

Effect of Computer-Assisted Instruction on Academic Achievement and Interest of High and Low Achieving Auto-mechanics Technology Students in Technical Colleges.

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Abstract

The poor academic achievement of students in technical colleges in Nigeria has been a major concern to technical educators and researchers. It is believed that the use of the effective instructional methods in technical colleges would enhance students' achievement. It is therefore important that teachers in technical colleges would adopt instructional methods that could improve the academic achievement of students in technical colleges. The study therefore, ascertained the effect of computer-assisted instruction on students' academic achievement and interest of high and low achieving in auto-mechanics technology in technical colleges. Four research questions were answered and two null hypotheses were tested at 0.05 level of significance. Quasi-experimental design was used for the study. Population of the study was 128 National Technical Certificate (NTC) year 1 Auto-Mechanics trade students in state owned technical colleges. Purposive sampling technique was used to draw four schools out of the six technical colleges with 101 students for the study. The researcher developed computer-assisted instructional package on Auto-mechanics trade which was used as treatment instrument for experimental group while control group were exposed to lecture/demonstration teaching method. Instruments for data collection were Auto-Mechanics Achievement Test (AMAT) and Auto-Mechanics Interest Inventory (AMII). The instrument were face and content validated by three experts. Test-retest method was used to establish its reliability of AMAT and was calculated using Pearson product moment correlation which yielded a correlation coefficient value of 0.81 and Cronbach alpha reliability coefficient method was used for AMII and 0.85 obtained. Arithmetic mean and standard deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the null hypotheses. Findings of the study revealed that students taught auto-mechanics using CAI achieved significantly higher and developed more interest than those taught using L/DTM. The study also revealed that the use of CAI help to boost the interest of low achieving students. Based on the findings of the study, it was concluded that CAI is an effective mode of instruction with capacity to improve students learning outcome and as well as inspired interest in auto-mechanics in technical colleges. Consequently, it was recommended among others that technical teachers should use CAI in teaching auto-mechanics in order to enhance students' academic achievement and arouse interest in technical colleges. Therefore, seminars and conferences should be organized for in-service technical teachers in order to prepare them for the use of computer based instruction to improve teaching of auto-mechanics technology in the technical colleges.

Keywords: *Computer Assisted Instruction, Academic Achievement, Interest, Auto-Mechanics Technology and Technical Colleges*

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I. INTRODUCTION

Education can be defined as a process of acquiring knowledge and experience for personal development and socio-economic development of the nation. This process can be formal or informal with distinctive attributes. According to Markus (2009) the quality of any educational programme underscores its ability to equip its recipients with practical and saleable skills to advance its economy optimally. The attainment and actualization of functional technical education for sustainable youth empowerment was also emphasized by the National Policy on Education (2004). The policy is aimed at: providing trained manpower in applied technology particularly at, craft, advanced craft and technical levels, provide the technical knowledge and vocational skills necessary for agricultural, commercial and electronic development and give training and

impact the necessary skills to individuals who shall be self-reliant economically. Practical skills acquisition is basically one of the major goal of technical colleges in Nigeria.

Technical college system was adopted as the first level of post basic education with common curriculum in all the technical colleges accredited by National Board for Technical Education (NBTE) in Nigeria (Federal Republic of Nigeria, 2013). Technical college is designed to prepare individuals to acquire manipulative skills, basic scientific knowledge and attitude required of craftsmen and technicians at subprofessional level. Also, technical colleges are established institutions where students are trained to obtain relevant knowledge and skills in different occupations for employment in the world of work (National Business Technical Education Board, NABTEB, (2012). Identifying the objectives of technical colleges, Umunadi (2013) defined technical college education as an education based on the fundamentals of industrial production. Umunadi, further emphasized that the main objectives of technical college education is to make students familiar with most import and branches of production in industry, commerce, imparting of skills and practical competencies in the handling of tools, materials and generally equipping the students with both theoretical knowledge and work habits. Technical colleges provide the young people with vocational competencies needed in various disciplines required in the world of work. Therefore the technical colleges in Nigeria are established to fulfill the objectives of producing skilled personnel needed for provision of the maximum economic security. Additionally, technical colleges provide technical and vocational training for quite a number of occupations including wood work, metal work, mechanical engineering craft practice, electrical installation, radio and television work, refrigeration, carpentry and joinery, furniture making, bakery, metal fabrication, tailoring, dress making typing, shorthand, accounts, spinning, weaving, dyeing and bleaching, metal fabrication, vocational agriculture, agricultural machine work and home economics (Olaitan, 1996). The duration of training is three years, leading to the award of National Technical certificate (NTC). Also available in some technical colleges are advance course leading to the award of Advanced National Technical Certificate (ANTC) or Advanced National Business Certificate (ANBC) in the various field of study (NBTE 2003). Thus, knowledge and skills acquired from these technical trades could help the graduates to secure gainfully employment especially in auto-mechanics trade programme.

Auto-mechanics technology is one of the mechanical trade subjects offered under motor vehicle mechanic work in Nigerian Technical Colleges (FRN, 2013). This trade involves the application of scientific knowledge in the design, selection of materials, construction, operation and maintenance of automobile devices (Nigerian Educational Research and Development Council (NERDC), 2007). The programme is aimed at producing craftsmen who would be able to test, diagnose, service, refurbish and completely repair any fault relating to the automobiles to the manufacturers' specifications. Hence, motor vehicle mechanics curriculum used in technical colleges is designed to offer general education subjects in addition to occupational trade components which invariably expose learners to basic theories, workshop practices, industrial training components and small business management as well as entrepreneurial training (FRN, 2013); Okoye and Okoye, 2015). To this end, the curriculum was designed to impart in learners specialized knowledge and requisite competencies/skills to enhance their creative expertise and employment opportunities, which would in turn result in socio-economic and technological development of the country.

The accomplishment of technological development is quite a difficult task especially now that technology is digitally driven at an unprecedented speed. Evidently, motor vehicle industry is in the frontier of technological dynamism which promotes competitiveness and innovative exploits which add value to human existence. Such innovations include: manufacturing of high speed cars with high fuel economy, invention of hybrid cars which defiles the primacy of hydrocarbon gas with its attendant destructive effects to the green house (ozone layer); the installations of sensory devices which make it possible for someone, with the aid of a remote control, to operate the car from a distance and also track and recover a stolen vehicle among other technological innovations. These innovations do not only make the industry highly competitive but also demands effective training and development of competent craftsmen and allied professionals who would apply their creative skills to meet the demands of technological changes. Though, in Nigeria, most of these innovations are yet to be fully utilized in most technical institutions. The innovation in automobile mark a departure from mechanically-operated engines to mechatronics system as well the integration of computer-aided devices in 21st century automobiles (Onwusa, 2015).

Furthermore, Okoye (2013) maintained that automobile industry in Nigeria is fraught with some incompetent road side mechanics who, while in effort to repair already diagnosed faults in cars, create more problems or even render the car perpetually irreparable. This could be attributed to lack requisite expertise among them hence often resort to trial and error approach in order to correct faults, which usually does not conform to manufactures' specifications. The practice has continued because auto-mechanics graduates seem to lack the needed competencies to perform the expected practical task in the workshops. Nevertheless, out of all the factors attributed to this situation, lecture-demonstration teaching methods appears the most vulnerable factor, and therefore calls for alternative and adoption of appropriate methods of teaching in auto-mechanics. In the same vein, this will enable learners acquire workplace competencies in order achieve excellent results and

also perform well in the industry. Sequel to this, Royles (2013) and Motibodhi (2014) affirmed that technical education teachers should be adequately trained to be able to inculcate in students, scientific knowledge and workplace technical skill, entrepreneurial skill, higher order thinking skills, problem-solving, creative thinking and ability to work in teams. Thus, knowledge acquired from technical colleges programme could help the graduates of auto-mechanics to secure gainfully employment.

To make the concepts of auto-mechanics subject interesting and compelling to learners, it becomes imperative to employ digital natives' theory. According to Prensky (2001) digital natives are those born and raised in a digital and media-saturated world. They are immersed in this technology from their early years and so, it is a naturally acquire skills. It is acquired in the same way they pick up their first language. In contrast, Prensky (2001) stated that the digital immigrants, are developing digital skills that will always be like learning a second-language rather than being innate. Currently, the natives are being taught by immigrants who are, in effect, not of the same language. Obviously, in the 21st century, visual materials are being used in every field and students are mostly in the effects of technological tools such as television, computers and audio-visual, cell phones with special effects which are highly stimulating. In this instance, the usage of computers in the classrooms has become inevitable and the ratio of the usage of computer based instruction has been on the increase.

Computer Assisted instruction (CAI) is an instructional method which uses computer to deliver instruction to students. In a CAI classroom, students interact with computer as a key element of the learning process. It uses combination of text, graphics, sound, animation and video in the learning process (Kulik&Kulik, 1991). Adedaja, and Fakokunde, (2015) refers to computer based instruction as an interaction between students, a computer controlled display and a response entry device for the purpose of achieving educational outcomes. The use of computer based instruction in the classroom motivates, and gets students to take active part in the learning process. It could also help to develop creativity, problem solving skills and self-reliance in students (Serin, 2011). The flexibility of learning through computer based instruction allows a wider range of stimuli thus, increases students' engagement in learning. Additionally, according to Akcy, Durmaz, Tuysuz and Feyzioglu (2006) remarked that the use of CAI gives opportunities to both students and teachers to learn by their speed and combine active learning with computer technology. It also motivates students to learn better by providing the students with immediate feedback and reinforcement and by creating an exciting and interesting game-like atmosphere.

Numerous studies have reported the effectiveness of CAI. Bayrak and Bayram (2010) in their study on the effectiveness of CAI on academic achievement of students in science and technology course found significant difference in the mean achievement scores of experimental and control groups in favour of the experimental group after treatment. Olori and IgboSanu (2016) investigated the effect of computer based multimedia presentation on senior secondary students' achievement in agricultural science. The result of the study revealed that the computer based multimedia presentation was found to be more effective than the conventional method because there was a statistically significant difference in the mean achievement scores of students taught using the computer-based multimedia presentation compared to those taught using the conventional method in favour of the experimental group. Similarly, Adedaja and Fakokunde (2015) studied the effects of computer based instructional puzzle on students' learning outcomes and retention in social studies. The study revealed a statistically significant main effect of treatment on students' achievement and retention in social studies. Serin (2011) investigated effects of computer based instruction on achievement and problem solving skills of science and technology students. The result of the study revealed that there was a statistical significant increase in the achievement and problem solving skills of the students in the experimental group that received the computer based science and technology instruction. These findings provide evidence that technological advancement in the use of computer based instruction have brought new learning and teaching opportunities to the extent that computers have proved their position in all aspects of science and technology instruction. The increasing importance of skilled persons not only as users of knowledge but producers of knowledge puts additional responsibilities on technical teachers to incorporate CAI in order to enhance academic achievement of students

Academic achievement connotes attainment in a school subject as symbolized by a score or mark on a test (Okoro, 2002). Antheson (2003) contended that cognitive achievement is dependent upon several factors among which are the instructional methods, learning environment and the learner. The psychomotor domain measures the skill performance of the learner. Achievement test are used to assess the attainment of the objective in psychomotor domain (Okoro, 2002). Okoro further pointed out that practical tests are best for the assessment of the psychomotor skill. This is so, because the achievement will required the involve manipulation of objects, tools, supplies or equipment. The criteria for achievement of psychomotor outcome will relate to the actual performance or the finished product and to the necessary level of performance. In view of the above, students' psychomotor achievement is the translation of the student's performance in practical test into scores or marks. Okoro, and Ekpo, (2016). Anene (2005) contend that achievement is quantified by a measure of student's academic standing in relation to those of other student tested with the same instrument.

There are students with different academic ability levels, which are categorized as low, medium and high ability levels. Students with marks from 0% to 39% are low-level ability; those with 40% to 69% are middle-level ability and those with 70% and above are high-level ability (Okoye, 2018). According to Ashley (2001) states that low level ability students are said to be the group of students who perform poorly in test and examinations. They are easily distracted, less able to set tasks in an organized manner and less able to control their own basic impulses and desires. Oyenuga (2010) also described the low-level ability students as students whose academic potentials are judged below class average while their achievement is described as poor. On the other hand, the high-level ability students were referred as those students who did not ascribe their fate to luck or to vagaries of chance but rather to their own personal decisions and efforts. The high-level ability students as whose academic potentials are above class average and their achievement described as good and excellent. However, in any teaching and learning process especially in auto-mechanics technology, students have psychological and social needs, and interest that direct and focus their attention towards improving achievement in learning. As a result, students are attracted to those activities which they view as having the potential to meet their needs and that appear interesting.

Interest is a persisting tendency to pay attention and enjoy some activities. Musa, (2009) defined interest as a zeal or willingness of participating in activity from which one derives some pleasure. Musa further stated that interest is a tendency to become absorbed in an experience and to continue in it. Ogwo and Oranu (2011) laid emphasis on the need for teachers to stimulate students' interest in learning without which students' achievement will be minimal. It is what one perceives in these engagements that shape ones' interest. Interest most often is directly tied to the content or instruction, it also directs and enhances learning. Despite of the advocacy that teachers should employ student-centered method in the teaching of auto-mechanics (NABTEB 2014), most auto-mechanics teachers at the technical colleges' level still use lecture/demonstration teaching method.

Lecture/demonstration teaching method (L/DTM) is the teacher-centered method, which is known as the traditional talk-chalk method of teaching. Here the teacher does the talking while students serve as receiver only by listening and taking down notes. Eze and Osuyi (2018) described lecture/demonstration teaching method as the type of teaching method in which the teacher is the principal actor while the learners watch with the intention to act later. In the same vein, Odundo and Gunga (2013) outlined the advantages some L/DTM of teaching and learning to include; teachers covering a lot of grounds in a single class period, dissemination of large quantity of information to students in a short period of time, and non- use of any equipment and laboratory. In addition, the method enable provision of quality learning materials by the teacher, encourages self-discovery learning and develops, students listening and communication skills.

In spite the outlined advantages of L/DTM, it has several disadvantages, it shows no regard for individual differences among learners and does not provide opportunity for adequate class participation in the teaching and learning process. As a result, students learn comparatively little of what has been taught as they only hear and see the teacher. In most cases, the students are passive and boredom is easily associated with the method. Therefore, the continual use of L/DTM in Nigerian technical colleges may perhaps reduce the ability of students to grasp relevant concepts (Mba, 2012). It causes dissatisfaction, inadequate knowledge development, low interest and high dependency of students on teachers. The consequence of this is that the students may not be able to retain their knowledge and to apply it to new situations.

The CAI package, if successfully integrated into teaching and learning process particularly in auto-mechanics technology it may possibly revolutionize the classroom environment making it more collaborative, active and interactive manner. This could curb or totally eliminate perceived poor academic achievement and lack of interest among the students. This assumption prompted the present study, effect of CAI on students' achievement and interest of high and low achieving auto-mechanics in technical colleges.

Statement of the Problem

One of the reasons for the persistent poor achievement of technical colleges' students in the final NABTEB examination has been the problem of inappropriate teaching methods arising from the continual use of conventional teaching methods such as (lecture and demonstration) to implement the curriculum (Owoso, 2012; Oranu, 2003). Conventional teaching method is teacher-centered and placed emphasis on knowledge transmission from the teacher to passive students and encourage rote learning. This demands that technical teachers would adopt instructional methods that would improve the academic achievement and interest of students in auto-mechanics technology. It is believed that the use of the appropriate instructional methods in technical colleges would enhance students' achievement. To achieve this, various researchers have recommended that the lecture/demonstration instructional method could improve the achievement of students in technical colleges in Nigeria. In spite of the use of this methods by teachers in technical colleges to ensure qualitative education at the technical colleges and bring about high quality products of students, there appears to be no improvement in the academic achievement of students in auto mechanic trade in technical colleges in Nigeria. Additionally the technological developments in automobile industries have resulted into big gap

between teaching at schools and the ways students get information in the 21st century. Currently, visual materials are used in all human endeavor students are under the effect of technological tools such as television, Ipad, Android phones and computers. Hence, when teaching and learning process at schools are not buttressed through various sounds, visuals and animations, productive learning may not take place (Ercan, Bilen&Bulut, 2014). Thus, the decline in students' achievement in auto-mechanics has become a major concern to researchers. Hence the need to investigate the effect of CAI on the academic achievement and interest of high and low-achieving auto-mechanics technology students' in technical colleges.

Purpose of the Study

The purpose of the study was to determine the effect of CAI on academic achievement and interest of high and low-achieving auto-mechanics technology students in technical colleges in Delta State. Specifically, the study determined:

1. The mean achievement score of high achieving students taught auto-mechanics with CAI and those taught with L/DTM.
2. The mean interest score of low achieving students taught auto-mechanics with CAI and those taught with L/DTM.
3. The mean achievement score of high and low achieving students taught auto-mechanics with CAI.
4. The mean interest score of high and low achieving students taught auto-mechanics with CAI.

Research Questions

The following research questions guided the study:

1. What are the mean academic achievement scores of high achieving students taught auto-mechanics using CAI and those taught using L/DTM?
2. What are the mean interest scores of low achieving students taught auto-mechanics using CAI and those taught using L/DTM?
3. What are the mean academic achievement scores of high and low achieving students taught auto-mechanics using CAI method?
4. What are the mean interest scores of high and low achieving students taught auto-mechanics using CAI method?

Hypotheses

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

1. There is no significant difference between the mean academic achievement scores of low and high technical college students taught auto-mechanics with CAI.
2. There is no significant difference between the mean interest scores of low and high achieving technical college students' taught auto-mechanics with CAI.

Method

Quasi-experimental design was adopted for the study. Specifically, the pretest, posttest non-randomized control group design was adopted for the study. The design was adopted because it was not possible for the researchers to randomly sample the subject and assign them to groups without disrupting the academic programme and the time table of the technical colleges involved in the study. The study was conducted in technical colleges in Delta State which is located in the south-south zone of Nigeria. The population of the study was 128 year one National Technical Certificate (NTC) 1 students. A sample size of 101 students was drawn from the four schools. Purposive sampling technique was based on availability of professionally qualified staff, computer facilities for teaching, regular electricity supply and willingness of regular teachers to participation as research assistance.

One intact class was used in each of the four schools giving a total of four intact classes. Simple random sampling was used to assign two intact classes to experimental groups and the other two intact classes to control groups. The groups for the study were coded group A and group B comprising one experimental class and one control class each. Experimental class high achievers consisted of 29 students and low achievers consisted of 27 students.

The instruments for data collection were Auto-Mechanics Achievement Test (AMAT) and Auto-Mechanics Interest Inventory (AMII) adapted by the researchers' from the NABTEB past examination questions between 2015 and 2018. AMAT contained 50 multiple choice test items with four options (A-D). AMII was based on five point Likert type scales of strongly Agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD). The CAI was developed by the researchers with the assistance of a professional programmed developer. The CAI package, AMAT and AMII and lesson plan were validated by experts. A panel of three experts from Technology and Vocational Education, and Computer Science Department from Nnamdi Azikiwe University, Awka, Anambra State. They considered the audibility, simplicity of the package as

well as its suitability for the level of the subject. They verified the extent to which the items of each unit were considered to testing the topic they were meant to test and check the possible errors and suggested answers. Base on the comments, corrections and advise of the experts, the original package was edited by the researcher for the final draft. The package, thus validated was used for the study. The reliability of the instrument was established using test-retest method. The copies of the instrument were administered twice to the Auto-mechanics students drawn from Government Science and Technical College Benin City, Edo State who were not part of the population studied. Reliability estimate method of test retest reliability using manual computation with the Pearson product moment correlation between the two sets of scores yielded a correlation coefficient value of 0.81. The estimate of internal consistency method was used for AMII with Cronbach alpha and reliability coefficient valued of 0.85 was obtained.

Experimental Procedure

The researchers' sought and obtained permission from the authorities concerned for the involvement and participation of their students and teachers in the study. In the first week, the researchers visited the schools for orientation for the participating research assistants. The metalwork teachers were trained on how to conduct the experiment treatment and were given prepared lesson plans. Teachers of the control group were instructed to use lecture-demonstration teaching method, while the teachers of the experimental group was told to use, metalwork computer tutorial CDs, laptops, projector machine, flash drives, modem, internet for teaching. Likewise, students of experimental groups were given training in how to maneuver computer, writing assignments, use of internet and software, sending, receiving and replying through emails. For each student in experimental group, email addresses were created and they were told to share their emails addresses with their teachers and class colleagues. The pretest was administered with the help of research assistants (the class teachers) to determine the initial abilities of the students prior to the experiment. In the second week, the teaching commenced and ended on the fifth week. The primary focus of the teaching process was concentrated on automobile workshop, auto diagnoses and-maintenance, servicing and repairs, vehicle layout or chassis types, engine component/functions, single and multi-cylinder engines, four-stroke engines and valve operations mechanism. Each lesson lasted for 80 minutes and the treatment lasted for five weeks. In the sixth week, posttest was administered by the class teachers so as to reduce the Hawthorn effect which would be introduced if the researchers administer the test. The experimental group wrote the examination using the computers. The scoring of the examination and displaying of results was done instantly by the computers. The control group wrote the examination conventionally and the research assistants supervised the examination, marked the scripts, recorded the marks and made the scores available to the students. Data collected for the study were analyzed using mean scores 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. Result of the pre-test and post-test were used for data analyses using Statistical Package for the Social Sciences (SPSS).

CAI Package Set-Up Procedure

The CAI package made use of the following electronic devices/gadgets. The projector screen, projector machine, computers system, flash drive, modem, cell phones, computer tutorial CD plate and table top for teachers and students. The projector screen is mounted at a distance from the projector and visible to the audience. The screen receives the beam from the projector machine. The projector machine has adjustable nuts which control the focal point between the screen and the projector. Also the projector machine is connected to the computer system from which it receives the instructional software CD-digital tutor and focuses on the screen. The teacher set - up the computer system in the auto-mechanics workshop.

1. The teacher connects and switched on the power source and electronic gadgets (computers, projector and loud speaker).
2. The teacher ensured that beam focuses squarely on the screen for sharpness/clarity of the software.
3. The teacher also adjust the projector nuts for a better display of the software.
4. The teacher insert in the CD-digital tutor into the computer system CD-ROM
5. The teacher go to my computer and double click the CD icon to play.
6. The computer tutorial carried out set-induction and states the specific objectives for the lesson of the day.
7. The students are well seating in the auto-mechanics workshop
8. The digital tutor introduces the lesson of the day through the projector and the instructional software was displayed to the audience.
9. The students listened, watch and act when the need arises.
10. The lesson lasted for 45 minutes for each package. The teacher instructed the students to click on menu to open their computer system. Students registered for the course with a registration number to be supplied by the teacher and a password they can easily remember. The teacher further ask the students to click on the file computer tutorial and the instructional software opened and the same lesson was displayed to the students individually in their system. Learners can learn the content as per their capacity and can repeat

the task if not understood by the learners. Capture the students' attention because the programmes are interactive and engaged the students' to work with their system. Therefore, students become active-participation and not passive in approach.

11. Computer instructor guided and controlled the navigation process of students and offered appropriate assistance when needed or demanded. Students were instructed to save the CD digital tutor file on their flash drive, CD plate, cell phones/memory card for future learning on their own time

II. RESULTS

Table 1

Pretest and Post-test Mean Achievement Scores of High Achieving Students taught Auto-mechanics using CAI and those taught using L/DTM

Scores of high achieving students						
Groups	No	Pretest		Post test		Gain in mean
		Mean	S/D	Mean	S/D	
Exp Group	29	24.69	2.49	35.53	5.37	12.20
Contr Group.	27	23.84	2.91	33.33	4.55	10.51

Table 4 shows that the posttest mean scores of high achieving students in the experimental performed much better than the control group. The experimental group had gain in mean of 12.20 which is higher than 10.51 gain in mean by the control group.

Table 2

Pretest and Post-test Mean Interest Scores of Low Achieving Students Taught Auto-mechanics with CAI and those Taught using L/DTM

Interest Scores of Low Achievers						
Groups	No	Pretest		Post test		Gain in mean
		Mean	S/D	Mean	S/D	
Exp Group	20	115.00	14.80	142.44	13.81	27.44
Contr Group.	25	117.33	10.82	119.60	11.03	2.37

Table 2 shows that the posttest mean interest score of low achievers in the experimental group is 142.44 while that of the low achievers in the control group is 119.60 with a difference of 22.84 in favour of experimental group with greater interest than those with control group low achievers.

Table 3

Pretest and Post-test Mean Achievement Scores of Low and High Achieving Students Auto-mechanics taught with CAI

Scores of Low and High Achieving						
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Groups	No	Pretest		Post test		Gain in mean
		Mean	S/D	Mean	S/D	
High Achievers (experimental)	29	24.19	2.49	35.53	5.35	11.34
Low Achievers (Experimental)	20	23.32	2.36	35.33	5.55	12.1

Table shows that the posttest mean high achieving score of experimental group is 35.35 while that of the low achieving students is 35.33 with a very slight difference of .02. This indicates that the use of CAI positively affects students' academic accomplishment of both low and high achieving students.

Table 4
Mean and Standard Deviation for Interest Scores of Low and High Achieving Technical College Students Taught Auto-mechanics with CAI.

Interest Scores of Low and High Achieving						
Groups	No	Pretest		Post test		Gain in mean
		Mean	S/D	Mean	S/D	
High Achievers (experimental)	29	115.00	14.80	142.44	13.81	27.3
Low Achievers (Experimental)	20	114.92	9.67	149.54	14.32	24.60

Table 2 shows that the posttest mean interest score of experimental group of low achievers is 149.54 while that of the high achievers is 142.44 in favour of low achievers. This could be as a result of integration of CAI that stimulates their interest in auto-mechanics subject.

Table 5
ANCOVA Summary of Differences in Achievement Mean Scores of High and Low-achieving Students in Auto-mechanics Taught with CAI

Source	Type III Sum of Squares	Df	Mean Square	F	P-value.
Corrected Model	470.062 ^a		235.031	3.384	.038
Intercept	719.144	1	719.144	10.353	.002
Pretest achievement	155.618	1	155.618	2.240	.138
Achievers	32.342	1	32.342	.466	.497
Error	6807.107	46	69.460		
Total	11965.000	49			
Corrected Total	7277.16848				

a. R Squared = .065 (Adjusted R Squared = .046)

Table 5 shows that there is no significant main effect of treatment in the posttest achievement of high and low achieving students in the experimental and control groups $F(1, 100) = 0.466, p > 0.05$. This means that there was no significant difference in the mean achievement scores of high and low achieving students in experimental and control group. Therefore, the hypothesis that there is no significant mean difference in the achievement of high and low achieving students is not rejected.

Table 6
ANCOVA Summary of Differences in Interest Mean Scores of High and Low-achieving Students in Auto-mechanics Taught with CAI

Source	Type III Sum of Squares	Df	Mean Square	F	P-value.
Corrected Model	698.637 ^a	2	349.319	.762	.470
Intercept	20454.174	1	20454.174	44.590	.000
Pretest interest	91.271	1	91.271	.199	.657
Achievers	602.735	1	602.735	1.314	.254
Error	44954.195	46	458.716		
Total	1663525.000	49			
Corrected Total	45652.832	48			

a. R Squared = .015 (Adjusted R Squared = -.005)

Table 6 shows that there is no significant main effect of treatment in the posttest interest mean scores of high and low achieving students in the experimental and control groups $F(1, 100) = 1.314, p > 0.05$. This means that there was no significant difference in the interest mean score of high and low achieving students in experimental and control group. Therefore, the hypothesis that there is no significant mean difference in the interest mean scores high and low achieving students is not rejected.

III. DISCUSSION

Findings of the study revealed that high achievers had higher mean academic achievement in both experimental and control groups in the posttest which high achievers in experimental group gained more than high achievers in the control group. This finding is in agreement with that Musa, (2009); Bayrakand Bayram, (2010) and Nwosu (2009) which reported that experimental group taught CAI achieved better than the control group taught with L/DTM.

Findings further revealed the high achievers in the experimental group had higher interest than those in the control group. This finding agrees with that of Okoro (2009) and Okoye (2018) which reported that high achiever taught with CAI performed better than the high achiever taught with L/DTM.

The study shows that the use of CAI positively affects students' academic accomplishment of both low and high achieving students. There was a slight difference in their performance in favour of high achievers. The findings support the finding of Okoye, (2018) which reported that high and low achievers in the experimental group achieved better than their counterparts in control group.

The results showed that both high and low achievers in the experimental group developed greater interest than those in the control group. The low achievers in the experimental group had greater posttest mean interest scores than the high achievers. This result is in agreement with the findings of Akcy, Durmaz, Tuysuz, and Feyzioglu. (2006) which reported that CAI is more effective for low achievers than high achievers level students.

Furthermore, findings of the study revealed that there was no significant difference in the mean academic achievement and interest scores of high and low achieving students in experimental and control groups. This finding disagrees with Oyenuga (2016) which found a significant difference between interest mean scores of students taught with computer simulation technique and those taught with L/DTM in favour of the experimental group.

IV. CONCLUSION

Based on the findings of this study, it was concluded that CAI positively affects students' academic accomplishment and stimulate interest in auto-mechanics subject. It was found more compelling, effective, rewarding and valuable in teaching of auto mechanics at technical colleges'.

V. RECOMMENDATIONS

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

1. Technical college teachers should be encouraged to adopt the use of computer based instruction to teach auto-mechanics technology
2. Teacher education also needs to incorporate computer based instruction concepts in the teacher education curriculum to empower technical teachers to use the computer based instruction.
3. Seminars and conferences should be organized for in-service technical teachers in order to prepare them for the use of computer based instruction to enhance teaching of auto-mechanics technology in the technical colleges.
4. Schools should be equipped with computer and internet facilities and other necessary instructional tools like slide, video presentations simulator, demonstrator and auto scan tools. It is necessary that teacher trainers must also be trained so that they are able to impart ICT training to student teachers in the technical education system.

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