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Research Paper

Effects of Addie and Dick & Carey Teaching Instructional Models on Students' interest and Retention in Motor Vehicle Mechanic Work in Technical Colleges in North - Central, Nigeria

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Abstract
This study was undertaken to determine the effects of Addie and Dick and Carey teaching instructional models on technical college student's interest and retention in Motor Vehicle Mechanics Work. The study was carried out in North - Central, Nigeria. four research questions and four hypotheses guided the study. The population for the study was 1011 National Technical Certificate Year Two students (NTC II) 2019/2020 session made up of 778 males and 233 females. The sample for the study was 99 drawn through purposive sampling technique. The instrument used for data collection was, Motor Vehicle Mechanic Work Interest Inventory (MVMWII) with 30- items interest inventory. The items in the MVMWII were developed to portray students' feelings towards studying Motor Vehicle Mechanic Works with or without the Addie and Dick & Carey models. The items were generated from the information obtained from the review of literature on interest in learning as well as other related literature. The items of the interest inventory were based on five-point Likert scale of Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), and Strongly Disagree (SD). The scale is weighted as follows: SA=5, A=4, U=3, D=2 and SD=1. The Motor Vehicle Mechanic Work Interest Inventory was used to test students' Interest in studying Motor Vehicle Mechanic Work and it was administered as pre and posttest.). Andalso, Motor Vehicle Mechanics Work Retention Test (MOVMEWORT), instrument used for data collection was a 40- multiple choice objective which was the same as the achievement test, except for the fact that, the items in the achievement test were re-organized. The instrument was validated by 5 experts from the department of Industrial and Technical Education, University of Nigeria, Nsukka. The Kuder Richardson 20 (K-R20) method was employed to determine the internal consistency of the instrument which yielded a coefficient of 0.82. The mean was used to analyse data relating to the research questions while the ANCOVA was employed to analyzing data relating to the test of hypotheses. The result of the study indicated among others that students taught using Dick and Carey Model performed academically higher in MVMW than their counterparts taught using the Addie instructional Model.

Key words*: teaching, models, academic interest, retention, effects, motor vehicle*

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I. Introduction

Motor vehicle mechanic work (MVMW) is one of the trade courses offered in technical colleges in Nigeria whose component parts are arranged in modules. The components include: engine maintenance, suspension system, steering and braking system, auto-electricity, transmission and reconditioning work, major engine repair works and service station mechanics.

The aim of teaching MVMW to students at this level who are mostly young full of energy and vigor and also prone to social vices (Okorie, 2001) is to equip recipients with skills for productive engagement. The Federal Government of Nigeria (FGN,2004) reported that the main aim of MVMW in Technical Colleges is to impart the necessary skills leading to the production of craftsmen, technicians and other skilled personnel who will be enterprising and self-reliant. Also, Olayinka (2009) asserted that motor vehicle mechanics is designed to produce competent auto mechanic craftsmen for Nigerian technological and industrial development. According to the National Board for Technical Education (NBTE) (2001), motor mechanics craftsmen are expected to test, diagnose, service and completely repair any fault on a motor vehicle according to the manufacturers' specification. It was in the light of this that the FGN emphasized the implementation of automobile technology in her educational system (FGN 2004).

Motor Vehicle Mechanics Work students are usually taught the course using conventional teaching method delivery which seems inadequate; looking at NABTEB poor results in MVMW for the past six years. NABTEB Chief Examiner's report (2010-2018) highlighted the persistent poor achievement of Motor Vehicle Mechanics work students in North – central Nigeria this leaves one in doubt about the effectiveness of the mode of teaching used by the teachers of Motor Vehicle Mechanics Work. In that region Tabotndip (2004) lamented that abstract teaching goes on today where teachers do not use apparatus and students are not using textbooks. This teaching method can hinder the development of individual student's active and creative abilities, and students who experience only this method of learning may no longer be considered sufficient for the needs of a future educated citizenry (Zhao, 2003). Richardson (2001) stressed that teachers must react constantly to the immediate events in the classroom despite having a basic plan of instruction that determines the important components of the lesson. Incorporating the use of instructional design models in the Nigerian education system especially in MVMW could assist students to achieve better in their academic career.

MVMW trade course was introduced in to the curriculum of Technical College programme in Nigeria with the aim of equipping young people with skills for gainful employment. Unfortunately, the technical education programme does not seem to adequately achieve this objective as majority of school leavers particularly those who offered MVMW trade course are unemployed as a result of lack of adequate practical skills. Apparently, training acquired in technical colleges seems inadequate to make motor vehicle mechanic work graduates competent and self-reliant as literature revealed that students' skill performance and interest in technical courses including motor vehicle mechanic work is not satisfying. Umunadi (2009) notes that technical college graduates' skill performance in motor vehicle mechanic work is on the decline which calls for immediate attention in order to arrest the situation.

This unsatisfactory performance has been partly blamed on inadequate teaching methods adopted by technical college teachers (Yalams & Fatiku, 2007). It has been argued that the use of Dick and Carey instructional guide (DCIG) may overcome this problem when carrying out practical skills learning in motor vehicle mechanic work as literature has indicated that Dick and Carey is a promising approaches for improving skills learning (Clark, 2006). Acquiring motor vehicle mechanic skills may be enhanced by Dick and Carey instructional guide (DCIG) techniques as literature has shown that task analysis can improve skill training involving complex and difficult tasks. Even though Dick and Carey are purported to have the potential to enhance skills acquisition, it is not quite certain whether Dick and Carey may be more effective in achieving better learning outcome in motor vehicle mechanic work repairing and maintenance as well as facilitating and sustaining students' interest in motor vehicle mechanic work. Therefore, the problem of this study posed as a question is: How would the use of Dick and Carey instructional guides (DCIG) affect students' academic achievement interest and retention in motor vehicle mechanic work.

The general purpose of the study was to investigate the effects of Addie and Dick and Carey teaching models on technical college student's academic achievement in Motor Vehicle Mechanics Work in North - Central, Nigeria. Specifically, the study sought to determine the:

1. Effects of Dick & Carey and Addie instructional models on student's interest in Motor Vehicle Mechanics work in Technical Colleges.
2. Effects of Dick & Carey and Addie instructional models on student's interest in Motor Vehicle Mechanics work in Technical Colleges.
3. Effects of Dick & Carey and Addie instructional models on student's retention in Motor Vehicle Mechanics Work in Technical Colleges.
4. Interaction effects of model type and gender on retention of students in Motor Vehicle Mechanic Work in technical colleges.

Research Questions

The following research questions guided the study:

1. What is the effect of Dick & Careys and Addies instructional models on students' interest in Motor Vehicle Mechanic Work in Technical Colleges?
2. What is the effect of Dick & Careys and Addies instructional models on the interest of male and female students in Motor Vehicle Mechanic Work in Technical Colleges?
3. What is the effect of Dick & Careys and Addies instructional models on student's retention in Motor Vehicle Mechanic Work in Technical Colleges?
4. What is the interaction effect of Dick & Careys and Addie instructional models and gender on students Retention in Motor Vehicle Mechanic Work in Technical Colleges?

Hypotheses

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

Ho_1: There is no significant difference in the mean interest scores of Motor Vehicle Mechanics Work students taught with Dick & Carey Model and those taught with Addie model in Technical Colleges

Ho_2: There is no significant difference in the mean interest scores of male and female students of Motor Vehicle Mechanics Work taught with Dick & Carey Model and those taught with Addie model in Technical Colleges.

Ho_3: There is no significant difference in the mean retention scores of Motor Vehicle Mechanics Work students taught with Dick & Carey Model and those taught with Addie model in Technical colleges.

Ho_4: There is no significant difference in the mean interaction effects of model types and gender on student's retention scores in Motor Vehicle Mechanics Work in Technical colleges.

II. Material and Methods

Design of the Study

The design of this study is a quasi-experimental design. It is a quasi-experimental design because the two treatment groups were randomly assigned to two intact classes. The use of intact classes was to avoid disrupting normal class activities in the schools involved in the study. The model design was represented thus:

Group 1: O X_1 O_1 O_2

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Group 2: O X_2 O_1 O_2

Where:

O = Pretest observations

X_1 = Treatment 1 using Dick & Carey Model

X_2 = Treatment 2 using Addie model

O_1 = Posttest observations

O_2 = Retention test

= Non-equivalent of the two groups

Area of the Study

The study was conducted in North – Central states of Nigeria. North – central was chosen because it has industries and commercial centers which need the services of well-trained Motor Vehicle Mechanic Works craftsmen and master craftsmen. North - central State has 14 Technical Colleges offering Motor Vehicle Mechanic Works whose students were used for the study to ensure that all the students in both Addie and Dick and Carey models share a common environment. Only two technical colleges were considered out of the 14 Technical colleges, because they are the technical colleges that offer Motor Vehicle Mechanic Works trades with adequate Motor Vehicle Mechanic Works facilities and well experienced teachers and they are: Federal Government Science Technical College Shiroro Kuta in Niger State and Government Technical College, Makurdi, Benue State.

Population for the Study

The population for the study was 1011 National Technical Certificate Year Two students (NTC II) 2019/2020 session (consisting of 778 males and 233 females) offering Motor Vehicle Mechanics Works in all the 14 Technical Colleges in North central States Nigeria. The data were obtained from the Principals' Offices of all the Technical Colleges. The reason for choosing NTC II student's class is that the students have been taught core areas of Motor Vehicle Mechanic Work and necessary skills on Motor Vehicle Engine and fuel systems.

Sample and Sampling Technique

The sample size for the study was 99 Motor Vehicle Mechanic Work second year students which comprised 72 males and 27 females from two technical colleges sampled for the study. The two Technical Colleges from the list of fourteen technical colleges in the North - Central States were purposively sampled because they are the technical colleges that offer Motor Vehicle Mechanic work trades with adequate Motor Vehicle Mechanic Works facilities and well experienced teachers. One technical college was selected from Niger State, Minna while another was chosen from Benue State. This eliminated to some extent interference in the experiment because all the students in the technical colleges are Boarding students. Each technical college has one intact class for Motor Vehicle Mechanic Work students and each intact class comprised males and females' students. One intact class was assigned as Dick and Carey Model (DCM) while the other one was assigned as Addie Model (AD) groups.

Instrument for Data Collection

Motor Vehicle Mechanic Work Interest Inventory (MVMWII) was the instrument used for collection of data for this study. Specifically, the questions were drawn from course outline of Motor Vehicle Mechanics Works. The Motor Vehicle Mechanic Work Interest Inventory MVMWII was a 30- item interest inventory. The items in the MVMWII were developed to portray students' feelings towards studying Motor Vehicle Mechanic Works with or without the Addie and Dick & Carey models. The items were generated from the information obtained from the review of literature on interest in learning as well as other related literature. The items of the interest inventory were based on five-point Likert scale of Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), and Strongly Disagree (SD). The scale is weighted as follows: SA=5, A=4, U=3, D=2 and SD=1. The Motor Vehicle Mechanic Work Interest Inventory was used to test students' Interest in studying Motor Vehicle Mechanic Work and it was administered as pre and posttest. While the instrument used for collection of data for retention test was Motor Vehicle Mechanic Work Retention Test (MOVMEWORT). The Motor Vehicle Mechanic Work Retention Test, (MOVMEWORT) was used to determine the extent to which the experimental groups differ in remembering the contents taught and was administered two weeks after the achievement test. Retention test was the same as the achievement test, except for the fact that, the items in the achievement test were re-organized.

Validation of the Instrument

The Motor Vehicle Mechanic Work Interest Inventory (MVMWII), and Motor Vehicle Mechanics Work instructions and lesson plan scripts of Addie and Dick & Carey Models were made available to the validators to ascertain the appropriateness of the instrument developed. Three lecturers from the Department of Industrial and Technical Education, University of Nigeria, Nsukka (UNN) validated the instrument. The experts were requested to validate the instrument based on the appropriateness of the instrument, clarity of the instrument, suitability of the instrument to the purpose and research questions of the study. Based on the expert's advice, 30 items Motor Vehicle Mechanic Work Interest Inventory (MVMWII), including Motor Vehicle Mechanics Work instructions and lesson plan scripts of Addie and Dick & Carey Models were suggested by the experts for corrections in some parts. Modifications were made based on the comments of the Validates. While,the retention test was the same as the achievement test, except for the fact that, the items in the achievement test were re-organized.The Motor Vehicle Mechanic Works Achievement Test (MOVMEWAT), marking scheme, Motor Vehicle Mechanics Work instructions and lesson plan scripts of Addie and Dick & Carey Models were made available to experts to ascertain the appropriateness of the instrument developed. These were lecturers from the Department of Industrial and Technical Education, University of Nigeria, Nsukka (UNN). The experts were specifically requested to check the instrument for clarity, appropriateness and suitability of the instrument to the purpose and research questions of the study. Modifications were made on the instrument, Motor Vehicle Mechanics Work instructions and lesson plan scripts of Addie and Dick & Carey Models based on suggestions of the experts.

Reliability of the Instruments

The Kuder Richardson 20 (K-R20) method was employed to determine the internal consistency of the instrument. The Motor Vehicle Mechanics Work Achievement Test (MOVMEWAT) was administered on equivalent sample of Motor Vehicle Mechanic Works second year students of Government Technical college okene in kogi state not chosen for the study. The objectives answer sheets were marked by the researcher and scores kept. After two weeks, the MOVMEWAT was re-administered on the same students of Government Technical College Okene in Kogi State. The objectives answer sheets were also marked by the researcher and the scores obtained in the first and second administrations of the tests were correlated. The reliability coefficient of the MOVMEWAT was found to be 0.82.

Experimental Procedure

The researcher briefed the two teachers who served as research assistants. This study involved two groups of subjects which were the Dick & Carey Model group (Experimental group 1) and the Addie model group (Experimental group 2). To ensure adherence to these two instructional design models, detailed lesson plans were developed following each procedure for the use by the teachers handling the two groups. The teacher that used Dick and Carey Model Lesson Plans was given detailed explanation on the use of Dick & Carey Model approach while another teacher that used Addie model lesson plans was also given detailed explanation on the application of the Addie model Lesson Plans. At the end of the briefing a micro teaching session was organized to ensure that the teachers have mastered the application of the lesson plans and also understood the general requirement of the research.

Pre-test

This study involved two groups of subjects which are the Experimental group 1 (Dick and Carey Model group) and the Experimental group 2 (Addie model group). On the first day of the experiment, the two groups (experimental groups) were subjected to the MOVMEWAT as pre-test to all the students in the sampled schools.

Treatment

The treatment for all the two groups lasted for eight weeks. The Experimental group 1 (Dick and Carey Model group) was assigned to Federal and Science Technical College, (FGSTC) SHIRORO - KUTA and the Experimental group 2 (Addie model group) was assigned to Government Technical College, (GTC) Makurdi. The research assistants conducted the experiments and also administered the measurement instruments (treatment instruments) to the students while the researcher monitored their activities. A total of 16 lesson periods were used, and each lesson period lasted for 40 minutes.

Post Test

At the end of the lesson, the post test was administered on the students. The teachers helped in distributing the instrument and answer sheets to the students. They also supervised the students and collected the answer sheets at the end of the test. The researcher marked and recorded the scores.

Control of Extraneous Variables

The following steps were taken in order to control extraneous variables that may pose a threat to the study:

1.*Guiding of the Participating Teachers:* The researcher explained the models to the participating teachers and guided them on how to use the models and administer the instruments. This enabled the teachers to uniformly implement the experiment.

2.*Experimental Bias:* To avoid experimental bias, the regular class teachers in the participating schools taught their own students in the two experimental groups. The researcher, therefore, personally was not involved in administering the research material. All the groups were located in different schools and LGA to avoid interaction among the subjects in the two experimental groups during the study.

3. ***Treatment Bias:*** Students in both groups (Dick and Carey Model group) and (Addie model group) were not informed or made to understand anything about the research process so that students can exhibit their natural behaviors during the experiment without bringing any bias. In addition, the tests question papers were withdrawn from the students and teachers immediately after the pre-test to avoid students becoming test wise (be sensitive to the test items).

4. *Subject Interaction:* The researcher did not select treatment groups from the same school to ensure that the students in the two experimental groups did not mix-up at all. This reason was to reduce the error that might arise from interaction and exchange of ideas.

Method of Data Collection

Students' scores in the first administration of Motor Vehicle Mechanic Work Interest Inventory (MVMWII) test items were served as the pre-test scores of the study. After eight weeks of teaching, the test items were rearranged and re-administered on the students as post-test. The scores obtained from second administration served as post-test scores for the study. While After two weeks, the items were rearranged and re-administered as Motor Vehicle Mechanic Work Retention Test (MOVMEWRT). The scores obtained from the third administration served as retention test scores in the study.

Method of Data Analysis

The data collected from the pretest and posttest were analyzed using mean to answer the research questions. The pretest- posttest mean gains of each of the experimental groups were compared to determine the

group that achieved better. The hypotheses were tested using Analysis of Covariance (ANCOVA) at 0.05 level of significance. For decision taking on the hypotheses tested, if the calculated F-value of the items is equal or less than the critical (table) F-value, the hypothesis was accepted. If otherwise, the hypothesis was rejected. interest Inventory was used to analysed students' interest.

III. Results

Results of the study were presented according to research questions and hypotheses

Research Question one

What is the effect of Dick & Careys and Addies instructional models on student's interest in Motor Vehicle Mechanics Work in Technical Colleges?

Data for answering research question oneis presented in Table 1

Table 1: Mean of Pretest and Posttest Scores Students in Motor Vehicle Mechanics Work in the Interest Inventory Items

Group	N	Pretest means $\overline{x}$	SD_1	Posttest means $\overline{x}$	SD_2	Mean Gain
Experimental Group (Dick and Carey Model)	42	22.69	0.92	70.07	1.15	47.38
Experimental Group 2 (Addie instructional Model)	37	22.21	1.01	68.24	1.34	46.03

N = No of student SD_1 =Standard Deviation for the pretest SD_2 = Standard Deviation for post-test

The data presented in Table 1 show that the experimental group 1 had a mean score of 22.69 and standard deviation of 0.92 in the pre-test and a mean score of 70.07and standard deviation of 1.15 in the post-test with a mean gain of 47.38. The experimental group 2 had a mean score of 22.21and standard deviation of 1.01 in the pre-test and a post-test mean of 68.24and standard deviation of 1.34 with a mean gain of 46.03. With this result, the students in the experimental group 1 taught Motor Vehicle Mechanics Work (MVMW) with Dick and Carey model are more effective in stimulating interest than experimental group 2 taught with Addie instructional Models. Hence, Dick and Carey Model is more effective than the Addie instructional Models on students' interest inventory items in MVMW.

Research Question Two

What is the effect of Dick& Careys and Addies instructional models on the interest of male and female students' in Motor Vehicle Mechanics Work in Technical Colleges?

Data for answering research question two are presented in Table 2

Table 2: Mean of Pre - test and Post - test Scores of Male and Female Students in Motor Vehicle Mechanics Work in the Interest Inventory Items

Gender	EG_1 (Dick and Carey Model)				EG_2 (Addie instructional Models)			
	N	Pretest $\overline{x}$	Post-test $\overline{x}$	Mean Gain $\overline{x}$	N	Pretest $\overline{x}$	Posttest $\overline{x}$	Mean Gain $\overline{x}$
Male	38	22.60	68.86	46.26	34	35.40	70.55	35.15
Female	4	22.18	66.31	44.13	3	34.80	67.90	33.1

N = No of student $\overline{x}$ = Mean $EG_{1,2}$ = Experimental Group 1 and 2

The data presented in Table 2 revealed that male students in the experimental group 1 taught Motor Vehicle Mechanic Work (MVMW) with Dick and Carey Model had a pre-test mean interest score of of 22.60,and a post-test mean interest score of score of 68.86,resulting to a mean gain of 46.26,while their female counterpart had a pre-test mean interest score of 22.18,and a post-test mean interest score of 66.31, resulting to a mean gain of 44.13. Also, male students in the experimental group 2 taught Motor Vehicle Mechanic Work (MVMW) with Addie instructional Models had a pre-test mean interest score of 35.40and a post-test mean interest score of 70.55, resulting to a mean gain of 35.15, while their female counterpart had a pre-test mean interest score of 34.80, and a post-test mean interest score of 67.90, resulting to a mean gain of 33.1. With this result, male and female students in the experimental group 1 taught MVMW with Dick and Carey model are more effective in stimulating interest than male and female students in experimental group 2 taught with Addie instructional Models. This result also showed that the male students performed better than females. This could be an indicator of the existence of a gender factor that has an effect on the interest inventory of students in MVMW.

Research Question Three

What is the effect of Dick & Careys and Addie instructional models on student's retention in Motor Vehicle Mechanics Work in Technical Colleges?

Data for answering research question three are presented in Table 3.

Table 3: Mean and Standard Deviation of Posttest and test of Retention Scores of the Experimental Groups in Motor Vehicle Mechanics Work

Group	N	Posttest mean $\bar{x}$	SD_1	Retention test mean $\bar{x}$	SD_2	Mean Loss $\bar{x}$
Experimental Group 1 (Dick and Carey Model)	42	72.04	1.17	65.89	0.51	6.15
Experimental Group 2 (Addie instructional Models)	37	70.24	1.36	63.17	0.78	7.07

N = No of student SD_1 =Standard Deviation for the pretest SD_2 = Standard Deviation for post-test

Data presented in Table 3 show that the Experimental group 1 had a mean score of 72.04 in the post-test and a mean score of 65.89 in the retention test with mean loss score of 6.15. Experimental group 2 had a mean score of 70.24 in the post-test and retention mean score of 63.17 with a post-test, retention mean loss of 7.07. With this result, the experimental group 1 retention of learning is higher than the retention of learning of the students in the Experimental group 2. The results therefore signify that students taught Motor Vehicle Mechanic Work with Dick and Carey Model retained their learning better than those taught with the Addie Instructional Models.

Research Question Four

What is the interaction effect of Dick & Careys and Addie instructional models and gender on student's Retention in Motor Vehicle Mechanic work in Technical colleges?

Data for answering research question four are presented in Table 4.

Table 4: Mean of Pretest and Posttest Scores of Male and Female Students in Motor Vehicle Mechanics Work Retention Test

Gender	EG_1 (Dick and Carey Model)				EG_2 (Addie instructional Models)			
	N	Posttest $\bar{x}$	Retention $\bar{x}$	Mean Loss $\bar{x}$	N	Posttest $\bar{x}$	Retention $\bar{x}$	Mean Loss $\bar{x}$
Male	38	73.11	66.09	7.02	34	70.77	64.57	6.2
Female	4	70.93	65.68	5.25	3	69.71	61.77	7.94

N = No of student $\bar{x}$ = Mean $EG_{1, 2}$ = Experimental Group 1 and 2

The data presented in Table 4 revealed that male students in the experimental group 1 taught Motor Vehicle Mechanic Work (MVMW) had a post-test score of 73.11 and a retention score of 66.09, resulting to a mean loss of 7.02, while their female counterpart had a post-test score of 70.93 and a retention score of 65.68, resulting to a mean loss of 5.25. Also, male students in the experimental group 2 had a post-test score of 70.77 and retention score of 64.57, resulting to a mean loss of 6.2, while their female counterpart had a post-test score of 69.71 and retention score of 61.77, resulting to a mean loss of 7.94 With this result, retention rate of male students is higher than that of female students in the experimental group 1 taught with Dick and Carey Model. Likewise, the retention rate of male students is higher than that of female students in the experimental group 2 taught using Addie instructional Models.

Test of Hypotheses

Hypothesis One

There is no significant difference in the mean interest scores of Motor Vehicle Mechanics Work students taught with Dick & Carey Model and those taught with Addie model in Technical Colleges

The data for the test of $H0_1$ was analysed and presented in Table 5

Table 5: Summary of Analysis of Covariance (ANCOVA) for Test of Significance between the Mean interest Scores of students Taught Motor Vehicle Mechanics Work with Dick & Carey Model and those taught with Addie models

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	2861.202[a]	2	715.300	212.434	.000
Intercept	226.350	1	226.350	67.223	.000
Pre – test	.103	1	.103	.031	.861

Groups	2367.808	1	2367.808	703.204	.000
Error	377.123	109	3.459		
Total	2267689.000	114			
Corrected Total	3238.325	113			

***Significant at P≤ .05**

The data presented in Table 5 shows F-calculated values for test of significance between the mean scores of experimental groups, Dick & Carey instructional and Addie instructional models treatment given to students in Motor Vehicle Mechanics Work interest inventory F-value for groups is 703.204with significant of F at .000, which is less than .05. The null-hypothesis is therefore rejected at .05 level of significance. With this result, there is significant difference between the mean interest scores of students taught Motor Vehicle Mechanics Work with Dick & Carey instructional Model and those taught with Addie instructional models.

Hypothesis Two

There is no significant difference in the mean interest scores of male and female students of Motor Vehicle Mechanics Work taught with Dick & Carey Model andthose taught with Addie model in Technical Colleges.

The data for the test of $H0_2$was analysed and presented in Table 6

Table 6: Summary of Analysis of Covariance (ANCOVA) for Test of Significance in the Mean Interest Scores of Male and Female Students Taught Motor Vehicle Mechanic Work in the Interest Inventory Items

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	5.107[a]	2	2.553	1.349	.267
Intercept	170.946	1	170.946	90.329	.000
Pre – test	.901	1	.901	.476	.493
Gender	4.762	1	4.762	2.516	.118
Error	123.011	57	2.158		
Total	1396386.000	60			
Corrected Total	128.118	59			

***Significant at P≤ .05**

The data presented in the Table 6 show that the F-value for gender stood at 2.516 with significance of F at .118, which is greater than .05. Hence, the null-hypothesis is accepted at .05 level of significance. This result implies that there is no significant difference between the mean interest scores of male and female studentsof Motor Vehicle Mechanics Work taught with Dick & Carey Model and those taught with Addie model in Technical Colleges in the interest inventory items.

Hypothesis Three

There is no significant difference in the mean retention scores of Motor Vehicle Mechanics Work students taught with Dick & Carey Model and those taught with Addie model in Technical colleges.

The data for the test of $H0_3$was analysed and presented in Table 7

Table 7: Summary of ANCOVA for Test of Significance of Effect of Treatment on Students' Retention in Motor Vehicle Mechanic Work

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	90394.925[a]	5	18078.985	370.089	.000
Intercept	67502.861	1	67502.861	1381.830	.000
Post test	265.215	1	265.215	18.923	.000
Group	64.034	2	32.017	.655	.521
Error	7425.252	152	48.850		
Total	451558.000	158			
Corrected Total	97820.177	157			

***Significant at P≤ .05**

The data presented in Table 7 shows that F calculated for the group is 0.655 with a significance of F at .521 which is greater than .05 (p=.521, p>0.05). The null-hypothesis is accepted at .05 of significance which implies that there is no significant difference in retention achievement score of students that used Dick and Carey Model and students that used Addie instructional Models in learning Motor Vehicle Mechanics Work. Therefore, the use of both instructions on lead to effective retention.

Hypothesis 4

There is no significant difference in the mean interaction effects of model types and gender on student's retention scores in Motor Vehicle Mechanics Work in Technical colleges.

The data for the test of $H0_4$was analysed and presented in Table 8

Table 8: Summary of ANCOVA for Test of Significance of Interaction Effects of Treatment on model types and Gender on Students in Retention in Motor Vehicle Mechanic Work

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	282.053[a]	4	70.513	5.031	.001
Intercept	185.425	1	185.425	13.230	.001
Post test	265.215	1	265.215	18.923	.000
Treatment	6.789	1	6.789	.484	.489
Gender	5.126	1	5.126	.366	.547
Error	1037.163	74	14.016		
Total	44642.000	79			
Corrected Total	1319.215	78			

***Significant at P≤ .05**

The data presented in Table 8 revealed that the F-calculated for gender stood at .366 with a significance of F .547 which is greater than .05 (p=0.547, p>0.05). The F- calculated for the treatement stood at .484with a significance value of 0.489 which is above cut-off of .05. The null-hypothesis (H_{05}) is accepted at .05 of significance which implies that there is no significant difference in the interaction effects and gender on students' retention. Therefore, the interaction effects and gender are effective.

IV. Discussion of Findings

The findings of this study are discussed in this section under different aspects dealing with effects of using instructional design models on teaching of students of Motor Vehicle Mechanics Work in Technical Colleges.

Data presented in Table 1 shows that the students in the experimental group 1 taught Motor Vehicle Mechanics Work (MVMW) with Dick and Carey instructional model improved more than experimental group 2 taught with Addie instructional Models in interest inventory. Data presented in Table 5 shows F-calculated values for test of significance between the mean scores of experimental groups, Dick & Carey instructional and Addie instructional models treatment given to students in Motor Vehicle Mechanics Work interest inventory F-value for groups is 703.204with significant of F at .000, which is less than .05. The null-hypothesis is therefore rejected at .05 level of significance. With this result, there is significant difference between the mean interest scores of students taught Motor Vehicle Mechanics Work with Dick & Carey instructional Model and those taught with Addie instructional models. The implication is that instructional model of Dick and Carey is more effective than Addie instructional Models. The finding agreed with the finding of Bello and Aliyu (2012) who found out that there were significant differences between the mean achievement scores of the experimental and control groups in the post-test; and this was not attributed to sex of the subjects (Male or Female) unlike in the school proprietorship (Federal or State Colleges of Education) when post-tested. The finding is also in consonance with the finding of Bakare (2010) who conducted a study on the effects of reciprocal peer tutoring on academic achievement of students in electronics technology in technical colleges of Ekiti State and found that students taught with reciprocal peer tutoring scored higher in the post test than those taught with lecture method in introduction to electronic measuring instrument. This finding agreed with the finding of Igwe (2010) who found that students taught basic electronics with tutorial, drill and practice methods of computer assisted instruction had a higher mean achievement scores than those students taught using the conventional teaching method in the achievement test. The findings is also in line with the assertion of Cotton (2001) who pointed out that the use of computer based learning produces achievement effects superior to those obtained with traditional instruction. Cotton explained further that student learning rate is faster with computer-based learning than with conventional instruction.

The data presented in Table 2 revealed that male and female students in the experimental group 1 taught MVMW with Dick and Carey instructional model improved more than male and female students in experimental group 2 taught with Addie instructional Models. In the same vein the data for the test of $H0_2$ was analysed and presented in Table 6the F-value for gender stood at 2.516 with significance of F at .118, which is greater than .05. Hence, the null-hypothesis is accepted at .05 level of significance. This result implies that there is no significant difference between the mean interest scores of male and female studentsof Motor Vehicle Mechanics Work taught with Dick & Carey instructional Model and those taught with Addie instructional model in Technical Colleges in the interest inventory items.This result also showed that the male students performed better than females. This could be an indicator of the existence of a gender factor that has an effect on the interest inventory of students in MVMW. It has been established that the learner's own feeling toward the

subject matter will largely determine how much of the material will be learned and how thoroughly it will be learned. This finding is in concordance with Aninweze (2014) which found out that Video Tape Instruction (VTI) had a significant effect on students' academic achievement and retention in Biology. Gender was a significant factor in students' academic achievement as the male students achieved higher than the female students. Gender also has a significant effect on student retention as the male students retained higher in total mean retention scores but females retained better when taught using VTI. The result showed that VTI was more effective in enhancing students' achievement and retention in Biology in Senior Secondary Schools.

Data presented in Table 3 shows that students taught Motor Vehicle Mechanic Work with Dick and Carey instructional Model experimental group 1 retention of learning is higher than the retention of learning of the students in the Experimental group 2 taught with the Addie Instructional Models. Therefore, the results signify that students taught Motor Vehicle Mechanic Work with Dick and Carey instructional Model retained their learning better than those taught with the Addie Instructional Models. In the same vein, data presented in Table 7 shows that F calculated for the group is 0.655 with a significance of F at .521 which is greater than .05 ($p=.521$, $p>0.05$). The null-hypothesis is accepted at .05 of significance which implies that there is no significant difference in retention score of students that used Dick and Carey Model and students that used Addie instructional Models in learning Motor Vehicle Mechanics Work. Therefore, the use of both instructions leads to effective retention. Yet, the finding indicates that Dick and Carey Model is more effective in enhancing students' retention of learning in Motor Vehicle Mechanics Work more than the Addie instructional Models. Active engagement of students in the learning activities according to Cotton (2001) improves students' creativity which enhances transfer of learning in new situation. This study is also in concordance with what Enohuean (2015) study found out that there is significant difference in the mean retention scores of students taught with instructional materials and those taught without instructional materials.

The data presented in Table 4 revealed that the, retention rate of male students is higher than that of female students in the experimental group 1 taught with Dick Carey instructional Model. Likewise, the retention rate of male students is higher than that of female students in the experimental group 2 taught using Addie instructional Model. In the same vein data presented in Table 8 revealed that the F-calculated for gender stood at .366 with a significance of F .547 which is greater than .05 ($p=0.547$, $p>0.05$). The F- calculated for the treatement stood at .484 with a significance value of 0.489 which is above cut-off of .05. The null-hypothesis (H_0) is accepted at .05 of significance which implies that there is no significant difference in the interaction effects and gender on students' retention. Therefore, the interaction effects and gender are effective. Finding revealed that males taught Motor Vehicle Mechanics Work with Dick and Carey Model performed better than females taught Motor Vehicle Mechanics Work with Addie instructional Model in the test for retention of learning. According to Brewer (2003) providing opportunities to interact with course material through the use of Dick & Carey instructional Model tends to change the course from a competitive endeavour to one that is more collaborative, student-centred, and focused on the cognitive development and construction of knowledge in the students irrespective of their gender. This agrees with a study carried out by Aninweze (2014) which found out that gender also has a significant effect on student retention as the male students retained higher in total mean retention scores but females retained better when taught using Video tape instruction VTI. The result showed that Video tape instruction VTI was more effective in enhancing students' achievement and retention in Biology in Senior Secondary Schools. The results of these findings showed that the use of Dick and Carey instructional Model helped to bridge gender differences in the performance of males and females in Motor Vehicle Mechanics Work.

V. Conclusion, Educational Implications of the Study and Recommendations

The need for appropriate and adequate learning outcomes at all educational levels is crucial in this contemporary world more than ever before. Educators are often tasked with developing courses and curricula that teach learners how to perform certain procedures by given instructions to learners. This instruction must be designed to provide an optimal, uniform learning experience for all learners. Instructions are often structured or modeled to present the abstract knowledge to learners. The use of model in teaching is usually discipline-specific as representation of a reality to learners. This study found out that students taught Motor Vehicle Mechanics Work with Dick and Carey Model had a higher mean achievement score than those taught with Addie instructional Models. The mean difference was found to be significant. The study here was an effect of academic achievement of Motor Vehicle Mechanics Work students taught with Dick and Carey Model and those taught with Addie instructional Models. The gender effect was found to be significant which favors the males in both models than females.These results therefore showed that instructional design model is more supportive in teaching technique to technical college students.

Findings of this study have implications for Motor Vehicle Mechanics Work teachers, Motor Vehicle Mechanics Work students, NABTEB and the society at large. Having found out that use of instructional design model improves students' academic achievement, especially Dick and Carey Model which is more effective for

improving students' achievement, and retention in Motor Vehicle Mechanic Works, there is need for technical teachers to adopt the use of instructional design model in teaching technical college students. There is need for teachers to seek knowledge of instructional design model to enhance their teaching methodology which will in turn lead to improved performance of students in MVMW. Motor Vehicle Mechanics Work teachers can use instructional design model to achieve learning objectives

Moreover, one of the important finding from this study is effect of gender on achievement and retention of Motor Vehicle Mechanic Work favours males more than females. This finding implied that more attention for female students would be needed by the school administrators to organize extra lesson as this would go a long way to improve their achievement in MVMW.

The implication of this finding on the use of instructional design model as found to improve students' achievement and retention if adopted by NABTEB, the findings of the study will provide useful information as it will serve as a handy guide in training Motor Vehicle Mechanics works teachers during practical classes.

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

1. Technical teachers of Motor Vehicle Mechanics Work should adopt the use of instructional design model in teaching of Motor Vehicle Mechanics Works trade course/ subjects.
2. Technical teachers of Motor Vehicle Mechanics Work should prepare their lessons in line with instructional design model guidelines in such a way that the students are given ample opportunity to interact freely with the teachers. This will go a long way to improve their academic achievement.
3. National Board for Technical Education (NBTE) should consider review of curriculum for Motor Vehicle Mechanics Work with a view to incorporating instructional design model into the teaching of Motor Vehicle Mechanics Work trade/subject.
4. Workshops, seminars and conferences should be organized by Federal and State Ministries of Education and Administrators of Technical Colleges to enlighten technical teachers and improve their knowledge and skills on the use of instructional design model in order to utilize it for improving students' academic achievement, retention and interest in Motor Vehicle Mechanics Work.
5. Students should always be allowed to participate actively and interact freely with the teachers and their peers in the class as this will improve their academic achievement gain in their subjects.
6. Facilities that could encourage the use of Dick & Carey models should be provided to Motor Vehicle Mechanic Work teachers in technical colleges.
7. Teachers should encourage their students to also learn work in groups as this will enable them improve their interpersonal skill, interpersonal intelligence, social skills, and relationship skills

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