# Effect of Collaborative Learning on Students' Academic Achievement in Graphics in Emmanuel Alayande University of Education, Oyo

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**Abstract**

*Graphics as a means of communication is very important for every students' to understand its nitty gritty in other to excel in engineering and technology-related courses. This caught the attention of the researchers to examine the effect of collaborative learning on students' academic achievement in Graphics in Emmanuel Alayande College of Education, Oyo. Two objectives and research questions guided the study. The population of the study comprised 22, 2021/2022 academic session, 200level students of Department of Technical Education, Emmanuel Alayande College of Education, Oyo. No sampling was made because of manageable size of the population. The study adopted quasi-experimental design. The instrument used for data collection was a 10-item Graphics Achievement Test (GAT). It was face and content validated by three research experts.0.86 reliability co-efficient was obtained through Kuder- Richardson formula. Data was collected by the researchers and analyzed using mean with the aid of Statistical Package for Social Science (SPSS 2.0). Findings revealed that with collaborative learning approach, students' achievement in Graphics was far better than when taught with the usual demonstrational method. Also, the approach had more effect on male students' academic achievement scores in Graphics than on female students. However, it was recommended that Technical educators should employ collaborative learning approach to teach Graphics or any other related topics to the students.And, Technical educators should encourage social interaction particularly among the males and female students during teaching learning process as it increases their academic achievement and eliminate gender disparity in complex-related task.*

**Keywords:** Academic achievement, collaborative learning, graphics and technical education

## Introduction

Right from the inception there is no uniqueness in the world of language and togetherness but it seems Graphics has only been the universal accepted communication symbol. Graphics has variously been used in the construction, engineering and technology-related areas to convey a message. Graphics often referred to as technical drawing it involves creativity, which is expressed visually. It starts in the mind and the initial outlet is usually in visual representation. In another word, what is conceived in the mind is made to form clear picture, which is then put on paper in the form of sketches or drawing to ascertain the workability or functionality of the initial concept. Graphics can be defined as visual representation of a real thing, an idea or a proposed design for construction (Oviawe, 2016).It is also seen as the universal language, which is used by engineers, architects, building technologists, and other professionals to communicate their thoughts, ideas and feelings about objects, which are of interest to them as compared to verbal or written

description, this method is brief and clearer (Reddy, 2008).

Graphics can be referred to as a course of study and its objectives as stated by (NERDC, 2007) includes; i. providing an understanding of the theoretical and applied concepts relating to the use of information and communication technology to facilitate visual communication of ideas in the construction and production industries; ii. Providing an introduction to modern drawing studio practice; iii. lay the foundation for technological development and further studies in construction and engineering; and iv. stimulating, developing and enhancing entrepreneurship skills in the diverse areas of drawing studio practice. According to Eze in Diraso (2013), Graphics forms one of the core engineering courses which means that for a student to excel in engineering and technology education he or she needs to understand the nitty gritty in Graphicswhich will outrightly determine its academic achievement. Achievement means to accomplish or attain a level successfully by making some efforts. Achievement as defined by Adeagbo (2020) as the level of knowledge, skills or accomplishment in an area of endeavour especially by making an effort for a period of time. Students' achievement in Graphics therefore connotes the level of knowledge or skills attained in Graphics which is ascertained through the scores on achievement tests. It can further be explained in term of high or low tomean the level of knowledge attained or acquired by students in Graphics.However, it is unfortunate that students' achievement in Graphics in Nigeria University of Education is nothing to talk about this view is supported with the assertion of (Reddy, 2008) who observed thattechnology students often run away from Graphics class thereby making the learning difficult which will later have effect on their academic achievement.

Many authors have tried to give reasons for the continued poor students' achievement in Graphics over the years. Medupin, Abubakre, Adebayo, Enock and Sulayman (2015) and Omeje (2002) argued out that students' poor achievement in Graphics is as a result of inadequate background knowledge in their primary/secondary education. They further stated that learning environment and students attitude constitute to this problem. Also, this is not limited to the teacher factors such as method often employed in the teaching learning process. The authors further argued that teaching method are mostly teacher centered and as a result students adopt rote learning, making this approach ineffective in learning difficult manipulative tasks. It is imperative for the teacher to give proper attention in choice of appropriate approaches for the inculcation of facts and concepts in students to facilitate a better understanding of the subject matter (Okwelle & Owo, 2018). There are many approaches that a teacher may use in lesson delivery. According to Adeagbo (2020), these approaches are lecture, demonstration, socratic, assignment, discussion to mention few. These approaches used in the teaching of Graphics in order to bring about a meaningful learning are teacher centered approaches, as the teacher does more of the talking and activities involved in the teaching and learning processes. According to Ogbonna in Oviawe (2016)posited that curricular activity in the lecture approach relies heavily on textbooks and workbooks. Students are viewed as "blank slates" unto which information is entrenched by the teacher. In this setting, the teacher seeks the correct answer to validate students' learning rather than assessing processes involved in the learning activities. This approach had failed to recognize the unique features of the inquiry-based nature of vocational subjects and the learners' individuality, thus failed to encourage creative thinking in the learners leading to poor achievement in the course.This ugly scenario makes it important to examine

student centered method such as collaborative learning approach.

Collaborative learning approach hangs around the word of Helen Keller who says "Alone we can do so little, together we can do so much." According to Bassett, McWhirter and Kitzmiller in Bhowmik (2016) defined collaborative learning a teaching strategy that allow small groups of students to work jointly by sharing knowledge among each other to enhance their own knowledge on a subject matter such as Graphics. In addition, Achufusi-Aka and Okpanachi (2021) explained collaborative learning as a strategy that facilitates group related learning where social skills are cultivated among teachers and students in course of teaching and learning in the classroom.It can therefore be deduced that collaborative learning is a co-teaching instructional method that gives rooms for students' engagement and interaction. The benefit of collaborative learning has been revealed in different researches; Okwelle and Owo (2018) and Oviawe (2016) posited that collaborative learning has a positive effect on student characteristics, group composition and task characteristics of a student's not limited to an average student. Contreras-Leon and Chapeton-Castro (2016) outlined some of the enormous benefit of collaborative learning to include; ability to enhance critical thinking of the students and creating positive social interaction with a number of students with similar needs. Brennen, 2017 & Jacobs (2016) added that collaborative learning provide 'grit' through support of teammates. Also, increase academic and social abilities (Turner, Christensen, Kackar-Cam, Trucano, & Fulmer, 2014; Sears &Reagin, 2013; Trespalacios, Chamberlin & Gallagher, 2011 & Roseth, Johnson & Johnson, 2008). Hence, this method helps students to be more confident, increasing their interest and ability most especially in a difficult task regardless of their gender.

Gender is seen as a learned socially constructed conditions ascribed to males and females (Okeke, 2008). Expectations from males and females are dependent on their cultural milieus. Gender in relation to achievement has been an issue of concern to researchers in education (Achufusi-Aka & Okpanachi, 2021; Backer, Miller & Timmer, 2018 & Al-kaabi, 2016). There are divergent opinions on which either male or female achieves better than the other. Iji, Ochu, Adikwu and Atamonokhai (2017) reported that collaborative instructional strategy increased the achievement scores of both male and female students but favored female students' more in the classroom. On a contrary note, Busola (2011) reported that male students achieved higher than their female counterparts with collaborative instructional strategy. Against this backdrop, the researchers sought to examine effect of collaborative learning on technical education students' academic achievement in Emmanuel Alayande college of education, Oyo

**Statement of the Problem**

Going on with the current decline in students'achievement rate in technology-related courses most particularly, Graphics has geared up a great concern among technical educators and administrators. Often, teaching has been teacher centered and students being passive in the classroom, well, can this be the cause? The need for exploring the use of some innovative individualized teaching method such as collaborative learning which will shift learning from the teacher to the students, through active participation of students becomes very needful. However, based on the literature reviewed it was evident that there is paucity of research evidence on the effect of collaborative learning on technical education courses such as Graphics inNigeria Colleges of Education. Taking into cognizance the numerous benefits of cooperative learning method, the researchers believe that its

application in technology-related courses needed to be highlighted. Therefore, it was in an attempt to bridge the knowledge gap on the effects of cooperative learning on technology-basedcourses such as Graphics at higher education level that gave credence to this study.

**Purpose of the Study**

The general purpose of this study was to examine the effect of collaborative learning on students' academic achievement in Graphics in Emmanuel Alayande College of Education, Oyo. Specifically, the study sought to determine;

1. difference in the mean achievement score of students taught Graphics with collaborative learning and those taught with demonstrational method.
2. influence of gender on mean academic achievement scoreof students taught Graphics with collaborative learning and those taught with demonstrational method.

**Research Questions**

The following research questions guided the study.

1. What is the difference in the mean achievement score of students taught Graphics with collaborative learning and those taught with demonstrational method?
2. What is the influence of gender on mean academic achievement score of students taught Graphics with collaborative learning and those taught with demonstrational method?

**Methodology**

The study adopted quasi-experimental pre-test post-test control group design which compared a control group using demonstrationalmethod with an experimental group using collaborative learning. The population of the study comprised 22, 2021/2022 academic session, 200level students of Department of Technical Education, Emmanuel Alayande College of Education, Oyo. This was selected because their curriculum contains the course content (Graphics). The entire population was used as study sample because the number is small and manageable. The sample was distributed equally into the control and experimental groups of 11 students each respectively. The instrument used for data collection was a 10-item Graphics Achievement Test (GAT) prepared by the researchers based on the 200-levelcourse content. Two experts from the Department of Technical Education, Emmanuel Alayande College of Education, Oyo and one in Department of Measurement and Evaluation in Tai Solarin University of Education, Ijagun, Ijebu-Ode face and content validated the instrument. The instrument was pilot tested on 10 200level students from Department of Technical Education from The college of Education, Lanlate and its reliability was ascertained at correlation coefficient of 0.86 using Kuder- Richardson formula.

In carrying out the experiment, the researchers taught both the control and experimental groups. In order to determine the pre-existing differences in overall ability of both groups, the groups were pretested and their mean scores obtained. Then, the experimental group received treatment in the form of collaborative learning leading to the administration of a post test on the group after which the mean score was recorded. However, the students in cooperative learning group completed learning activities in small groups while the students in the control group did not receive any treatment rather, they were taught through the demonstrational method and thereafter, post-tested and the mean score noted. The entire exercise lasted for a period of four weeks. The data obtained were statistically analyzed using mean with the aid of Statistical Package for Social Science (SPSS 2.0).

**Results and Data Presentation**

**Research question 1**

What is the difference in the mean academicachievement score of students taughtGraphics with collaborative learning and those taught with demonstrational method?

Data for answering research question 1 are presented in Table 1

**Table 1: Difference in the mean academic achievement score of students taught Graphics**

| Groups | Pre-test (N) | Post-test (N) | Pre-test mean (M1) | Post-test mean (M2) | Mean Diff. |
|---|---|---|---|---|---|
| Difference | | | | | |
| Experimental | 11 | 11 | 3.67 | 8.21 | 4.54 |
| Control | 11 | 11 | 3.32 | 6.42 | 3.10 |

Table 1 revealed that the pre-test mean score of the experimental group which used collaborative learning strategy was 3.67 while that of the control group which used conventional method was 3.32. Again, the post-test mean scores for both the experimental and the control groups were recorded as 8.21 and 6.42 respectively. Again, the mean gain on the basis of the differences between the pre-test scores and post-test scores of each group indicated 4.54 for the experimental group and 3.10 for the control group. This shows that the achievement of students in Graphics was better when taught with collaborative learning.

**Research question 2**

What is the influence of gender on mean academic achievement score of students taught Graphics with collaborative learning and those taught with demonstrational method?

Data for answering research question 2 are presented in Table 2

**Table 2: Gender influence on mean academic achievement score of students taught Graphics**

| Gender | Pre-test (N) | Post-test (N) | Pre-test mean | Post-test mean | Mean Gain |
|---|---|---|---|---|---|
| Male | 18 | 18 | 4.17 | 7.24 | 3.07 |
| Female | 4 | 4 | 3.83 | 6.49 | 2.66 |

Results in Table 2 show the influence of gender on students' academic achievement in Graphics. Result show that the male group taught Graphics had a pretest mean score of 4.17 and a posttest mean score of 7.24. The Female group taught Graphics had a pretest mean score of 3.83 and a posttest mean score of 6.49. The difference between the pretest and posttest mean for male and female group was 3.07 and 2.66 respectively. However, for both male and female groups, the posttest mean scores were greater than the pretest mean score with the male group having the higher mean gain and the higher mean in the posttest.

**Discussion of Findings**

Findings from research question one revealed that with collaborative learning approach, students'achievement in Graphics was far better than when taught with the usual demonstrational method. This finding agrees

with Achufusi-Aka and Okpanachi (2021), Okwelle and Owo (2018) and Al-kaabi (2016) who reported that collaborative learning approach enables students to be active during learning process and increase their class participation since the teaching and learning is done together compare to the demonstrational method where the teaching is done by the teacher and student s being passive.

In addition, the study disclosed that collaborative learning approach had more effect on male students' academic achievement scores in Graphics than on female students. The finding contradicts the findings of Achufusi-Aka and Okpanachi (2021) and Iji, Ochu, Adikwu and Atamonokhai (2017) who posited that collaborative learning approach increased the achievement scores of both male and female students but favored female students' more in the classroom. The finding of this study tallies with the findings of Busola (2011) with the adoption of collaborative learning approach, male students performs better than their female counterparts in science and engineering related courses which include Graphics.

## Conclusion

Based on the findings of the study, it is evident that collaborative learning approach is more effective in enhancingstudents' academic achievement in Graphics since teaching and learning is done together which makes each of the students to be active and make a positive contributions and participation to learning. To this end, the study concluded that with the numerous benefitsembedded in collaborative learning approach it is believe that its application to Graphics will increase students'achievement compare to the demonstrationalmethod.

## Recommendations

Based on the findings of the study, the following recommendations were proffered;

i. Technical educators should employ collaborative learning approach to teach Graphics or any other related topics to the students.
ii. Technical educators should encourage social interaction particularly among the males and female students during teaching learning process as it increase their academic achievement and eliminate gender disparity in complex-related task.

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