2005) posited that models are powerful strategies for teaching and learning that eliminate virtually all differences among students due to gender, race/ethnicity, and socioeconomic status. Similarly, the positions Kpolovie et al. (2014) and Putrayasa et al. (2014) buttressed the findings of the study as the authors posited that students pay rapt attention to specific things once the teacher has captured their interest and as a result are enthusiastic and active against odds. On the issue of gender, the findings of the study were corroborated by the position of Oketch in Oke (2019). Oketch in Oke (2019) noticed predominant gender inequalities issues in Vocational and Technical Education (VTE) with overt low participation of female students than their male counterparts. Also observed in this study, was low participation of female auto mechanics students than male auto mechanics students. Also observed in this study was a significant difference in the mean interest scores of male and female auto mechanics students in favor of the male students which was also buttressed by Oke et al. (2014), who from a previous study found significant difference between males and females in the level of motivation given to them which however spur either of the sets to be interested in a particular subject area than the other. From the foregoing, there is statistical evidence to support the fact that participants in the Experimental Groups are different in the mean interest score in favor of the treatment given. Hence, the use of models in auto mechanics stimulate students' interest.

5. Conclusion

This study has revealed that auto mechanics students taught using models developed high level of interest than those taught without using models. This means that the use of models stimulates students' interest as against none use of models. It is then envisaged that the adoption of the use of models would encourage students' participation in the teaching and learning processes and thus improve their interest level. Therefore, it is recommended that the adoption of the use of models in teaching different aspects of auto mechanics by Technical College auto mechanic teachers would help in arousing students' interest and thus improve their academic performance and acquisition of skills. Also, teachers should ensure that adequate instructional methods and facilities are deployed for overt results in the society.

References

Ahmad Mokhtar, Z. & Lakman, N.A. (2021). Peralihan Dari Pembelajaran Bersemuka Ke Pembelajaran Secara Atas Talian Untuk Subjek Mechanics Of Civil Engineering Structures semasa Pandemik COVID-19. *ANP Journal of Social Science and Humanities*, *2*(2), 11-18. https://doi.org/10.53797/anpjssh.v2i2.2.2021

Ariyo, S.O., Udogu, K.C. & Mamman, D. (2021). Integration of automobile mechatronics technology into the curriculum of automobile trades programmes at the technical colleges in Nigeria. *Randwick International of Education and Linguistics Science Journal (RIELS) 2(1), 20 -28.*

Audu, R., Aede, H.B.M., Yusri B.K, Muhammad, S.B.S. & Inti, M.M. (2014). Retraining needs of motor vehicle mechanics teachers at technical college level. *Journal of Technical Education and Training (JTET),* 6 (1), 11- 22.

Behar-Horenstein, L.S. (2005). Teachers' use of models of teaching. Educational Practice and Theory, 27(1), 49-66.

Chittleborough, G. (2013). Using models in teaching and learning science. *Successful science education practices: exploring what, why and how they worked*, 183-202.

Federal Republic of Nigeria. (2013). National policy on education - 6th Edition. Lagos Nigeria: NERDC Press.

Gall, M.D., Gall, J.P., Borg, W.R. & Mendel, P.C. (2007). *A guide for preparing a thesis or dissertation proposal in education, for Gall, Gall, and Borg'Educational research: an introduction'and'Applying Educational Research'*. Pearson Education.

Karmintoro, Utomo, S., Suad. & Paul, D.C. (2021). The Necessity Analysis of Mind Mapping Based Pocket Book with Materials of Diversities in Indonesia. *Asian Pendidikan*, *1*(2), 23-30. https://doi.org/10.53797/aspen.v1i2.4.2021

Korsun, I. (2018). The use of learning models in physics teaching. Asia-Pacific Forum on Science Learning and Teaching, 19(2), 1 -17.

Kpolovie, P.J., Joe, A.I. & Okoto, T. (2014). Academic achievement prediction: Role of interest in learning and attitude towards school. *International Journal of Humanities Social Sciences and Education (IJHSSE)*, *1*(11), 73-100.

Lemo, O.O. & Fadairo, O.O. (2016). Innovations in modern automobiles and corresponding skill needs of automobile craftsmen in Nigeria. In Adetoro, N., Bosu, R., Oladipo, S.E., Ankomah, Y., Ekine, A & Akomaning, E. (Eds) Proceeding of the 2nd TASUED-UCC Interdisciplinary Conference, held at TASUED, 22nd – 25th August. Pp 621-635.

National Board for Technical Education. (2003). National technical certificate and advanced national technical certificate curriculum and module specifications in motor vehicle mechanics' work. Kaduna-Nigeria: NBTE Press.

Ogbuanya, T.C. & Usman, D.A. (2020). Assessment of instructional facilities in implementing the contents of the motor vehicle mechanics' work curriculum in technical colleges in north central Nigeria. *Jurnal Pendidikan Teknologi dan Kejuruan, 26 (2), 95-106.*

Ogundola, P.I. & Olakotan, O.O. (2018). Training needs of technician in diagnosing and maintaining automobiles with electronic transmission system. *Journal of Research in National Development (JORIND), 16(2), 77-81.*

Oke, J.O. (2019). Gender difference as a factor in fostering creative thinking skills among building technology students in Nigerian technical colleges. *Journal of Specialized Education (JOSPED), 3(1), 16-29.*

Oke, J.O., Musta'amal, A.H. & Fatokun, J O. (2014). Parental influence on creativity development and vocational interest of children in Ekiti State Nigeria. *Journal of Techno Social 5(1), 11-19.*

Okeke, E.A.C. (2001). Women in Science, Technology and Mathematics Education in Nigeria. *Proceedings of Science Teachers Association of Nigeria 42nd Annual Conference*. Ilorin.

Oyenuga, A.O. (2010). effect of models on academic achievement of technical college auto-mechanics students in Lagos State, Nigeria. Unpublished Ph.D Thesis. Department of Vocational and Technical Education, Faculty of Education, University of Nigeria, Nsukka, Enugu State.

Prosser, C.A. & Quigley, T.H. (1949). *Vocational Education in a Democracy.* Chicago, Illinois: American Technical Society.

Putrayasa, I.M., Syahruddin. & Mergunayasa, I.G. (2014). Pengaruh Model Pembelajaran Discovery Learning Dan Minat Belajar Terhadap Hasil Belajar IPA Siswa. *Jurnal Mimbar PGSD Universitas Pendidikan Ganesha, 2(1), 1–11.*