

EFFICACY OF TWO MODES OF PEER LEARNING STRATEGIES ON SECONDARY SCHOOL STUDENTS' ENGAGEMENT IN GRAPHICAL ECONOMICS CONTENT: IMPLICATION FOR CURRICULUM SPECIALIST AND EDUCATIONAL ADMINISTRATION AND PLANNING

EFICÁCIA DE DUAS ESTRATÉGIAS DE APRENDIZAGEM ENTRE PARES NO ENVOLVIMENTO DE ALUNOS DO ENSINO MÉDIO EM CONTEÚDOS DE ECONOMIA GRÁFICA: IMPLICAÇÕES PARA ESPECIALISTAS EM CURRÍCULO E PARA A ADMINISTRAÇÃO E PLANEJAMENTO EDUCACIONAL

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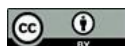
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Abstract

This study investigated the effect of two modes of peer learning strategies (Peer-to-Peer and Peer-Led Team Learning) on students' engagement in graphical analysis-related contents of Economics. The study adopted a quasi-experimental design involving pre-test and post-test non-equivalent groups. The population comprised all the 2,130 senior secondary school II students offering Economics, while the sample size of 167 SS II students was drawn using multistage sampling procedure. Data were

Resumo

Este estudo investigou o efeito de dois tipos de estratégias de aprendizagem entre pares (aprendizagem entre pares e aprendizagem em equipe liderada por pares) no envolvimento dos alunos em conteúdos relacionados à análise gráfica da disciplina de Economia. O estudo adotou um desenho quase-experimental envolvendo grupos não equivalentes com pré-teste e pós-teste. A população foi composta por todos os 2.130 alunos do segundo ano do ensino médio que cursavam Economia, enquanto a



collected using a validated engagement response questionnaire and analysed using mean and standard deviation to answer research questions, while analysis of covariance (ANCOVA) was used to test hypotheses at 0.05 level of significance. The findings of the study revealed that students taught using the Peer-to-Peer strategy had higher mean engagement scores than those taught using Peer-Led Team Learning. The study also found that male students had higher engagement scores than female students in graphical analysis-related contents of Economics. However, there was no significant interaction effect of instructional strategy and gender on students' engagement, indicating that both male and female students benefited similarly from the peer learning strategies. Based on the findings, it was concluded that peer learning strategies, particularly Peer-to-Peer, are effective in enhancing students' engagement in Economics graphical analysis. The study recommended that Economics teachers should adopt student-centered and collaborative instructional strategies to improve engagement and learning outcomes among students.

Keywords: Peer-to-Peer (P2P). Peer-Led Team Learning (PLTL). Students' Engagement. Graphical Analysis. Economics. Gender. Secondary School Students.

amostra de 167 alunos do segundo ano do ensino médio foi selecionada por meio de um procedimento de amostragem em múltiplas etapas. Os dados foram coletados por meio de um questionário validado de resposta de envolvimento e analisados utilizando média e desvio padrão para responder às questões de pesquisa, enquanto a análise de covariância (ANCOVA) foi utilizada para testar hipóteses com um nível de significância de 0,05. Os resultados do estudo revelaram que os alunos ensinados com a estratégia Peer-to-Peer apresentaram pontuações médias de engajamento mais altas do que aqueles ensinados com a Aprendizagem em Equipe Liderada por Pares. O estudo também constatou que os alunos do sexo masculino apresentaram pontuações de engajamento mais altas do que as alunas do sexo feminino em conteúdos de Economia relacionados à análise gráfica. No entanto, não houve efeito de interação significativo entre a estratégia de ensino e o gênero no engajamento dos alunos, indicando que tanto os alunos do sexo masculino quanto os do sexo feminino se beneficiaram de forma semelhante das estratégias de aprendizagem entre pares. Com base nos resultados, concluiu-se que as estratégias de aprendizagem entre pares, particularmente a Peer-to-Peer, são eficazes para aumentar o engajamento dos alunos na análise gráfica de Economia. O estudo recomendou que os professores de Economia adotem estratégias de ensino centradas no aluno e colaborativas para melhorar o engajamento e os resultados de aprendizagem entre os alunos.

Palavras-chave: Peer-to-Peer (P2P). Aprendizagem em Equipe Liderada por Pares (PLTL). Engajamento dos Alunos. Análise Gráfica. Economia. Gênero. Alunos do Ensino Médio.

1 INTRODUCTION

The understanding of people, businesses, markets and governments and better response to the threats and opportunities that emerge when things change demands the study of Economics. The world would be a better place if Economics was better understood (Stone, in Jana, 2018). Hence, an understanding of Economics is a strong tool

for economic growth. Economics is a subject that studies how societies, governments, businesses, households, and individuals allocate scarce resources and interact with each other to produce and maintain livelihoods. The subject has two main features that are intellectually fascinating and challenging (Jana, 2018) first is the development of conceptual models of behaviours to predict responses to changes in policy and market conditions. Second, is the statistical analysis to investigate these changes, these analyses can be in a mathematical representation, charts and graphs. The concern of this study is the graphical analysis.

The learning of graphical analysis requires an in-depth illustration of basic concepts when it relates to an application to real-life experience through the study of Economics. Economics being a life subject uses graphs not only for readable presentation of data but also to show relationships and connections between variables. The importance of learning Economics and its analysis made it relevant for the societal and intellectual development of man. At the senior secondary school level in Nigeria, Economics was included in the curriculum as a result of its relevance to understanding of the economy. The curriculum content covers concepts and graphical illustrations for a better understanding of the subject matter. Such contents include; basic principles of economics, economic systems, business organizations, population, labour market, human capital development, the structure of Nigeria's economy, financial institutions, and public financing, among others (Nigerian Educational Research Development Council (NERDC) in Oleabhiele, 2018). The features of concepts of Economics make it difficult for the learner specifically the graphical aspect of learning (Inayati, Handaayani, Kustiandi, Haryono & Sapir, 2018). Eneogu (2017), found that tools of economic analysis, the elasticity of demand and supply, production, measures of central tendency, concepts of cost, long and short-run cost, market structure and equilibrium determination of the market price are contents students found difficult and they are graphically presented. Graphical analysis is a powerful tool used to interpret content in Economics. It could be used to explain complex equations or text effectively and efficiently in the graph (Chegg study, 2019). Furthermore, Orley and Randall (2021) opined that graphical analysis in Economics is a process that scientifically investigates economic phenomena using diagrams and graphs. However, complex mathematical concepts are easy to explain and understand through graphs. Graphical analysis is relevant for the illustration and

demonstration of trends, patterns, and relationships between sets of data (Davis, 2021). It is based on this view that students are recommended to participate in the active learning of graphical-related content in Economics. However, Mohammed and Jimoh (2022) found that mathematical and statistical contents of Economics (where graphical contents are impeded) are perceived as difficult by students and so students lose interest which results in disengagement from learning. The understanding of the graphical contents in Economics demands that students are engaged. Kourilsky and Wittrock (2020) emphasized the need for students' engagement in the strategies teachers use in the presentation of graph content to improve their knowledge of the subject.

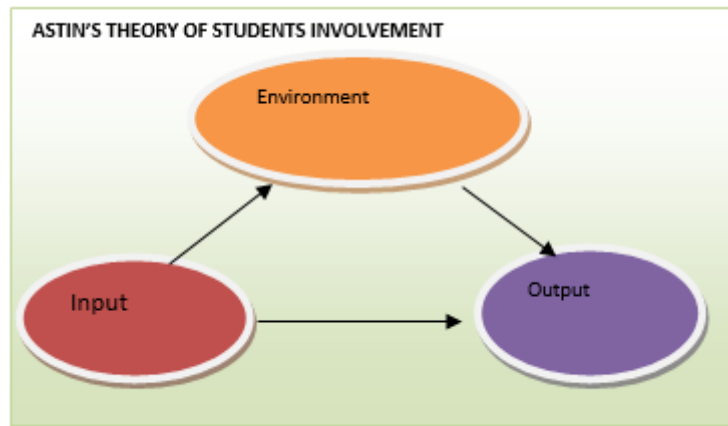
Student engagement involves the active participation of the learner in the teaching and learning process. Glossary of Education (2016), described students' engagement as the level of attention, curiosity, interest, optimism, and feeling students indicate during learning which may motivate them to learn and progress in their studies. Student engagement refers to meaningful engagement throughout the learning environment (Delfino, 2019). It is one of the important constructs that is used to understand the behaviour of the student towards the teaching-learning process especially in studies like this that requires peer engagement in learning graph. Operationally, student engagement is the extent to which students participate optimally in classroom activities. In an engaged learning environment, classrooms become communities where learning happens. This sense of community allows students to feel connected to their teachers and also engage in collaborative active learning.

In collaboration with the above statement, the present investigation is anchored on the Theory of Student Involvement (TSI) by Alexander Astin (1984) who observed that students' participation in learning requires some level of psychosocial and physical energy inserted into learning experiences. The theory postulates that involvement in learning is continuous and that the amount invested varies from student to student. Astin opined that for maximum growth and learning to occur, the student must be actively engaged in learning. The core concepts of the theory are composed of three elements. The first is the student's "inputs" such as their demographics, their background, and any previous experiences. The second is the student's "environment", which accounts for all of the experiences a student would have during college. Lastly, there are "outcomes"

which cover a student's characteristics, knowledge, attitudes, beliefs, and values that exist after a student has graduated college (Alminnourliza, Noordin & Nur, 2018).

Figure 1

ASTIN'S THEORY OF STUDENTS INVOLVEMENT



According to Astins' theory, the quality and quantity of a student's involvement (input) on campus (environment) have a direct impact on the amount of learning and personal development that the student experiences (Output). Hence, the interaction of students within the environment enhances learner engagement and outcomes. Studies have shown that students' engagement could be linked to an increase in behaviour, affective and cognitive engagement, academic satisfaction, agented skills and social skills, and reduced dropout (Martin, 2018; Truta, PARVL, & Topala, 2018; Manzuoli, Baez, & Sanchez, 2019). Eneogu, Ezegbe, Ugwuanyi, Ejimonye, Idika, and Obiorah (2019), found that students were more engaged in Team Accelerated Instruction when applied to the teaching of Quantitative Economics. Also, Dean and Jolly in Shewmaker, 2019, observed that students can actively be involved in classroom activity and be precisely disengaged due to the nature of learning opportunities. Reynolds (2022) identified factors that led to students' disengagement including learning difficulties, relationships with teachers, and lack of engagement in education. Morin (2021) stressed that personal attributes such as boredom, academic motivation, sense of belonging, and low esteem influence students' engagement in the classroom. Many research studies have shown a positive relationship between student engagement and academic performance

with higher engagement level associated with better grades (Kahn, Everington, Kelm, Reid, & Watkins, 2017; Delfino, 2019; Sukor, Ayub, Rashid, & Halim 2021; Ghita & Xiao, 2021). It was reported that there is poor performance in the graphical contents of Economics (Mohammed & Jimoh, 2022) which may be due to factors related to students' engagement. This has made students' engagement an educational priority. It is based on these backdrops and with the postulation of Astin's theory on the importance of involvement in learning that this study investigated two instructional strategies (Peer-To-Peer and Peer-Led Team Learning) that enhances engagement through interaction with the environment (peers) that may enhance performance in Economics (output).

Peer-to-Peer (P2P) learning is referred to as a peer learning strategy in which learners teach fellow learners. It involves face-to-face teaching and learning comprehensively with one another of the same peer, such that each student is actively involved in teaching and learning instruction. Smith (2021) explained that peer-to-peer learning involves students teaching and learning from each other by watching and observing their comprehension which increases as they put course concepts into their own words in collaborative and reciprocal learning with classmates. The steps in the P2P learning strategies process include:- the grouping of students (5-6), assigning of topics (subtopics) to students, brief time to review lessons, presentations of course concepts by individual students in each group (group works), self-evaluation among each other before the teacher gives a mini assessment and homework. Students assess themselves to know their strengths and weaknesses. Peer-to-peer learning encourages active collaboration. P2P learning occurs when students engage in collaborative learning and teaching from one another not the teacher (Drew, 2023). Drew noted that students see each other's perspectives which helps them progress, learn more depth topics, interact socially and engage in learning that breeds motivation. Research has shown that peer relationship is correlated with learning engagement (Gremmen, Van den Berg, Steglich, Veenstra, & Dijkstra, 2018; Sokmen, 2019). Hence, P2P is efficacious as shown in research (Idowo, 2023; Drew, 2023) but students who learn in Peers may lack the knowledge and professionalism an experienced adult can provide. Hence this study compared the efficacy of Peer-to-Peer (P2P) and Peer-Led Team learning (PLTL) to find out the one that improves students' engagement in graphical analysis-related content in Economics.

Peer-led-Team learning (PLTL) is an innovative peer learning strategy that involves one or more exceptional students in the subject to lead the instruction. Peer-Led-Team Learning is a peer-led workshop which is a remediation approach for students left behind in the class used in the sciences and mathematics (Lamina & Aranes, 2020). According to Varma-Nelson (2019), Peer-Led-Team learning is an instructional strategy that motivates students who have done perfectly well in a subject to guide the teaching process of a group. In the PLTL, the class is grouped in small sizes of six to ten depending on the number of students and peer leaders (instructors), each instructor must have gone through some level of training and be the best student in that subject. The PLTL starts with the selection and introduction of a Peer Leader (PL) by the teacher (the teacher recommends the best student in Economics based on a continuous assessment), a mini-workshop with the peer leaders on contents to teach and giving recommended instructional materials to use as a guide, presentation of course by PL; students are grouped based on the number of PL(s), teams work begins by interactive session (questioning and problem-solving), mini evaluation(self-assessment) and at the end of the lesson, home works are given. The goal of PLTL is that students interact freely and actively in discussions with their peers led by a Peer leader or instructor (who must have undergone some level of training with the teacher) and is a member of the peer. Peer-Led Team Learning is an active learning approach that has a strong base that students benefit from during participation (Tuzlukaya, Sahin, & Cigdemoghu, 2022). Lewis, Rockaway and Will (2018) found that PLTL caused a reduction in instructor-led class time and a tendency of being chaotic based on grouping. In the PLTL strategy students are motivated to learn more and this increases student engagement, motivation and performance in English (Varma-Nelso, 2019). Lamina (2020) found out that PLTL had positive effects on the learning achievement in Chemistry and the engagement of students. These findings may differ by gender, hence, gender was considered in this study as a moderating variable.

Gender refers to the characteristics of women, men, girls and boys that are socially constructed. This includes norms, behaviours and roles associated with being a woman, man, girl or boy, as well as relationships with each other. As a social construct, gender varies from society to society and can change over time (World Health Organisation, 2023). In a classroom setting students of different gender are engaged in the learning process, which makes it relevant for this study to consider gender. Studies on gender have

shown that gender has a remarkable influence on student engagement (Eneogu (2017); Durken, Way, Bobis, Anderson, Skilling, Martin, et al, 2017). Hartono, Umamah, and Puji (2019) identified that there is a significant difference in students' engagement level based on gender. Thus, this study compared the effectiveness of P2P learning and PLTL on students' engagement in graphical analysis content in Economics in a senior secondary school in Nsukka Local Government Area of Enugu State.

Economics as important as it is, is perceived difficult by students and research revealed poor performance in quantitative and statistical related contents which harbors the graphical analysis. This perceived difficulty of Economics may affect the interest of students which may lead them to be disengaged in the learning of the contents. This has been attributed to factors including strategies teachers use in delivering Economics instruction which does not encourage participatory learning. Hence, this investigation on the efficacy of P2P and PLTL on students' engagement in graphical Economics content is timely as both strategies though different may encourage students' participation which may result in to increase in learning engagement in learning graphical Economics content.

2 PURPOSE OF THE STUDY

The study investigated the efficacy of two modes of peer learning strategies on secondary school students' engagement in graphical economics content in Nsukka local government area of Enugu state, Nigeria. Specifically, the study determined the;

1. effect of Peer-to-Peer and Peer-Led Team Learning Strategies on students' engagement in graphical related contents of secondary school Economics;
2. influence of gender on students' engagement mean scores on graphical related contents of senior secondary school Economics;
3. interaction effect of two modes of peer learning strategies and gender on students' mean engagement response scores in secondary school Economics.

3 RESEARCH QUESTIONS

This research aimed to address the following research questions;

1. What are the mean engagement response scores of students taught graphical analysis-related contents of secondary school Economics using Peer-to-Peer and Peer-Led Team Learning strategies?
2. What are the mean engagement responses scores of male and female students taught graphical analysis-related contents of secondary school Economics?
3. What is the interaction effect of Peer learning strategies and gender on students' engagement response scores in secondary Economics?

4 MATERIALS AND METHODS

The study adopted a Quasi-experimental design, specifically a non-equivalent control group design. The study was carried out in Nsukka Local Government Area of Enugu state, Nigeria. This study was carried out in 32 public secondary schools in Nsukka Local Government Area of Enugu State. The population of this study was 2,130 Senior Secondary Students II from which a sample size of 167 SSII students (69 males and 98 females) in the 2019/2020 academic session was drawn. The study used a multi-stage sampling technique to draw participants (students). At the first stage, a purposive sampling technique was used to select 19 co-education schools from the thirty-two public secondary schools in Nsukka Local Government Area, which was done due to the gender variable used in this study. At the second stage, a simple random sampling technique was used to draw four schools from the 19 co-educational public schools. At the third stage, a simple random sampling was used to draw one intact class from each of the four schools giving a total of four intact classes for the experiments. Two intact classes received P2P and the other two intact classes received PLTL treatments.

The instrument for data collection was Students' Self-Report on Engagement Questionnaire (SSREQ). The items of SSREQ were adapted from two different instruments by Eneogu, (2017) (Students' Self Report on Engagement, SSRE) and Appleton, Christenson, Kin, and Reschly, (2006) (Student Engagement Instrument SEI) (see appendix I for the adaptation of the items of SSREQ from SSRE and SEI). SSREQ is a five-point scale modified Likert-type scale that measures students' level of engagement. These adapted items from the instruments were modified and structured to suit the contents of this study based on P2P and PLTL activity engagement in graphical

Economics. The instrument SSREQ comprise two sections, the first section sought demography data of the student which include the name of the school, gender, and class number. The class number given to the student by the research assistants was used to cross-match the pre-test and post-test. The second section is on students' experiences during Economics class. This section of the instrument contains 30 items which were structured on a Modified Likert-type scale Strongly Agree (SA) = 4 points, Agree (A) = 3 points, Disagree (D) = 2 points, Strongly Disagree (SD) = 1 point, Uncertain (U) = 0. The instrument for data collection was subjected to both face validation which was done by three experts. The corrections given were reflected in the final production of the instrument. The internal consistency of the instrument was administered to 30 students using Cronbach Alpha obtaining a reliability index of 0.79. The experiments lasted for six weeks, and Students were allowed to express their experiences by responding to the questionnaire self -Report (SSREQ) before and after the experiment. The study used Mean and standard deviation to answer research questions and Analysis of Covariance (ANCOVA) to test the hypotheses at $p < 0.05$ level of significance. The use of ANCOVA in quasi-experimental research of non-equivalence groups is to adjust the differences observed by the research subjects.

4.1 Experimental procedures

The following procedures were undertaken in carrying out the quasi-experiment. First, the researchers trained the four regular Economics teachers who were the research assistances of the sample schools on how to use P2P and PLTL. The training of the teachers were based on schools 1 and 2 which handle the P2P Learning strategy and Schools 3 and 4 handled PLTL for two days each. The lesson plans were given to the teachers to assist in the implementation. In the P2P learning strategy, the following procedures were adopted which were used in teaching each topic mentioned:-Step 1: Introduction of Previous Knowledge. The teacher introduces previous knowledge and test of entry behaviour on the student to usher the topic of the day; Step 2: The teacher introduces P2P learning to the student; Step 3: Grouping students in 5-6 per group and assigned topics each that was presented; Step 4: Students Presentation: The students in each group start presenting in their various groups one after the other in turns. They were

given 5 minutes each for presentations; Step 5: At the end of students' presentations, the teacher selects one group to present to the entire class. That selected group presented within 10 minutes; Step 6: Evaluation: the teacher asked students questions; Step 7: Motivation and praise of student for work well done.

In the PLTL learning strategy, the following procedures were adopted and used in teaching each topic mentioned above:-Step 1: Introduction of previous knowledge. The teacher introduces previous knowledge and entry behaviour test to present the lesson; Step 2: The teacher introduces the PLTL to the students and presents peer leaders to the class. The teacher carefully explains to the students the processes of PLTL strategies and what they are expected to do at each stage; Step 3: Grouping of students. The teacher groups students into some peer leaders and assigns them to each group. These groups are taught by their peer leaders; Step 4: Presentation of a topic by the Peer Leaders. The peer leaders present the topic of the day to their various groups. They discuss and interact extensively on the topic of the day; Step 5: Evaluation. Students are given a test that was administered in form of a quiz; Step 6: Marking and collection of scores by students; Step 7: Recognize and praise the best student in the groups.

5 RESULTS

Research Question One: What are the mean engagement response scores of students taught Graphical Analysis related contents of secondary school Economics using P2P and PLTL strategies?

Table 1

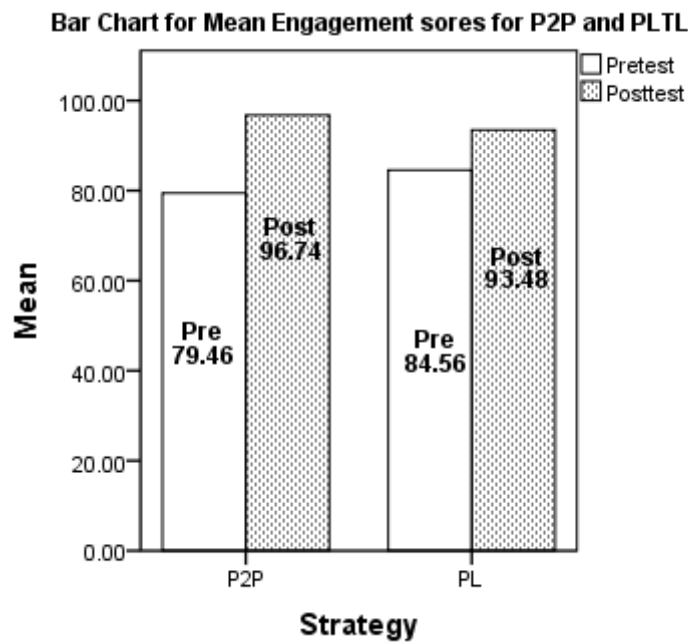
Mean and Standard Deviation of the Mean Engagement Response Scores of Student taught Graphical Analysis Related Contents of Secondary School Economics using P2P and PLTL

Group	Pre-test			Post-test		Mean Diff.
	N	Mean	SD	Mean	SD	
P2P	105	79.46	14.30	96.74	9.61	17.28
PLTL	62	84.56	12.74	93.48	12.26	8.92

Result in Table 1 shows that the students who were taught graphical analysis-related contents of Economics using P2P had a pretest mean engagement response score of 79.46, and a post-test mean engagement score of 96.74, while those who were taught using PLTL had a pretest mean engagement responses scores of 84.56 and post-test mean engagement response scores of 93.48. The mean gain response score of 17.28 and 8.92 for the respective groups was recorded. These show that students in the P2P group had high mean engagement response scores than their counterparts in the PLTL group. The P2P group had a standard deviation score of 14.30 for the pretest and 9.61 for the posttest indicating that the scores were widely spread. PLTL had a standard deviation of 12.74 for the pretest and 12.26 for the posttest indicating the scores were not widely spread. This is illustrated in the bar chart below.

Figure 2

Bar Chart for Mean Engagement scores for P2P and PLTL



It can be observed from the bar chart that the pretest bar for P2P is lower than that of PLTL while the posttest bar for P2P is higher than the bar for PLTL. This indicates that P2P group had higher engagement than PLTL group.

H0₁: There is no significant difference in the mean engagement response scores of students taught graphical analysis related contents of Economics using P2P and PLTL

Table 2

Analysis of Covariance of the effect of P2P and PLTL on students' mean engagement response scores in graphical related contents of secondary school Economics

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Remark
Corrected Model	3916.259 ^a	2	1958.130	21.020	.000	
Intercept	20587.702	1	20587.702	221.006	.000	
Pretest	3502.231	1	3502.231	37.596	.000	
Strategy	932.770	1	932.770	10.013	.002	Sig
Error	15277.310	164	93.154			
Total	1543326.000	167				
Corrected Total	19193.569	166				

Sig-Significant (p<0.05)

Result in Table 2 shows that the probability associated with the calculated value of F (5.691) for the effect of P2P and PLTL on students' mean engagement response score in graphical analysis-related content of Economics is 0.018. Since the probability value 0.018 is less than 0.05 level of significance (P<0.05) at which the hypothesis is tested, the null hypothesis is rejected. Therefore, there is a significant difference in the mean engagement response scores of students taught graphical analysis-related contents of economics using P2P and PLTL.

Research Question Two: What are the mean engagement response scores of male and female students in graphical analysis-related content in Economics?

Table 3

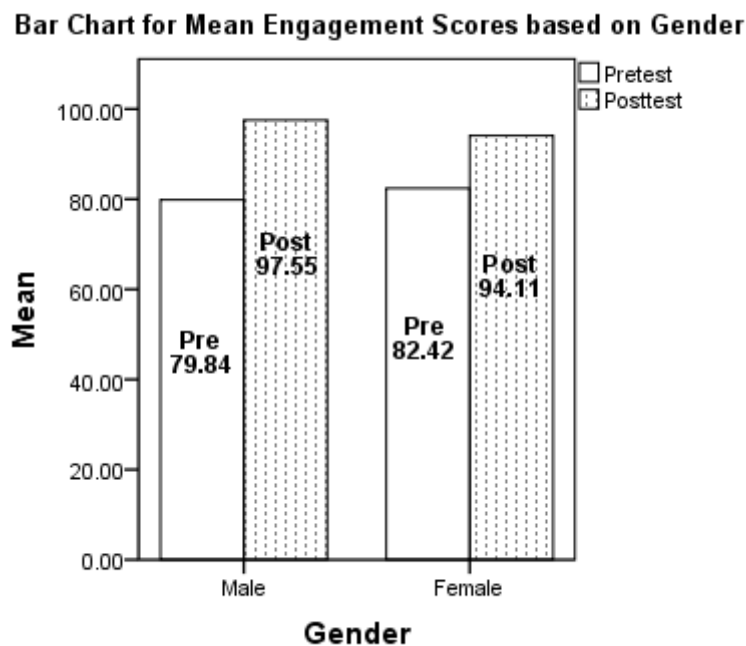
Mean and Standard Deviation of the Mean Engagement Response Scores of Male and Female Students in Graphical and Analysis Related Contents of Secondary School Economics

Gender	N	Pretest Mean	SD	Post-test Mean	SD	Mean Diff.
Male	69	79.84	13.85	97.55	9.61	17.71
Female	98	82.42	13.95	94.11	11.32	11.69

Result in Table 3 reveals the mean engagement response scores of male and female students in graphical-related content in Economics before and after the experiment. Male students had a pre-test mean engagement response score of 79.84 and a post-test mean engagement score of 97.55 while their female counterparts had a pretest of 82.42 and a post-test of 94.11. The mean gain responses of 17.71 and 11.69 for male and female students respectively, indicate that male students had higher mean engagement response than their female counterparts as a result of treatment. The table further shows the high standard deviation of 13.85 before treatment and 9.61 after treatment indicating that the scores are widely spread. Female students had a standard deviation of 13.95 pre-test, and 11.69 post-test implying that the scores were not widely spread. This is illustrated in the bar chart below.

Figure 3

Bar Chart for Mean Engagement Scores based on Gender



From the bar chart, it can be observed that the pretest bar for male students is lower than that of their female counterparts. The posttest bar for males is higher than the posttest bar for females. This indicates that male students had higher engagement than female students.

H0₂: There is no significant difference in the mean engagement response scores of male and female students in graphical analysis related contents of Economics.

Table 4

Analysis of Covariance of mean engagement response scores of male and female students in graphical analysis related contents of Economics

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Remark
Corrected Model	3711.754 ^a	2	1855.877	19.659	.000	
Intercept	23084.872	1	23084.872	244.540	.000	
Pretest	3233.022	1	3233.022	34.248	.000	
Gender	728.264	1	728.264	7.715	.006	Sig
Error	15481.815	164	94.401			
Total	1543326.000	167				
Corrected Total	19193.569	166				

Sig-Significant (p<0.05)

Result in Table 4 shows that the calculated value of F (7.715) for the influence of gender on students' mean engagement response scores in graphical-related contents of Economics is 0.006. Since the probability value of 0.00 is less than 0.05 level of significance (P<.05) at which the hypothesis is tested, the null hypothesis was rejected. Thus, there is a significant difference in the mean engagement response scores of male and female students in graphical analysis-related contents of Economics.

Research Question three: What is the interaction effect of two modes of peer learning strategies (P2P and PLTL) and gender on students' mean engagement responses scores in graphical analysis-related contents of secondary school Economics?

Table 5

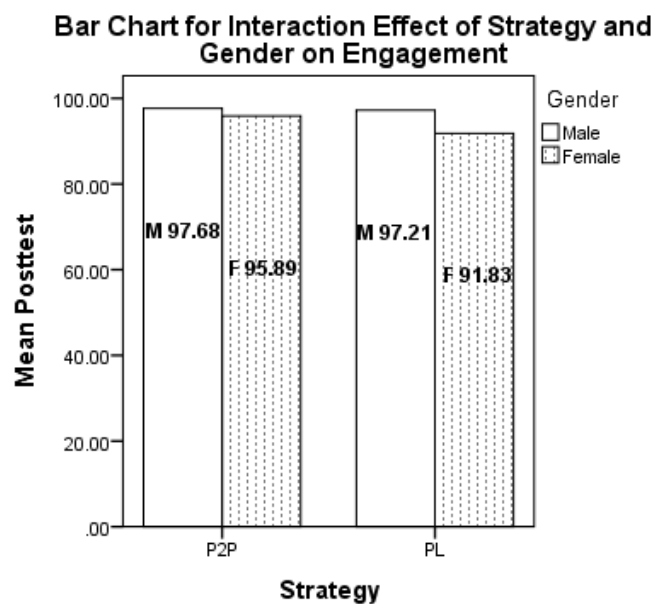
Mean and Standard Deviation of Students for the Interaction Effect of P2P, PLTL and Gender on Engagement Response score in Graphical Analysis Related Contents of Secondary School Economics

Groups	Gender	N	Pretest		Post-test	
			Mean	SD	Mean	SD
P2P	Male	50	78.66	13.85	97.68	8.78
	Female	55	80.18	14.79	95.89	10.31
PLTL	Male	19	82.95	13.73	97.21	11.79
	Female	43	85.28	12.37	91.83	12.24

Result in Table 5 shows that male students in the P2P group had a pretest mean engagement response score of 78.66 and post-test engagement score of 97.68 while the female students in the same group had a pretest mean engagement score of 80.18 and post-test engagement score of 95.89. Also, male students in the PLTL group had a pretest mean engagement score of 82.95 and post-test engagement score of 97.21 while their female counterparts had an engagement mean score pretest of 85.28 and a post-test engagement score of 91.83. This shows that male students had higher engagement scores than their female counterparts in the two groups. This implies that the increase in post-test scores is a result of treatments and not the combination of treatment and gender. Also, the table shows the pretest standard deviation for the P2P group at 13.83 and 14.79 for male and female students respectively, and post-test standard deviation of 8.78 and 10.31 for male and female students respectively implying that individual scores were dispersed away from the mean after treatment for females than for males. Also, for the PLTL group, males had a standard deviation of 13.73 in the pretest and 11.79 in the post-test indicating a wide part from the Mean. The female students had a standard deviation in the pretest of 12.37 and 12.24, indicating that the scores were not widely spread; this implies the closing up of the mean scores. This is illustrated with the bar chart below.

Figure 4

Bar Chart for Interaction Effect of Strategy and Gender on Engagement



The chart showed that male students had higher engagement in both groups – P2P and PLTL. This indicates no interaction effect as higher engagement is attributed to treatment and not combination of treatment - strategy and gender.

H0₃: There is no significant interaction effect of peer learning strategies and gender on students' mean engagement response scores in graphical analysis-related contents in Economics.

Table 6

Analysis of Covariance on interaction effect of peer learning strategies and gender on students' mean engagement response scores in graphical analysis related contents of Economics

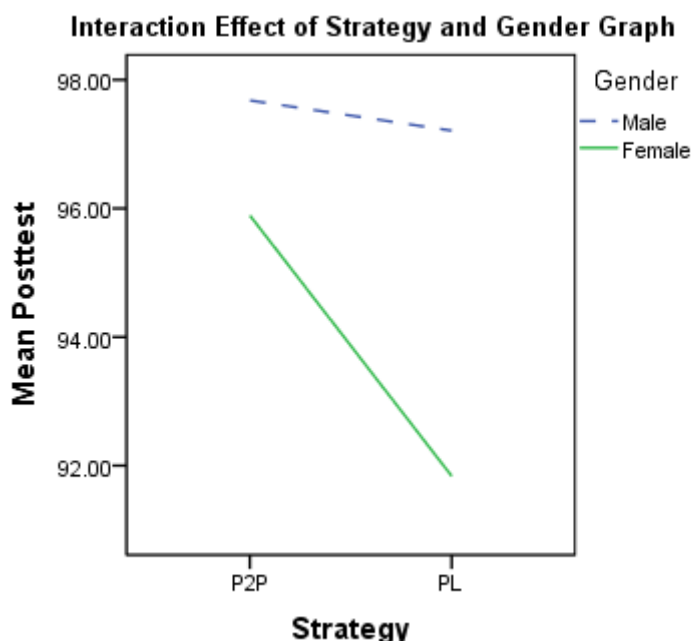
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Remark
Corrected Model	4556.426 ^a	4	1139.106	12.607	.000	
Intercept	20484.639	1	20484.639	226.719	.000	
Pretest	3678.101	1	3678.101	40.708	.000	
Strategy	514.218	1	514.218	5.691	.018	
Gender	629.082	1	629.082	6.963	.009	
Strategy*Gender	130.797	1	130.797	1.448	.231	NS
Error	14637.143	162	90.353			
Total	1543326.000	167				
Corrected Total	19193.569	166				

NS – Not Significant (p>0.05)

Result in Table 6 revealed that the calculated value of F(1.448) for the interaction effect of strategies and gender on students' mean engagement response scores in graphical analysis-related contents of Economics had an associated probability value of 0.231. Since the probability value of 0.231 is greater than 0.05 level of significance (P> 0.05) at which the hypothesis was tested, the null hypothesis was accepted. Hence, there is no significant interaction effect between the strategy and gender on students' mean engagement response scores in graphical analysis-related contents of Economics. This is illustrated in the graph below.

Figure 5

Interaction Effect of Strategy and Gender Graph



The graph clearly showed that there is no interaction between strategy and gender. This is indicated by the non-intercepting two parallel lines.

6 DISCUSSION OF FINDINGS

6.1 Effect of Peer-to-Peer and Peer-Led Team Learning Strategies on students' engagement in graphical related contents of secondary school Economics

The finding of this study revealed that students taught Economics using the Peer-to-Peer (P2P) instructional strategy obtained higher mean engagement scores than those taught the same graphical analysis-related contents using the Peer-Led Team Learning (PLTL) strategy. Further analysis revealed a significant difference in the mean engagement response scores of students taught graphical analysis-related contents of Economics using P2P and PLTL. This suggests that P2P was more effective in promoting active participation, attention, collaboration, and overall involvement of students during the teaching and learning process. The higher engagement observed among students

exposed to P2P may be attributed to the direct interaction and shared responsibility among learners, where students freely exchange ideas, explain concepts to one another, and participate more confidently without the pressure often associated with formal teacher-led settings. This supports the constructivist view of learning, which emphasizes that knowledge is better constructed when learners actively interact with their peers and environment (Vygotsky, 1978).

This finding is consistent with Vygotsky's social learning theory, which posits that learning occurs more effectively through social interaction and collaborative engagement (Vygotsky, 1978). It also aligns with the findings of Topping (2005), who reported that peer-assisted learning strategies significantly improve students' classroom participation, motivation, and engagement because learners tend to feel more comfortable discussing difficult concepts with classmates of similar academic status. Similarly, Johnson and Johnson (2009) noted that cooperative learning environments increase students' engagement by fostering positive interdependence, accountability, and active involvement in classroom tasks. In Economics, particularly in graphical analysis where concepts such as demand and supply curves, equilibrium, elasticity, and cost functions require interpretation and critical thinking, P2P enables students to simplify abstract concepts through peer explanation, thereby improving understanding and engagement.

Although Peer-Led Team Learning (PLTL) also encourages collaboration, its relatively lower engagement score may be due to its semi-structured format where a designated peer leader guides the group learning process. Some students may become passive observers rather than active contributors when leadership is concentrated in one student, thereby reducing equal participation. This observation agrees with Gosser and Roth (1998), who noted that while PLTL improves collaborative learning, the effectiveness often depends on the competence of the peer leader and the willingness of group members to participate actively. This may explain why P2P, which promotes more balanced interaction and mutual participation, produced better engagement outcomes than PLTL. The significant difference in mean engagement scores further confirms that the variation was not due to chance, but rather to the effectiveness of the instructional strategies employed.

Studies by Topping (2005), Johnson and Johnson (2009), Gosser and Roth (1998), and Slavin (2014) are in agreement with this finding. Topping (2005) found that peer-

assisted learning improves students' engagement, participation, and confidence because learners interact more freely with their peers. Johnson and Johnson (2009) also reported that cooperative learning strategies promote higher engagement through positive interdependence, accountability, and equal participation. Similarly, Gosser and Roth (1998) noted that although Peer-Led Team Learning (PLTL) supports collaborative learning, its effectiveness depends largely on the competence of the peer leader and active participation of group members. Slavin (2014) further emphasized that student-centered and peer-supported instructional strategies enhance classroom engagement and academic achievement more effectively than leader-centered approaches. These studies support the present finding that students taught Economics using Peer-to-Peer (P2P) demonstrated higher engagement than those taught using Peer-Led Team Learning (PLTL). The finding also aligns with those who found that peer learning has a positive relationship with learning and engagement (Gremmen, Van den Berg, Steglich, Veenstra, & Dijkstra, 2018; Sokmen, 2019). Also in agreement were the findings of Idowo (2023) and Drew (2023) whose study reported that P2P is efficacious in improving peer learning. Also, Bond, Buntins and Kernes, (2020) were of the view that students have a high level of engagement in classroom instruction with peers.

6.2 Influence of gender on students' engagement mean scores on graphical related contents of senior secondary school economics

The findings of the study revealed that male students had higher mean engagement scores than their female counterparts in graphical analysis-related contents of Economics. This indicates that male students were more actively involved in classroom activities, discussions, problem-solving tasks, and collaborative learning processes than female students during the teaching of graphical concepts in Economics. The significant difference in the mean engagement response scores further suggests that gender had a notable influence on students' level of engagement and that the difference observed was not due to chance. This may be attributed to differences in confidence levels, classroom participation patterns, and societal perceptions regarding quantitative and analytical subjects, where male students are often encouraged to be more assertive in subjects involving calculations, graphs, and critical analysis.

However, this does not imply that female students are less capable academically; rather, it may reflect differences in learning experiences, motivation, teacher expectations, and classroom climate. Female students may become less engaged when instructional methods do not sufficiently encourage inclusive participation or when stereotypes about performance in analytical subjects persist. This view is supported by Hyde (2014), who argued that gender differences in academic performance and engagement are often socially constructed rather than biologically determined. Therefore, the lower engagement among female students may be addressed through supportive teaching strategies, equal participation opportunities, and confidence-building classroom practices.

This finding is consistent with the work of Eccles (2009), who reported that gender differences in academic engagement often emerge in subjects perceived as analytical or mathematically demanding, with male students tending to show higher confidence and participation levels. Similarly, Meece, Glienke, and Burg (2006) found that male students often demonstrate greater classroom participation in quantitative subjects due to stronger self-concept and lower anxiety toward problem-solving tasks. In the context of Economics, especially graphical analysis involving demand and supply curves, elasticity, equilibrium, and cost analysis, students are required to interpret abstract relationships and apply logical reasoning, which may create anxiety among some female students if adequate support is not provided.

6.3 Interaction effect of two modes of peer learning strategies and gender on students' mean engagement response scores in secondary school economics

The findings of the study revealed that there was no significant interaction effect of the two modes of peer learning strategies (Peer-to-Peer (P2P) and Peer-Led Team Learning (PLTL)) and gender on students' mean engagement response in graphical analysis-related contents of Economics. This indicates that the effectiveness of the peer learning strategies on students' engagement did not depend on whether the students were male or female. In other words, both male and female students responded similarly to the instructional strategies, and gender did not significantly influence how students engaged

with graphical concepts when taught using either P2P or PLTL. This suggests that the benefits of peer learning strategies are generally applicable across gender groups.

This finding implies that while male students may have shown slightly higher engagement overall, the use of either P2P or PLTL did not favor one gender over the other in a statistically significant way. Both instructional strategies provided relatively equal opportunities for participation, collaboration, and concept understanding among male and female students. This supports the idea that well-structured peer learning environments can help reduce gender-based differences in classroom engagement by creating inclusive spaces where all learners can contribute actively regardless of gender.

The finding is consistent with the study of Johnson and Johnson (2009), who reported that cooperative learning strategies promote equal participation among students and minimize the influence of gender differences in classroom interaction and engagement. Similarly, Slavin (2014) found that student-centered instructional strategies such as peer learning improve engagement across diverse learner groups without significant gender bias. Their studies emphasized that collaborative learning structures create balanced academic environments where both male and female students benefit equally. Furthermore, this finding aligns with the work of Hyde (2014), who argued that many observed gender differences in academic participation are often influenced by classroom conditions rather than fixed biological factors. When inclusive teaching strategies such as peer learning are effectively implemented, gender disparities in engagement can be minimized. Therefore, the absence of a significant interaction effect in this study suggests that peer learning strategies are effective and gender-friendly approaches for teaching graphical analysis-related concepts in Economics.

7 CONCLUSION

The study concluded that peer learning strategies significantly influence students' engagement in graphical analysis-related contents of Economics. Students taught using the Peer-to-Peer (P2P) strategy demonstrated higher engagement than those taught using the Peer-Led Team Learning (PLTL) strategy, indicating that P2P is more effective in promoting active participation, collaboration, and involvement in learning. The study also found that male students had higher mean engagement scores than female students,

showing that gender plays a role in students' classroom engagement. However, there was no significant interaction effect between peer learning strategies and gender on students' engagement, implying that both male and female students benefited similarly from the use of P2P and PLTL. Based on these findings, it was concluded that peer learning strategies, particularly Peer-to-Peer (P2P), are effective instructional approaches for improving students' engagement in graphical analysis-related contents of Economics. Since the strategies were found to be beneficial across gender groups, teachers should adopt learner-centered and collaborative methods that encourage equal participation and active learning. This will help make the teaching of graphical concepts in Economics more meaningful, inclusive, and effective for all students.

8 RECOMMENDATIONS

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

1. Economics teachers should adopt Peer-to-Peer (P2P) instructional strategy more frequently in teaching graphical analysis-related contents because it was found to promote higher student engagement than Peer-Led Team Learning (PLTL).
2. Teachers should incorporate more learner-centered and collaborative teaching approaches in Economics classrooms to encourage active participation, discussion, and peer interaction, especially when teaching abstract graphical concepts such as demand and supply curves, equilibrium, and elasticity.
3. Female students should be given additional academic support, motivation, and confidence-building opportunities to improve their engagement in graphical analysis-related contents of Economics and reduce gender gaps in classroom participation.
4. Teachers should create inclusive classroom environments that provide equal opportunities for both male and female students to participate actively in peer learning activities without bias or stereotype.
5. School administrators should organize workshops, seminars, and professional development programmes for Economics teachers on the effective use of peer learning strategies such as P2P and PLTL in classroom instruction.

6. Curriculum planners and educational policymakers should encourage the integration of peer learning strategies into the teaching of Economics at the secondary school level to improve student engagement and academic outcomes.

8.1 Implication for curriculum specialists

Curriculum specialists should consider integrating peer learning strategies such as Peer-to-Peer (P2P) and Peer-Led Team Learning (PLTL) into the Economics curriculum, particularly for topics involving graphical analysis. The findings suggest that student-centered instructional approaches enhance learners' engagement; therefore, curriculum designers should ensure that learning activities promote active participation, collaboration, and peer interaction. Additionally, curriculum content should be structured in a way that allows flexibility for teachers to adopt interactive methods that cater to diverse learners, thereby improving comprehension and sustained interest in Economics.

8.2 Implication for educational administration and planning

Educational administrators and planners should support the effective implementation of peer learning strategies by providing adequate instructional resources, teacher training, and conducive classroom environments. Schools should organize regular professional development programmes to equip Economics teachers with the skills required to implement P2P and PLTL effectively. Furthermore, administrators should ensure appropriate class sizes and learning conditions that encourage group interaction and active engagement. Proper planning and policy support will enhance the successful adoption of these strategies, ultimately improving students' engagement and learning outcomes in Economics.

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AUTHORS' CONTRIBUTION

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Nji, Ifeyinwa Awele: Conceptualization of the study, development of research objectives, supervision of the research process, and final review of the manuscript.

Chinyelugo, Tochukwu C. and Anaenyeonu Ifeoma M: Design of methodology, instrument development, validation of research instruments, and coordination of data collection.

Ojielo Paschal Ikemefuna, Ibem Ukpai Ogele, and Ekwewwuo, Linus Eze: Data collection, organization of fieldwork activities, and administration of research instruments to respondents.

Nji, Ifeyinwa Awele, Anaenyeonu Ifeoma M and Ojielo Paschal Ikemefuna: Data analysis, interpretation of results, statistical computations, and preparation of findings and discussion sections.

Oliver Igwebuike Abbah, Nji, Ifeyinwa Awele and Ibem Ukpai Ogele: Literature review, drafting of the manuscript, editing, proofreading, formatting, and preparation of the final version for submission.

All authors read and approved the final manuscript.

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