

Interactive Effect of Group Instructional Methods and Gender on Technical College Motor Vehicle Mechanics' Students' Academic Achievement and Interest in Niger State, Nigeria

Abutu, Francis; Ekhalia, B. J.; *Ojulokunrin, R. W. and **Odey, S. A.

Department of Industrial & Technology Education
Federal University of Technology Minna, Niger State, Nigeria.

*Department of Vocational and Technical Education, Adekunle Ajasin University, Akungba.

**Skills Development and Certification Department
Federal Ministry of Labour and Employment, Awka, Nigeria.

Correspondence Author: francisfutminna@gmail.com, GSM: +2348067901229.

Abstract

This study determined the interactive effect of group instructional methods (collaborative and cooperative instructional methods) and gender on technical college Motor Vehicle Mechanics' students' academic achievement and interest in Niger State, Nigeria. The study used the quasi-experimental research design; specifically, the pre-test post-test non-equivalent control group experimental design. Multi stage sampling technique was used to arrive at the sample size of 264. Motor Vehicle Mechanics Achievement Test and Motor Vehicle Mechanics Interest Inventory which were the instrument used, was validated and the tested reliability was 0.83 and 0.91 respectively. Data collected were analyzed using mean and ANCOVA at .05 level of significance. The findings revealed that: gender had an effect in favour of males in the achievement test as male students had higher mean gain in the mean achievement scores in Motor Vehicle Mechanics'. There was no significant interaction effect of treatments given to students and their gender with respect to their mean achievement scores in Motor Vehicle Mechanics'. The findings imply that cooperative instructional method is a viable teaching method for improving students' achievement and interest in Motor Vehicle Mechanics'. It is recommended that Motor Vehicle Mechanics' teachers be encouraged, trained and equipped with necessary skills required to effectively use cooperative instructional method in teaching.

Keywords: *Technical College, Achievement, Motor Vehicle Mechanics', Collaborative and cooperative instructional method.*

Introduction

Effective teaching and learning in the classroom to a larger extent depends on the appropriateness of the instructional method used. Instructional method refers to the teaching method adopted by a teacher to deliver instruction or to teach a lesson. The common types of conventional or traditional instructional methods usually used in Nigerian vocational and technical schools are: lecture method, demonstration method, discussion method, role play, field trip and project method which researchers believed is teacher centered, encourages more of individualized learning procedure and deprive students the full opportunity to practice group learning which is currently a fundamental requirement for effective performance in modern automobile workplace (Ogwo & Odigiri ,2013). If the teacher is truly interested in preparing the

students to perform effectively in the increasing technologically advanced automobile workplace, then the way of teaching the students must reflect the needs of the workplace.

In responses to this, group oriented instructional methods was introduced into the class room to enhance teaching and learning of science subjects. This type of learning has been called by various names: cooperative learning, collaborative learning, collective learning, peer teaching, peer learning or team teaching (Melinda, 2008). However, the focus of this study is on Collaborative instructional method (COLIM) and Cooperative Instructional Methods(COPIM) which are among the two group oriented but dissimilar instructional methods used for teaching students in groups. Whether it is through COLIM or COPIM, teaching students how to learn to work together is necessary to prepare them for effective transition from school to work in the industries.

Collaborative Instructional Method (COLIM) and Cooperative Instructional Method (COPIM) are two group-oriented teaching methods used to teach students team work skills. COLIM is a group oriented teaching method that involves four to six students learning in groups and in which the teacher exercise less control over the learning activity by sitting down to watch to ensure orderliness as the interactive group learning activity progresses from one stage to the other based on the stated instructional objectives (Felder & Brent, 2001). COLIM creates an environment for collective interaction among students in a group as they progress from one learning activity to the other. Proponents of group oriented instructional methods claim that, the fact that students are actively exchanging ideas, debating and negotiating ideas within small groups not only increases achievement and interest among the participants but also promotes critical thinking and social skills (Slavin, 1995). It does not only teach social skills but facilitates retention, improves the experience, enhances creativity and also teaches leadership skills which is possible as team leader role is rotated among students within each group in every new lesson class. Thus, the success of one student helps other students to succeed. Johnson and Johnson (1995) explained that collaborative learning is heavily rooted in the idea that learning is inherently social and can be facilitated through active group participation and practices.

Johnson and Johnson (1995) revealed persuasive evidence that collaborative teams achieve higher levels of thought and retain information longer than students who work quietly as individuals. Bruffee (1995) explained that, Collaborative learning suggests a transaction as opposed to a transmission of knowledge (as in cooperative). In the collaborative instructional

method (COLIM), the teacher plays a more passive role than he or she would in a cooperative setting. The teacher believes that knowledge is not to be transmitted to the student instead the student is put into a situation where he/she interacts constructively with others to arrive at knowledge. Frank (2000) revealed that collaborative learning have four essential characteristics: shared knowledge among students, shared authority among teachers and students, teachers as mediators, and heterogeneous groupings of students.

On the other hand, Cooperative Instructional Method (COPIIM) is a group oriented teaching method that involves students learning in groups and in which the teacher exercise more control over the learning activity by moving about in the classroom from one group to the other to ensure orderliness and active participation of learners as the interactive group learning activity progresses from one stage to the other based on the stated instructional objectives (Rosser, 2008). The main thrust of cooperative instructional method is to involve students actively in group learning process, a level of student empowerment which is not possible through traditional teaching methods. Johnson, Johnson and Smith (1998b) stated that cooperative learning has five elements required for effectiveness: positive interdependence, individual accountability, face-to-face promotive interaction, appropriate use of collective skills and group processing.

From the foregoing it is obvious that both COLIM and COPIIM are two group-oriented instructional methods but the two are operationally different. Both COLIM and COPIIM involve teaching learners in small groups and are both based on the theory of constructivism: knowledge is constructed and transformed by students but operationally, they have many differences because in collaborative instructional method (COLIM) the students are in control of their own learning and the teacher exercises less control over learning activity. Melinda (2008) in identifying the difference between COLIM and COPIIM revealed that in COLIM, the teacher exercises less control over group interactive learning activity because in COLIM the students are in control of their own learning and the group leader performs much of the teachers' facilitative role while in COPIIM, the teacher exercises full control over group interactive learning activity by fully monitoring and directing the group learning activity. In COPIIM the teacher observes, listens and intervenes in a group when necessary while in COLIM the activity is less monitored by the instructor as he redirects questions back to the group members. When questions are directed towards the teacher, the teacher guides the students to the information needed. COPIIM

shifts the role of learning to the teacher while COLIM shifts the role of learning to the students. In COPIIM, the teacher still controls most of what goes on in the classroom, even though the students are working in groups while in COLIM, the students take full responsibility for learning together.

A large and rapidly growing body of research confirms the effectiveness of cooperative learning and collaborative learning in science and engineering education. Johnson, Johnson and Smith (2000); Jumoke and Idowu (2012) in separate studies revealed that relative to students taught traditionally with instructor-centered teaching method, cooperatively taught students tend to exhibit higher academic achievement, better high-level reasoning and critical thinking skills, deeper understanding of learned material, less disruptive behavior in class, lower levels of anxiety and stress, greater intrinsic motivation to learn and achieve, greater ability to view situations from others' perspectives, more positive and supportive relationships with peers, more positive attitudes toward subject areas, and higher self-esteem. Similarly, collaborative learning also enhances learning in several ways. Ngozi and Aphonsus (2014) revealed that weak students working individually are likely to give up when they get stuck; working collaboratively, they keep going. Intelligent students faced with the task of explaining and clarifying material to weaker students often find gaps in their own understanding and fill them in. Students working alone may tend to delay completing assignments or skip them altogether, but when they know that others are counting on them, they are motivated to do the work in a timely manner.

Collaborative instructional method (COLIM) and cooperative instructional method (COPIIM) might bring improvement in the teaching and learning of Motor vehicle mechanics' to enable more students pass examinations and also to acquire the needed work skills in maintenance and repairs of automobiles. Moreso that in recent times the automobile components have changed, Hillier & Coombes (2004), and Kirpal (2006b) revealed that, there have been a transition from coil ignition system to electronic ignition system, carburetor fuel supply system to electronic injection system, pure electrical control system to electronic control unit (ECU), manual braking system to anti-lock braking system (ABS), manual transmission system to automatic transmission incorporated with torque converter among others. As a result, effective maintenance of today's automobiles demand more applied work skills from technical college students in Motor vehicle mechanics' (MVM).

Motor Vehicle Mechanics' (MVM) according to National Policy on Education (FGN, 2013) is one of the vocational programmes offered at the technical college level. The policy revealed that technical college is one of the vocational and technical institution saddled with the responsibility of educating and training craftsmen and master craftsmen in various technical trades in Nigeria. Graduates of Motor Vehicle Mechanics' also called Automobile mechanics' according to National Board for Technical Education (NBTE, 2001), should among others be able to identify problems, repair and service mechanical, electrical and electronic system and components of cars, buses and trucks. The philosophy of Motor Vehicle Mechanics' programme according to NBTE (2001) is to produce competent automobile craftsmen for Nigeria's technological and industrial development and to conduct examinations leading to the award of the National Technical Certificate (NTC) and Advanced National Technical Certificate (ANTC) for automobile craftsmen and master craftsmen respectively. NBTE also strive to provide facilities and also coordinates activities in technical colleges to enhance students' achievement in MVM.

Students' academic achievement refers to students' performance in response to a feedback from test and measurement. According to Anene (2005), students' academic achievement is quantified by a measure of the students' academic standing in relation to those of other students of his age. Unfortunately, recent trend analysis report from NABTEB chief examiners revealed poor students achievement in MVM. The trend analysis of NABTEB results in the past five years (2012 to 2016) as revealed by the NABTEB registrar, Olatunde (2016) showed that the students performance in terms of achievement in MVM are consistently poor and less than 45%. The chief examiners report revealed the trends in performance fluctuations between 28.6%, 38%, 29.9%, 33% and 41% respectively, showing the overall pass rate for the past five years to be consistently poor. This implies that over 50% of MVM students find it difficult to obtain complete result at first sitting, thereby hindering their chances of proceeding to tertiary institution. The recent repeated failure report and the prevailing deficiency in technical knowledge and requisite work skills among automobile craftsmen show that the goals of MVM have not been fully achieved in technical colleges. This calls for the need to try out new instructional methods such as collaborative and cooperative instructional method which the researcher beliefs may help in improving students' achievement and interest in learning MVM.

Students' interest reflects input into the subject, such as attention level in class, zeal in learning the material, perception of a course's intellectual challenge and acquired competence in the field. Interest has been recognized by researchers as a motivational factor that can influence learning and performance. Ainley, Hidi and Berndorf (2002) stated that learners interest need to be considered by educators in the field of teaching as this will create a more favorable learning environment for learners. The NABTEB report on poor students' achievement in MVM is a pointer showing that students interest in MVM is low because the researcher believes that high interest in a subject enhance high achievement. The increasing unemployment rate among automobile craftsmen resulting from the inability of MVM graduates to practice their trade could also be attributed to the cumulative effect of the students' low interest toward MVM in technical colleges. In line with this, Melinda (2008) attributed the periodic decline in students' interest in mechanical engineering trades at college level to poor motivation of students and inappropriateness of method of instruction which limit students' participation. Perhaps, adoption of group-oriented instructional methods such as collaborative and cooperative instructional method that allows active students' participation may help improve students' interest in MVM for both gender (male and female).

Gender refers to the status of being male or female. It has been documented that disparity exists between male and female students performance in science and technical subjects. Maigida (2013) revealed that researches by several scholars showed measureable differences in favour of boys in achievement and interest in mathematics, science and technical subjects. On the other hand, Udoh (2001) reported that female students' displayed higher achievement than male students' in practical chemistry and home economics. But, a few scholars have also found no significant difference in academic performance in science and technical subjects between male and female students (Onibokun, 1990 & Popoola, 2002). In this regards, Onibokun and Popoola believes that such a difference does not exist and are of the opinion that both male and female students' have the potentials of performing equally in science and technical related subjects.

The diverse opinions of these scholars show that there is no conclusive argument on the interactive effect on gender on students' achievement and interest in MVM as a subject. Apart from the NABTEB failure reports in MVM, Ogwo and Odigiri (2013), and Rosser (2008) in separate studies on instructional methods revealed that group oriented instructional method of

teaching automobile trade subjects or courses has currently gained more relevance in meeting industrial needs because it encourages collaborative effort or team work which is currently a fundamental requirement for effective performance in the automobile maintenance trade in line with global best practice. It is obvious that group oriented instructional method of teaching MVM is needed if the teacher is to expose the students to the transition towards collaborative effort required in the modern automobile workplace. Due to the positive benefits of both COLIM and COPIM in enhancing instructional delivery, the researcher is not sure as to which is most suitable for exposing and preparing MVM students for the team learning ability needed in the modern automobile workplace. There is also no conclusion on the interaction effect of treatments given to students and their gender with respect to their achievement and interest in MVM.

Statement of the problem

Despite the Nigerian government huge investment effort towards improving technical college education, the performance of the students in past five years (2012 to 2016) in MVM as revealed by NABTEB chief examiners has never been encouraging (NABTEB,2014). The trend analysis of results from 2010 to 2014 as revealed by the NABTEB registrar, Olatunde (2016) showed that students performance in terms of achievement in MVM are consistently poor and stood between a failure rate of 71.4%, 62%, 70.1%, 67% and 59% respectively. Apart from the NABTEB failure reports in MVM, Ogwo and Odigiri (2013), and Rosser (2008) in separate studies on instructional methods revealed that group oriented instructional method of teaching automobile trade subjects has currently gained more relevance in meeting industrial needs because it encourages collaborative effort or team work which is currently a fundamental requirement for effective performance in the automobile maintenance trade in line with global best practice. Group oriented instructional method is also gaining more relevance because global research study on employers needs by Ogundola, Popoola and Oke (2010) ranked collaboration or team work as the number one trait that chief executive of organizations seek in new employees.

Odigiri and Ede (2010) lamented that automobile craftsmen are expected to work in teams in automobile industry and collaborate on projects, yet in technical college they are taught with traditional instructional method which is teacher-centered, encourages more of individualized learning procedure and deprive students the full opportunity to practice learning together in teams. It is obvious that group oriented instructional method of teaching MVM is

needed if the teacher is to expose the students to the transition towards collaborative effort required in the modern automobile workplace. This calls for an urgent need to study the interactive effect of group instructional methods (collaborative and cooperative instructional methods) and gender on technical college Motor Vehicle Mechanics' students' academic achievement and interest in Niger State, Nigeria. If nothing is done at this moment, the failure rates of MVM students in national examinations will continue to escalate; unemployment among MVM graduates will continue to increase; qualified automobile craftsmen will continuously be difficult to find and the modern automobiles in Nigeria will continue to suffer disrepair in the hands of unqualified craftsmen.

Purpose of the Study

The study determined the interactive effect of group instructional methods and gender on Technical college Motor Vehicle Mechanics' students' academic achievement and interest in Niger State, Nigeria. Specifically, the objectives of the study determined the:

1. Effect of gender on students' academic achievement in Motor Vehicle Mechanics' when taught with collaborative and cooperative instructional methods.
2. Effect of gender on students' interest in Motor Vehicle Mechanics' when taught with collaborative and cooperative instructional methods.

Research Questions

The following research questions were raised to guide the study:

1. What is the effect of gender on students' academic achievement in Motor Vehicle Mechanics' when taught with collaborative and cooperative instructional methods?
2. What is the effect of gender on students' interest in Motor Vehicle Mechanics' when taught with collaborative and cooperative instructional methods?

Research Hypotheses

The following null hypotheses tested at .05 level of significance guided the study.

H₀₁: There is no significant interaction effect of treatments given to students and their gender with respect to their mean achievement scores in MVM.

H₀₂: There is no significant interaction effect of treatments given to students and their gender with respect to their mean interest scores in MVM.

Methodology

The study used the quasi-experimental research design; specifically the pre-test post-test non-equivalent control group experimental design. This study was conducted in Niger State and covered all the NBTE accredited Niger State owned technical colleges offering Motor Vehicle Mechanics' (MVM). The target population for this study consisted of 387 Technical College two (TC II) MVM students in all the Niger state owned technical colleges. This comprised of 367 males and 20 females. Multi stage sampling technique involving three stages was used to arrive at the sample size of 264. This comprised of 247 males and 17 females. The experimental group A had a population of 169 students while experimental group B had a population of 95 students. Two sets of lesson plans were designed and used to teach both experimental groups. The collaborative instructional lesson plan was used to teach experimental group A while the second set of the lesson plan was the cooperative instructional lesson plan which was used to teach experimental group B.

Automobile Mechanics Achievement Test (MVMAT) was the instruments used for data collection. The instrument as well as the lesson plan was validated by experts in the Department of Industrial and Technology Education of the Federal University of Technology, Minna, Nigeria. A pilot study was conducted and the reliability testing of the instrument (MVMAT) being a multiple choice type test was carried out with the use of Kuder-Richardson formula 20 (K-R 20) while the reliability of the Motor Vehicle Mechanics' Interest Inventory was using Cronbach Alpha method and a reliability coefficient of 0.83 and 0.91 was respectively obtained. Through the Statistical Package for Social Sciences (SPSS) data collected were analyzed using mean and Analysis of Covariance (ANCOVA). Mean was used to answer the research questions while ANCOVA was used to test the hypotheses at .05 level of significance.

Results

Research Question One

Table 1

Pre-test and Post-test Mean Scores of Male and Female Students Taught MVM with Collaborative and Cooperative Instructional Methods in the Achievement Test.

Gender	Collaborative Instructional Method				Cooperative Instructional Method			
	N	Pre-test	Post-test	Mean Gain	N	Pre-test	Post-test	Mean Gain
		\bar{x}	\bar{x}	\bar{x}		\bar{x}	\bar{x}	\bar{x}
Male	158	6.26	18.97	12.71	89	5.66	22.99	17.33
Female	11	6.91	17.18	10.27	6	6.17	18.12	11.95

The result in Table 1 showed that male and female students taught MVM using COPIIM had a higher mean gain score than those taught using COLIM in the achievement test. This result also showed that the male students performed better than females. This may be an indicator of the existence of a gender attribute that has an effect on the achievement of students in Automobile Mechanics.

Research Question Two

Table 2

Pre-test and Post-test Scores of Male and Female Students Mean Interest Scores in MVM in the Interest Inventory.

Gender	Collaborative Instructional Method				Cooperative Instructional Method			
	N	Pre-test	Post-test	Mean Gain	N	Pre-test	Post-test	Mean Gain
		\bar{X}	\bar{X}	\bar{X}		\bar{X}	\bar{X}	\bar{X}
Male	158	1.84	2.90	1.06	89	1.12	3.19	2.07
Female	11	1.08	1.50	0.42	6	1.03	2.94	1.91

Table 2 shows that male students taught Motor Vehicle Mechanics using Collaborative Instructional Method (COLIM) had a pre-test mean interest score of 1.84 and a post-test mean interest score of 2.90, resulting to a pre-test post-test mean gain of 1.06, while their female counterpart taught using Collaborative Instructional Method had a pre-test mean interest score of 1.08 and a post-test mean interest score of 1.50, resulting to a pre-test post-test mean gain of 0.42. Also male students taught Motor Vehicle Mechanics using Cooperative Instructional Method (COPIIM) had a pre-test mean interest score of 1.12 and a post-test mean interest score of 3.19, resulting to a pre-test post-test mean gain of 2.07, while their female counterpart taught using Cooperative Instructional Method had a pre-test mean interest score of 1.03 and a post-test mean interest score of 2.94, resulting to a pre-test post-test mean gain of 1.91. With these results,

male and female students taught Motor Vehicle Mechanics using Cooperative Instructional Method had a higher mean gain than those taught using Collaborative Instructional Method in the interest inventory. In both instructional methods, male students had higher mean gain in the interest inventory.

Hypothesis One

Table 3

Summary of Analysis of Covariance (ANCOVA) for test of Significance of Three Effects: Treatments, Gender and Interaction Effects of Treatments and Gender on Students' Achievement in MVM

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	1082.079 ^a	4	270.520	18.185	.000
Intercept	5261.536	1	5261.536	353.698	.000
Pre-test	25.474	1	25.474	1.712	.192
Gender	167.526	1	167.526	11.262	.001
Treatment	98.933	1	98.933	6.651	.010
Gender*Treatment	32.932	1	32.932	2.214	.138
Error	3852.826	259	14.876		
Total	112989.000	264			
Corrected Total	4934.905	263			

***Significant at sig of F<.05**

Key: df=degree of freedom, F= ANCOVA F-ratio calculated by the computer, Sig.=Probability value calculated by the computer, Sig of F= Significance of F calculated by the computer, F<.05=Alpha level for taking decision on hypothesis when compare with Sig of F.

From the result in Table 3, there is a significant difference between the mean achievement scores of students taught MVM with COLIM and those taught with COPI. The null hypothesis for treatment is therefore rejected, while the alternative form is accepted. On the hypothesis on gender effect, the result presented showed that, there is a significant difference in the mean achievement scores of male and female students taught MVM with COLIM and those taught with COPI. The result on Table 3 revealed that there is no significant interaction effect of treatments given to students and their gender with respect to their mean achievement scores in Automobile Mechanics. Therefore the null hypothesis for interaction effect of treatment and gender is upheld.

Hypothesis Two

Table 4

Summary of Analysis of Covariance (ANCOVA) for test of Significance of Three Effects: Treatments, Gender and Interaction Effects of Treatments and Gender on Students' interest in MVM

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	129.710 ^a	4	32.427	177.570	.000
Intercept	74.087	1	74.087	405.694	.000
Pre-test	.162	1	.162	.887	.347
Gender	1.686	1	1.686	9.233	.003
Treatment	26.849	1	26.849	147.024	.000
Gender*<i>Treatment</i>	.136	1	.136	.744	.389
Error	47.298	259	.183		
Total	1262.653	264			
Corrected Total	177.008	263			

*Significant at sig of $F < .05$

The data presented in Table 4 shows F-calculated values for three effects: treatments, gender and interaction effects of treatments and gender on students' interest in MVM. The F-calculated value for treatment is 147.024 with a significance of F at .000 which is less than .05. With this result, there is a significant difference between the mean interest scores of students taught MVM with collaborative instructional method and those taught with cooperative instructional method. The null hypothesis four on treatments is therefore rejected at .05 level of significance. The F-calculated value for gender is 9.233 with a significance of F at .003 which is less than .05. This means that there is a significant difference in the mean interest scores of male and female students taught MVM with collaborative instructional method and those taught with cooperative instructional method. The interaction of treatments and gender has F-calculated value of .744 with significance of F of .389. Since .389 is higher than .05, there is no significant interaction effect of treatments given to students and their gender with respect to their mean interest scores in MVM. Therefore the null hypothesis 2 is accepted.

Findings of the Study

Based on the data collected and analysis, the following findings were made:

1. There was an effect of gender in favour of males in the achievement test as male students taught Motor Vehicle Mechanics using both instructional methods had higher mean achievement scores than their female counterparts.
2. There was an effect of gender in favour of males in the interest inventory as male students taught Motor Vehicle Mechanics using both instructional methods had higher mean interest scores than their female counterparts. However the male students taught MVM using cooperative instructional method had higher mean interest scores than those taught with collaborative instructional method.
3. There was no significant interaction effect of treatments given to students and their gender with respect to their mean achievement scores in MVM.
4. There was no significant interaction effect of treatments given to students and their gender with respect to their mean interest scores in MVM.

Discussion of Findings

The data shown in Table 1 provided answers to research question three. From the findings there was an effect of gender in favour of males in the achievement test as male students taught Motor Vehicle Mechanics using both instructional methods had higher mean achievement scores than their female counterparts. Similarly, two-way Analysis of Covariance (ANCOVA) was used to test the first hypothesis, Table 3, at the calculated F-value for gender (11.262) with significance of F at .001 and alpha level of .05, indicating that there was a significant effect of gender in favour of males in the mean achievement scores of male and female students taught MVM with collaborative instructional method and when exposed to cooperative instructional method. Also two-way Analysis of Covariance (ANCOVA) was used to test the hypothesis on interactive effect, Table 3, at the calculated F-value for interaction effect of treatment and gender on achievement (2.214) with significance of F at .138 and alpha level of .05. This findings shows that there was no significant interaction effect of treatments given to students and their gender with respect to their mean achievement scores in MVM. The implication of this findings is that there was a significant effect of gender in favour of males in the mean achievement scores of

male and female students taught MVM with collaborative instructional method and when taught with cooperative instructional method.

In line with the findings above, it has been documented that disparity exists between male and female students' performance in science and technical subjects. Owodunni (2009) in a study on gender inequality in technical and vocational education found out that gender role affect familiarity with academic content, career aspirations, attitude toward subjects, teacher expectations and preferred approaches which also affect academic achievement and interest of students. Similarly Riding, Grimley, Dahraei and Banner (2003) in a research on gender differences in achievement discovered measureable differences in favour of boys in achievement and skill performance in mathematics and science related subjects. The findings was further confirmed in a study on gender difference where Kimura (1998) attributed the higher achievement of boys than girls in vocational subjects to the masculine and stressful nature of most vocational subjects, Motor Vehicle Mechanics inclusive. In this study, even though female students had higher pretest mean achievement scores in both methods, the overall analysis indicated by the mean gains showed that the male students performed better than females. This could be an indicator of the existence of a gender attribute that has an effect on the achievement of students in Motor Vehicle Mechanics.

The data presented in Table 2 provided answers to research question four. The finding revealed that there was an effect of gender in favour of males in the interest inventory as male students taught Motor Vehicle Mechanics using both instructional methods had higher mean interest scores than their female counterparts. However the male students taught MVM using cooperative instructional method had higher mean interest scores than those taught with collaborative instructional method. Two-way Analysis of Covariance (ANCOVA) was used to test the second hypothesis, Table 4, at the calculated F-value for gender (9.233) with significance of F at .003 and alpha level of .05, which shows that there was a significant effect (difference) in the mean interest scores of male and female students taught MVM with collaborative instructional method and those taught with cooperative instructional method. Females in cooperative group had higher mean interest scores in MVM. Also two-way Analysis of Covariance (ANCOVA) was used to test the sixth hypothesis, Table 4, at the calculated F-value for interaction effect of treatment and gender on achievement (.744) with significance of F at .389 and alpha level of .05.

This findings shows that there was no significant interaction effect of treatments given to students and their gender with respect to their mean interest scores in MVM. The findings imply that both male and female students have the same potentials of performing equally in Motor Vehicle Mechanics without any bias effect cause by their status of being male or female. Therefore when male and female students are taught Motor Vehicle Mechanics in the same teaching and learning environment with the same methods and the same teacher, there performance is same without gender difference creating any significant edge. Thus the gender effect statistically discovered was not based on the interaction effect of treatment and gender.

Melinda (2008) in a study on constructing knowledge together attributed the periodic decline in students' interest in mechanical engineering trades at college level to poor motivation of students and inappropriateness of method of instruction which limit students' participation. The higher mean interest scores of male students in Motor Vehicle Mechanics confirmed the findings of Akamobi (2005) who reported that male students' displayed higher interest than male students' in practical Physics and Metalwork at technical colleges. The higher interest statistically displayed by male students is also in agreement with the findings of Zafran and Zawitz (1997), and Popoola (2002) who in separate studies on the effect of gender difference in education, discovered that male students displayed higher interest in mechanical engineering courses than their female counterpart. The lower achievement of female students in MVM together with their lower interest scores could be a pointer that gender actually has significant effect on male and female students' interest in MVM. On the contrary, Onibokun (1990), Kolawole and Philips (2004) in separate studies on gender revealed that gender difference has no effect on students' interest and are of the opinion that both male and female students' have the potentials of demonstrating higher interest in science and technical related subjects.

Above all assisting the learner to learn is the ultimate goal of any instructional method in both formal and informal education. As Ukoha and Eneogwe (1996) noted, if an instructional method does not facilitate acquisition of the desired knowledge, skill attitude or behaviour then it is ineffective, has no value and the expected learning outcome will not occur. If the teacher is to expose the students to the transition towards team work ability required in the modern automobile workplace, then there is need to adopt cooperative instructional method in teaching MVM in technical colleges.

Conclusion

Motivating students to acquire knowledge and skills is the ultimate goal of any instructional method in both formal and informal education. If an instructional method does not facilitate acquisition of the desired knowledge, skill attitude or behaviour then it is ineffective, has no value and the expected learning outcome will not occur. It is very vital for Motor Vehicle Mechanics teachers to adopt group instructional methods especially cooperative instructional methods. This is because interest is an important factor for attaining high achievement in any subject or course.

There was an effect of gender in favour of males in the achievement test and interest inventory as male students had higher mean gain in the mean achievement and interest scores. There was no significant interaction effect of treatments given to students and their gender with respect to their mean achievement and interest scores in MVM. Based on the findings of this study, the researcher therefore conclude that cooperative instructional method is a viable teaching method for improving students achievement and interest in Motor Vehicle Mechanics at technical colleges. The researcher strongly believe that the poor achievement and interest of students in Motor Vehicle Mechanics at technical colleges earlier observed in this study can be improved by adopting cooperative instructional method in technical colleges.

Recommendations

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

1. Motor Vehicle Mechanics teachers should adopt cooperative instructional method to improve teaching and learning of team work skills.
2. The National Board for Technical Education, National Business and Technical Examinations Board, Niger State technical education board should periodically organize retraining programmes inform of workshops, seminars and conferences to update the technical teachers on the skills and procedures for teaching using cooperative instructional method.
3. At regular intervals the teachers at technical colleges should be given orientation to create awareness on the relevance and need to prepare the automobile craftsman for the world of work by adopting cooperative instructional method that teaches team work ability.

4. Cooperative instructional method should be adopted at technical teacher training programmes in tertiary institutions to prepare the teacher for cooperative teaching task needed for effective teaching and learning in schools.
5. The curriculum planners and developers should carry out curriculum improvement to capture cooperative learning activities and experiences.

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