



EFFECT OF CO-OPERATIVE LEARNING STRATEGY ON SENIOR SECONDARY SCHOOL STUDENTS' ACHIEVEMENT IN WOODWORK TECHNOLOGY

Oladiran S. OLABIYI, Adeneye O. A. AWOFALA

Abstract: This study explored the aftermath of co-operative learning strategy on senior secondary school students' achievement in woodwork technology in Nigeria within the scheme of the pre-test, post-test non-equivalent control group quasi-experimental design. Three null hypotheses and three research questions guided the study in which the experimental group undergone tutelage with the co-operative learning strategy while the control group received instruction with the conventional teaching method for eight weeks. One instrument, Woodwork Technology Achievement Test (WTAT) with KR-20 reliability coefficient of 0.85 was used for data collection. Results showed that students in the experimental group achieved significantly better performance in woodwork technology than students in the control group. Also, male students slightly outperformed their female counterparts in woodwork technology with cooperative learning strategy, although no significant difference existed between genders taught woodwork technology using cooperative learning strategy. Gender had no statistically significant main influence on students' achievement in woodwork technology. Also, the interaction effect of treatment and gender on students' achievement in woodwork technology was not statistically significant. The co-operative learning strategy made lesson more interesting, easy and created friendship among students. It was thus, recommended that co-operative learning strategy be adopted as a close substitute to the conventional teaching method in teaching woodwork technology in senior secondary schools in Nigeria.

Key words: Co-operative learning strategy, achievement, woodwork technology, conventional teaching method

1. Introduction

All over the world, technological innovation remains the benchmark for judging country's development. Technology education is not only vital to the sustenance of individuals but helped to promote the growth and advancement of a country technically and industrially (Alebiosu & Ifamuyiwa, 2008). Presently, it is the general consensus that technology literacy is the pertinent doorway to the continued existence of a country mechanically and this is achievable through technical vocational education and training (TVET). The Nigerian education system is designed to cultivate in the minds of individuals critical thinking ability to solve everyday problems and contribute significantly and meaningfully to the growth and advancement of the Nigerian society. Albeit, there are distinct subjects in the curriculum of schools at the pre-tertiary education level in Nigeria and these subjects were carefully crafted to deliver dividends of education when properly articulated and taught thereby enhancing the formidable goals of Nigerian education as exemplified in the National Policy on Education (FRN, 2013). One of such subjects in senior secondary school curriculum is woodwork technology.

Woodwork technology as a TVET subject is offered and implemented in senior secondary schools in Nigeria. Woodworking is a deliberate activity of skillfully crafting objects from wood, and is associated with furniture making, wood statuette, and wood turning. It is important to note that the daily improvements in contemporary technology and the pressures from industries have significantly changed woodwork technology as a formidable and dynamic field of study. The advancement in

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computer aided machines has made woodworking an interesting vocational subject to the extent that more products can be mass-produced with little or no waste. Woodworking is the deployment of technically creative knowledge and dexterity in the planning, assortment of materials, assembling and fastening of two or more pieces of wood together or wood to other structural materials to produce products.

The programme for woodwork technology in TVET institutions in Nigeria is designed to produce competent technologists and craftsmen who are skilled in the art of joinery work and teachers who in turn will develop the skills in students. Woodwork technology promotes in individuals mental, affective and psychomotor skills needed for the production of exact products from wood for human deployment and use. One of the major objectives of woodwork technology is to make an individual student self-reliant and be an employer of labour thereby reducing unemployment in the society. In a formal classroom setting, where woodwork technology is taught, learning occurs majorly through expository and unproductive teaching (Agogo & Onda, 2014). That is skills, knowledge and attitudes are imparted and acquired through memorization without meaningful understanding of the underlying principles. However, several research reports have indicated that students achieve poorly in senior secondary school technical subjects especially woodwork technology (Kareem & Ma'aji, 2011). It is noted that under performance in woodwork technology may be ascribed to poor instructional strategy use and the problem may have stemmed from the traditional method being used by teachers at senior secondary school level (Awofala, 2012; Awofala, Arigbabu & Awofala, 2013; Odogwu, 2011). Proponents of functional education believe that meaningful changes in students' outcome is accounted for by significant modifications in school core curriculum (Awofala & Sopekan, 2013; Awofala, Olaoluwa & Fatade, 2013; Awofala, Ola-Oluwa & Fatade, 2012) and pedagogy. Without mincing words, most Nigerian teachers may not be pedagogically situated to teach in this modern day schools because they were professionally ill equipped compared to the modern day constructivist teaching. Many Nigerian teachers were schooled in the classroom where teachers remained the authority and dispenser of knowledge and students passive recipient of teachers' memorized information which made them unable to explain what they have learnt. In this 21st century the learners should actively engage in knowledge construction by assimilating novel information and proficiencies into their repertoire of previously learnt concepts.

To further buttress this point, Offorma (2009) posited that learners should not be spoon-fed, instead the learners should be left to discover solutions by themselves. Offorma further explained that the message becomes effective when teaching rules and procedures involve the active participation of learners, stimulate their imagination, provoke and guide their thinking. Small group pedagogy enables students to mentally practice and associate learning materials with previously existing mental plan, to produce a deep and stronger level of comprehension. The working together of peers is seen to produce a greater level of modelling, mental dis-equilibration, criticism and viewpoint taking that appear as learners elucidate and accept clarification from their classmates (Johnson & Johnson, 2008). Cooper, Robinson and Patall (2006) explained that cooperative learning as a teaching approach allows and encourages students to work together to help one another to learn to achieve a common goal. Students are placed in small groups while considering their academic ability. Each individual in a group is accountable to the group success. This encourages members to explain difficult topics to one another so that the group gets a good result at the end. In co-operative learning, students are selected to form heterogeneous teams using varied learning methods for the sole purpose of enhancing social skills and each other understanding of a specific school subject. Because it promotes active participation of students, co-operative learning helps students to take charge of their own learning to enhance learning efficiency that leads to improved academic achievement (Yusuf, 2014). The three major goals of adopting co-operative learning strategy in classrooms according to Slavin (2011) include developing students' social and communication skills, increasing open-mindedness and reception of diversity, and enhancing educational attainment. Co-operative learning strategy positions the students at the centre of learning by focusing on directing, inspiring, and boosting collaborations among students, with students being made reflective of personal learning activities and collaborations with their colleagues (Shimazoe & Aldrich, 2010).

Co-operative learning approach is professed by some researchers that it creates a competitive learning environment (Killen, 2007). Esiobu (2011) investigated the influence of cooperative learning on gender equity and concluded that the approach is a gender pleasant collaboration needed by people. Esiobu stressed that cooperative learning be invigorated at the pre-tertiary level for early empowerment of students in the area of democratic values and conducts vital for engendering nonviolent cohabitation and workable improvement. The rudimentary tenet of cooperative learning approach is to engender practicable social skills and enhance scholarship in learning, with the ultimate aim of benefitting from this social interaction (Esiobu, 2011). With this, students are empowered to use their social skills to help one another to improve their learning attainment for the betterment of the society. Thus, the cooperative approach remains a learning strategy for inspiring low-skilled learners to catch social skills (Graham, 2005). It is apparent that irrespective of the levels of students, they will benefit from cooperative learning strategy (Johnson & Johnson, 2005).

Research has shown that the success of cooperative learning is a function of the following features of progressive collaboration, individual accountability, social interaction, and self-assessment of the team (Johnson & Johnson, 2009). In cooperative learning students collaborate with one another to catch social skills and maintain high academic attainment irrespective of their gender. It is evident that gender is a major determinant of students' academic performance in vocational subjects (Howden, 1998) and gender is a recurring issue in vocational education.

Gender is a social perception of being regarded as male (masculine) or female (feminine) within a society. Apparently there is a remarkable difference in achievement in technical and vocational subjects based on gender (Howden, 1998). Therefore, this study determined if cooperative learning strategy would make a significant influence on students' academic achievement in woodwork technology based on gender.

1.1. Research Questions

Three research questions stated below were answered in the present study.

Research Question One: What is the effect of treatment (co-operative learning strategy vs. conventional teaching method) on students' achievement in woodwork technology?

Research Question Two: What is the influence of gender on students' achievement in woodwork technology?

Research Question Three: What is the interaction effect of treatment (cooperative learning strategy & conventional teaching method) and gender (male & female) on students' achievement in woodwork technology?

1.2. Null Hypotheses

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

H₀₁: The main effect of treatment (cooperative learning strategy & conventional teaching method) on students' achievement in woodwork technology is not significant.

H₀₂: The main influence of gender on students' achievement in woodwork technology is not significant.

H₀₃: The interaction effect of treatment and gender on students' achievement in woodwork technology is not significant.

2. Method

2. 1. Research Design

In this study a pre-test, post-test, non-equivalent control group quasi-experimental research design was adopted. In quasi-experiment, researchers cannot randomize participants of treatment groups (Nworgu,

2006). Therefore, in this study the experimental group and the control group were arbitrarily allotted intact classes. This step was carried out to prevent the disruption of school time-table and normal academic classes of the participants. The quasi-experimental design which involved a 2×2 factorial matrix was used to contrast the treatment's (at two levels) scores crossed with gender (at two levels). The scheme of the study is emblematically given as follows:

$$\begin{array}{lll} O_1 X_1 O_2 & X_1 \text{gain} = O_2 - O_1 & O_1 O_3 \text{ pre-tests} \\ O_3 C O_4 & C \text{gain} = O_4 - O_3 & O_2 O_4 \text{ post-tests} \end{array}$$

Where X_1 represents cooperative learning strategy and C represents conventional teaching method. The mean difference scores between O_1 and O_2 and O_3 and O_4 were subjected to statistical significance by deploying the Analysis of Covariance statistic.

2. 2. Participants

In this study, students made up the participants and they consisted of 250 (126 males and 124 females) Senior Secondary School year two woodwork technology students. Simple random sampling was used to select one intact class each from three streams each of six equivalent coeducational secondary schools that were distantly located from one another within the city of Lagos, Nigeria. The researchers arbitrarily allotted three schools to the cooperative learning strategy with 120 students (59 males and 61 females) and the remaining three schools to the conventional teaching method with 130 students (67 males and 63 females). In the cooperative learning schools and conventional teaching schools students' mean ages were 15.6 years and 15.5 years correspondingly.

2. 3. Instrumentation

This study used researcher designed Woodwork Technology Achievement Test (WTAT) for data collection. The WTAT used as pretest and posttest involved 30 multiple choice objective test items with choices A to D selected from previous West African Examinations Council (WAEC) question papers in woodwork technology and covered topics related to pull-over cross cutting machine, circular rip saw, saw bench, surface planning machine, and narrow band saw as contained in the senior secondary year two woodwork curriculum. These topics were chosen because students performed poorly in them in schools in Nigeria. The initial 40 –items of WTAT was given out to two experts in woodwork technology at the University of Lagos, Akoka, Lagos, Nigeria for face and content validation. The validation involved scrutinizing the items of WTAT against the contents and topics of the lesson note, language editing, and appropriateness of the test to the target participants. Five items were removed based on experts' recommendation and the face validated WTAT was tested for difficulty index and discrimination power. Items with difficulty power of 0.4-0.6, discrimination power of 0.2 and above, and distractor index of negative decimal were retained (Akinsola & Awofala, 2009). Based on this, five items were removed leaving the final 30 items for the WTAT which was trial-tested in a Federal Government Secondary School in Ogun State. Each item on the WTAT was scored 2 marks, thus, a total score of 60 marks was obtainable. Kuder-Richardson 20 formulae was used to calculate the reliability coefficient of the WTAT and a value of 0.85 was computed. The WTAT covered the first three levels (knowledge, comprehension, and application) of Bloom taxonomy of cognitive domain called the lower-order cognitive domain as contained in the table of specification (Table 1) below.

Table 1. Test Item Specifications in Woodwork on WTAT

| Topics | Level of cognitive domain | | | |
|------------------------------------|---------------------------|---------------|-------------|-------|
| | Knowledge | Comprehension | Application | Total |
| 1. Pull-over cross cutting machine | 2 | 2 | 2 | 6 |
| 2. Circular rip saw | 2 | 2 | 2 | 6 |
| 3. Saw bench | 2 | 2 | 2 | 6 |
| 4. Surface planning machine | 2 | 2 | 2 | 6 |
| 5. Narrow band saw | 2 | 2 | 2 | 6 |
| Total | 10 | 10 | 10 | 30 |

2. 4. Procedure

Two sets of lesson plans were developed by the researchers based on the topics of the study in the table of specification. Each set consists eight (8) lesson plans that can be taught in eight weeks in which each lesson plan is of 80 minutes period. The first set of lesson plan written by the researchers was based on co-operative learning strategy and this was applied in teaching students of the experimental group. The second set of lesson plan deployed in teaching students of the control group was written with conventional teaching method in mind. The teachers of the experimental group were trained for one week to ensure fidelity of the treatment and the study was carried out during the normal school hour.

Before the commencement of instruction on the first day of the study, WTAT was applied as pre-test to both groups after, which the lesson plans were applied respectively to both the experimental and control groups for eight weeks. Immediately after the treatment, the items of WTAT were re-ordered to prevent halo effect and the re-ordered WTAT was applied to both the experimental and control groups as post-test. As a prelude to treatment in the experimental group, the students were divided into low and high ability groups using the results of the pre-test. The high ability students should score 50% and above on the pre-test while the low ability students should score below 50% on the pre-test. Six different schools were involved in the study and the first three schools were randomly assigned the experimental treatment while the remaining three schools were assigned the control treatment using simple random sampling technique. The conditions for administering the pre-test and post-test in all schools were the same. Students in the experimental group were constituted into a heterogeneous group of four to form teams thereby consisting of both high and low ability students of both genders in order to maximize strength. The students in each group were assigned complementary roles. Each lesson in the experimental group commenced as an entire class teaching in which the topic was introduced, the teacher gave an outline of the learning outcomes and provided first-hand information to the students regarding their participation in the lesson. Thereafter, students made way to their groups and every student was given an assignment based on the topic to be discussed. The topics were first discussed at the group stage based on their findings before the group presentation in the class. At the group level, every student was given opportunity to share his/her results on the given topic. The learning proficiencies of the students in the experimental group were assessed by tests given at the end of each academic task. The test consisted of tasks that the students in the experimental group had deliberated upon for mastery and students' scores in each group were computed for comparisons. Groups with the top scores were properly acknowledged, praised, and motivated. Students in the control group were treated with the chalk and talk method otherwise called the conventional teaching approach. Deploying this approach in this study, the teacher made a whole class presentation on the topics with minimal students' participation and interaction. In other words, students in the control group remained passive while the teacher was regarded as sole authority to be contacted for information. In this approach students were unable to take charge of their own learning.

2. 5. Method of Data Analysis

The collected data in the study were inputted into the SPSS version 17 for computation and both the descriptive and inferential statistics were applied to answer the research questions and test the null hypotheses respectively. Mean and standard deviation were used to answer the research questions while the Analysis of Covariance was used to test the null hypotheses at 0.05 level of significance.

3. Results

Research Question One: What is the effect of treatment (co-operative learning strategy vs. conventional teaching method) on students' achievement in woodwork technology?

Null Hypothesis One: The main effect of treatment (cooperative learning strategy & conventional teaching method) on students' achievement in woodwork technology is not significant.

In Table 2 below were the results of statistical analysis of pre-treatment and post-treatment achievement scores between the control and experimental groups based on gender.

Table 2. Results of statistical analysis of pre-treatment and post-treatment achievement scores based on gender

| Treatment | Gender | Post-test | | Pre-test | | Mean difference | N |
|--------------|--------|-----------|-------|----------|-------|-----------------|-----|
| | | Mean | SD | Mean | SD | | |
| Cooperative | Male | 48.52 | 6.02 | 31.81 | 10.89 | 16.71 | 59 |
| | Female | 48.13 | 5.82 | 33.18 | 10.40 | 14.95 | 61 |
| | Total | 48.33 | 5.90 | 32.51 | 10.63 | 15.81 | 120 |
| Conventional | Male | 33.79 | 10.04 | 30.93 | 11.06 | 2.86 | 67 |
| | Female | 36.21 | 11.96 | 33.59 | 11.38 | 2.62 | 63 |
| | Total | 34.96 | 11.04 | 32.22 | 11.25 | 2.74 | 130 |
| Total | Male | 40.69 | 11.16 | 31.34 | 10.95 | 9.35 | 126 |
| | Female | 42.07 | 11.16 | 33.39 | 10.87 | 8.68 | 124 |
| | Total | 41.38 | 11.16 | 32.36 | 10.93 | 9.02 | 250 |

The results in tables 2 and 3 present answer to research question one and test null hypothesis one respectively. Table 2 showed that the students of the experimental group taken through woodwork technology using cooperative learning strategy pooled a pre-test mean score of 32.51 (SD=10.63) and a post-test mean score of 48.33 (SD=5.90) with a mean difference of 15.81. Meanwhile, the control group taught woodwork technology with conventional teaching method pooled a pre-test mean score of 32.22 (SD=11.25) and a post-test mean of 34.96 (SD=11.04) with a mean difference of 2.74. This showed that the experimental group taken through woodwork technology using the cooperative learning strategy achieved better performance than the control group treated with the conventional teaching method. Hence, the conventional teaching method was less effective when compared with the cooperative learning strategy.

Additional scrutiny of the post-treatment achievement scores of both groups (control and experimental) by means of Analysis of Covariance as revealed in Table 3 depicted that the disparity in means between the experimental and control groups was meaningfully weighty ($F_{(1, 249)}=433.25$, $p=0.000$, $\eta^2_p=0.64$). The partial eta squared (η^2_p) (Awofala, Fatade & Udeani, 2015) of 0.639 showed that treatment alone accounted for 63.9% of the variability in achievement in woodwork technology. This outcome indicated that treatment has a large effect on achievement in woodwork technology (Cohen, 1988). Therefore, it was concluded that there was a significant main effect of treatment on students' achievement in woodwork technology in favour of the cooperative learning group.

Table 3. Summary of Analysis of Covariance of Achievement in Woodwork Technology Scores by Treatment and Gender

| Source | Type III Sum of Squares | df | Mean Square | F | Sig | Partial Eta Squared |
|------------------|-------------------------|-----|-------------|---------|------|---------------------|
| Corrected model | 24889.880 ^a | 4 | 6222.470 | 249.397 | .000 | .803 |
| Intercept | 9821.187 | 1 | 9821.187 | 393.633 | .000 | .616 |
| Pre-test | 13552.279 | 1 | 13552.279 | 543.175 | .000 | .689 |
| Treatment | 10809.587 | 1 | 10809.587 | 433.248 | .000 | .639 |
| Gender | 7.802 | 1 | 7.082 | .313 | .577 | .001 |
| Treatment×Gender | 58.110 | 1 | 58.110 | 2.329 | .128 | .009 |
| Error | 6112.776 | 245 | 24.950 | | | |
| Total | 458996.000 | 250 | | | | |
| Corrected Total | 31002.656 | 249 | | | | |

a. R Squared = .803 (Adjusted R Squared = .800)

Research Question Two: What is the influence of gender on students' achievement in woodwork technology?

Null Hypothesis Two: The main influence of gender on students' achievement in woodwork technology is not significant.

The results in tables 2 and 3 present answer to research question two and test null hypothesis two respectively. In Table 2 it was shown that the male students taught woodwork technology pooled a pre-test mean score of 31.34 (SD=10.95) and a post-test mean score of 40.69 (SD=11.16) with a mean difference of 9.35. Meanwhile, the female students who undergone tutelage in woodwork

technology pooled a pre-test mean score of 33.39 (SD=10.87) and a post-test mean score of 42.07 (SD=11.16) with a mean difference of 8.68. This showed that female students taught woodwork technology performed slightly better than the male students in the post test. Hence, there could still be slight gender difference in achievement in woodwork technology in favour of the female students.

Additional scrutiny of the post-treatment achievement scores of both genders (male and female) by means of Analysis of Covariance as revealed in Table 3 depicted that the disparity in means between the male and female groups was not meaningfully weighty ($F_{(1, 249)}=0.31$, $p=0.58$, $\eta^2_p=0.001$). Thus, it was resolved that gender had no significant main influence on students' achievement in woodwork technology.

Research Question Three: What is the interaction effect of treatment (cooperative learning strategy & conventional teaching method) and gender (male & female) on students' achievement in woodwork technology?

Null Hypothesis Three: The interaction effect of treatment and gender on students' achievement in woodwork technology is not significant.

The results in tables 2 and 3 present answer to research question three and test null hypothesis three respectively. It was revealed that male students taught woodwork technology with the cooperative learning strategy pooled a pre-test mean score of 31.81 (SD=10.89) and a post-test mean score of 48.53 (SD=6.02) with a mean difference of 16.71. In the meantime, female students taught woodwork technology with the cooperative learning strategy pooled a pre-test mean score of 33.18 (SD=10.40) and a post-test mean score of 48.13 (SD=5.82) with a mean difference of 14.95. However, male students who undergone tutelage in woodwork technology with the conventional teaching method pooled a pre-test mean score of 30.93 (SD=11.06) and a post-test mean score of 33.79 (SD=10.04) with a mean difference of 2.86. For the moment, female students who undergone tutelage in woodwork technology with the conventional teaching method pooled a pre-test mean score of 33.59 (SD=11.38) and a post-test mean of 36.21 (SD=11.96) with a mean difference of 2.62. With these outcomes both genders that undergone tutelage in woodwork technology through the cooperative learning strategy gained comparably and maximally from the instruction than the male and female students that undergone tutelage in woodwork technology through the conventional teaching method. Thus, the cooperative learning strategy and the conventional teaching method could be used to lessen the achievement disparity between both genders in woodwork technology.

Additional scrutiny of the post-treatment achievement scores of students by treatment and gender by means of Analysis of Covariance as revealed in Table 3 depicted that the interaction effect of treatment and gender was not meaningfully weighty ($F_{(1, 249)}=2.33$, $p=0.13$, $\eta^2_p=0.009$). Thus, it was concluded that the interaction effect of treatment and gender on students' achievement in woodwork technology was not statistically significant.

4. Discussion

The outcomes presented in Table 3 indicated weighty main effect of treatment on students' achievement in woodwork technology in which treatment alone accounted for 63.9% of the variability in students' achievement in woodwork technology. This outcomes revealed that the adoption of cooperative learning strategy in teaching woodwork technology greatly improved the achievement of students than when students were treated with the conventional teaching method. This outcome supported previous outcomes (Ho & Boo, 2007; Awofala, 2014; Armstrong, Shumei, & Marguerite, 2007; Adeoye, 2015; Awofala & Nneji, 2011; Olatoye, Aderogba & Aanu, 2011; Awofala, 2011a; Awofala, 2011b; Akinsola & Awofala, 2008, 2009; Awofala, Fatade & Ola-Oluwa, 2012; Awofala, Fatade & Ola-Oluwa, 2013; Awofala, 2010), which linked enhanced content learning and achievement to student-centred pedagogies. Previous findings (Awofala, Arigbabu & Awofala, 2013) have condemned the conventional teaching method for over emphasizing teacher as the authority in the classroom and neglecting students' participation, which could have a damaging influence on students' achievement (Awofala, 2011a) in woodwork technology. As a learner-centred strategy, the cooperative learning approach was more efficient in sustaining and increasing students' achievement

in woodwork technology than the conventional teaching method because the strategy enabled the participants to work collectively in groups, with a view to sharing opinions and participate in thinking out of the box on problems (Awofala, Arigbabu & Awofala, 2013) which aided their achievement in woodwork technology. This supports the assertion of Slavin (1985, 1995) that cooperative learning strategy is not only very effective in giving incentive to students but that it provides a task structure that enables functional learning to take place. Some related investigations have shown that the efficacy of cooperative learning strategy hinged on the chance it affords students to collaborate in finding solution to problems, share ideas and enhance achievement (Awofala, Arigbabu & Awofala, 2013; Tarim & Akdeniz, 2008; Awofala, Fatade & Ola-Oluwa, 2012; Ojaleye & Awofala, 2018; Zakaria, Chin & Daud, 2010). The finding of the study is in agreement with past results because the structure of cooperative teams allows students' active participation and social interaction. However, students were convinced that cooperative learning strategy made lesson enjoyable, helped them to learn quickly, reduced memorization and regurgitation of information, built collaboration between peers, helped in information search, and kept students busy and lively. Since cooperative learning engages students' cognitive and affective skills and makes learning livelier in the classroom, it discourages students from dodging duty assigned to them and anyone that engages in peer teaching will learn quickly and more effectively and efficiently.

The non-meaningful central influence of gender on students' achievement in woodwork technology recorded (Table 3) agreed with previous results in science, technology, and mathematics (Awofala, 2017; Fatade, Nneji, Awofala & Awofala, 2012; Awofala & Anyikwa, 2014; Awofala, 2016). From these studies we noted no statistically meaningful gender disparities in students' learning outcomes. The result of no statistically significant gender difference in achievement in woodwork technology was in contradiction with the perennial beliefs of researchers (Awofala, 2011c; Awofala, 2008) that gender stereotypes are prevailing in schools in Nigeria. According to Schiefele and Csikszentmihalyi (1995) gender disparities in learning outcomes are a function of personal conviction of capabilities and sex role labelling. The present study outcome on gender suggested that both genders had similarly rich experiences and exposures within and outside the school system and that statistically significant gender difference in achievement in woodwork technology could be disappearing.

The non-weighty interface of treatment and gender on students' achievement in woodwork technology in the present study was in accordance with previous study (Ojaleye & Awofala, 2018; Adeyemi, 2008; Mahira & Azamat, 2013) that indicated that gender appeared not to intermingle with teaching strategy to yield outcomes. This meant that in this study the treatment conditions did not prove discriminatory over gender. Esiobu, (2011) found statistically significant difference in biology achievement between genders taught with the cooperative learning strategy. Another study by Adeyemi (2008) showed that there was no statistically significant difference in social studies achievement between genders that went through classes in cooperative learning strategy. In the same way, Mahira & Azamat (2013) found no statistically significant gender difference in achievement in mathematics of students treated with the cooperative learning strategy. The present study result implied that cooperative learning strategy is a good substitute to the conventional teaching method in enhancing learning and bridging gender difference associated with the learning of woodwork technology. Thus, this strategy could be deployed by teachers for personalizing teaching for both genders.

5. Conclusion

Through quantitative research paradigm, this study examined the effect of cooperative learning strategy on students' achievement in woodwork technology in Lagos State, Nigeria. It also examined the influence of gender as a moderator variable on the dependent measure. The study established that the conventional teaching method was less effective when compared with the cooperative learning strategy in enhancing and sustaining students' achievement in woodwork technology. More so, this study established that gender was not an important variable in students' achievement in woodwork technology. Thus, regardless of gender students will maintain enhanced achievement in woodwork technology when cooperative learning strategy is employed for teaching woodwork technology. The result therefore showed that cooperative learning strategy proved to be a worthwhile substitute to the

conventional teaching method for teaching woodwork technology in senior secondary schools in Nigeria. The study concluded that the adoption of cooperative learning strategy in teaching woodwork technology in senior secondary schools in Nigeria would not only engender and instill social interaction in the students but would enhance their achievement in both internal and public examinations in woodwork technology.

In line with this study's results, a few recommendations were outlined:

1. Teachers of woodwork technology should be acquainted with the nitty-gritty of cooperative learning strategy in the teaching of woodwork technology in schools in Nigeria for an enhanced academic achievement.
2. Senior secondary school students should be given the opportunity to actively participate in classroom activities and freely interact with their teachers and their peers so as to engender social creativity in them and enhance their academic prowess in woodwork technology.
3. Government through the Ministry of Education in Lagos State should support teachers by organizing workshops and seminars for them on cooperative learning strategy and its variants and other teaching methods that could improve students' academic achievement in school subjects like woodwork technology.

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Authors

Oladiran S. OLABIYI, University of Lagos, Akoka (Nigeria). E-mail: solabiyi@unilag.edu.ng

Adeneye O. A. AWOHALA, University of Lagos, Akoka (Nigeria). E-mail: aawofala@unilag.edu.ng

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