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Effect of Think-pair Share Learning Strategy on Secondary School Students Achievement in Computer Studies: Implications for Global Development

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CONTENT

ABSTRACT

Background: This study examined the effect of the Think-Pair-Share (TPS) learning strategy on secondary school students' achievement in computer studies in Anambra State. The strategy was considered against the traditional lecture method to explore its potential in fostering meaningful learning. **Objective:** The study aimed to determine the effectiveness of TPS in enhancing students' achievement in computer studies and to establish whether gender differences exist in students' performance when taught using this approach. The study focused on Junior Secondary School Two (JSS2) students in Aguata and Awka education zones of Anambra State. **Methods:** The study used a quasi-experimental pre-test post-test non-equivalent group design with 393 JSS2 students. Data were collected using a validated CSAT (KR-20 = 0.70). Mean and standard deviation answered research questions, and ANCOVA tested hypotheses at the 0.05 level.. **Result:** Findings revealed that students taught computer studies with TPS achieved significantly higher results than those taught using the lecture method. In addition, male students taught with TPS performed better than their female counterparts. **Conclusions:** The study concluded that the TPS learning strategy effectively promotes meaningful learning in computer studies in secondary schools. **Contribution:** The study proves that TPS is a viable student-centred strategy capable of enhancing achievement in computer studies. It recommends that curriculum planners encourage teachers to adopt TPS more frequently and that educators shift from lecture-dominated instruction to interactive approaches that prioritise students' active participation.

KEYWORDS

Think-pair Share Learning Strategy; Students Achievement; Computer Studies; Global Development

1. INTRODUCTION

The role of computers in scientific and technological development has been established because they are used in almost all fields of human endeavour, such as education, medicine, agriculture, and engineering. Computers have changed lives in many ways and are expected to change schools and education. This is why the computer is one of the tools in information and communication technology (Obiakor, 2019). Thus, as the world lives in the Information

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and Communication Technology era, a swiftly changing economy, schools should equip students with computer knowledge that will allow them to fully participate in the rapidly changing economy for efficacy in science and technology.

To successfully achieve the goals of sustainable development in Nigeria, there is a need to engage creatively in science education. The valuable role of science education in the technological development of any nation is never in dispute. Fafunwa (2018) opined that we are living in a world where science and technology have become an integral part of the world's culture, and any country that overlooks this significant statement does so at its own peril. Hence, a solid background in the basic sciences is very crucial if Nigeria has to attain the required science and technological development height. One of such basic sciences is computer science. At secondary levels of education, computer science is a school subject called computer studies.

Computer studies are not about learning how to use the computer; it is much more than computer programming. Computer studies is the study of ways of representing objects and processes in information and communication technology. More so, it involves defining problems, analysing problems, designing solutions, developing, testing, and maintaining programs. Computer studies, as opined by Ononye et al (2021), involve teaching and inculcating in the learner the basic skills required to independently manipulate the computer to achieve educational goals. Obiakor (2019) argued that computer studies as a subject are aimed at helping students acquire the skills and competencies required in this digital world of competitiveness. Such basic skills and competencies upon graduation make them conversant with terms and practices embedded in the world of computers. Ekebosi (2019) is of the view that computer studies are a subject organised to enable people to understand the function, uses, and limitations of computers and to provide an opportunity for the study of modern methods of information processing. In addition, Okeke (2021) views a computer as a general-purpose device that can be programmed to carry out a set of arithmetic or logical operations automatically. In the context of this study, computer studies are lower-level and basic-level computer science subjects for secondary school students, which help them to learn and know the basic knowledge and skills of computer studies at their level and age, with a well-developed and planned curriculum.

The intention of Nigeria's curriculum planners is to include computer studies in the secondary school curriculum, which dates back to 1988 when the National Policy on Computer Education was enacted and launched (Onah, 2018). The policy suggested the following as some of the computer curriculum context at the secondary school level for computer education: A basic appreciation of how the computer works, an understanding of the basic principles of operating the computer, hands-on experience using the pre-programmed packages which are relevant to the interests of the students, as teacher aids in different subjects. National Policy on Education (2014) stated that it is expected that by the end of secondary education, the child would have acquired reasonable competence in software such as word processing, spreadsheet, database and analysis programs that allow learners to interact with the computer the way they desire.

Also, one of the major merits of the National Policy on Education (2014) is that it recommended the introduction of computer studies at all secondary schools in Nigeria. The policy recommended a total lifting of restrictions on computer studies in a way that a computer literacy program can begin right from primary school. More so, computer studies should be introduced at any level, provided the necessary facilities and resources are adequately provided for effective implementation. Since then, efforts have been made to include computer studies in the primary, junior and senior secondary school curriculum. For the effectiveness of this study, the junior secondary school level will be aimed at.

Recently, in the Nigerian educational system, computer studies at the junior secondary school level were merged with other subjects such as Physical and Health Education, Basic Science and Basic Technology; and all are called Basic Science and Technology. Despite the fact that they were merged as one subject, presently they are still being taught separately by specialised teachers from each of these four major areas. The content of the computer studies curriculum changed after the merger. This current development calls for a re-examination of how well the teaching and learning of the subject is executed to achieve the subject objectives.

The objectives of computer studies at the junior secondary school level of education by the Federal Ministry of Education (FME, 2019) are to enable the learner to: Acquire basic computer skills such as the use of the keyboard, mouse and system, use the computer to facilitate learning electronically; develop a reasonable level of competence on ICT applications that will engender entrepreneurial skills. Finally, to realise the objectives of computer studies as stipulated in the curriculum requires appropriate learning strategies, techniques, approaches and strategies. Despite these objectives behind the establishment of computer studies in junior secondary school, the examination body that

is in charge of junior secondary external exams, known as the Basic Education Certification Examination (BECE), still reported poor achievement in the subject.

Basic Education Certification Examination (BECE) Chief Examiner (2019-2023) reported that the rate of credit level in computer studies is poor due to the use of the wrong teaching method. The report also has it that the poor achievement came as a result of weaknesses by students in these areas of computer studies, namely internet, operating system, search engine, graphic package, CorelDRAW, Paint Environment, Spreadsheet Package, Computer Safety Measure and Computer Software. Oribhabor (2020) asserted that the BECE Chief Examiners' report (2019) confirmed that students' poor achievement in computer studies comes as a result of weaknesses in the areas of ICT gadgets, computer virus, database, worksheet, search engines, computer problem-solving skill, internet and spreadsheet package. Similarly, BECE Chief Examiners' Report (2019-2023) summarily attributed the poor achievement of students in computer studies concepts of Computer Virus, Search Engine, Spreadsheet Packages and Spreadsheet features and terminologies to lack of qualified teachers to handle the Computer studies concepts in the classroom and poor instructional strategies used in presenting the technical and practical content areas of the subject to students in the computer base classroom/laboratory.

Similarly, Iniobong (2018) observed that poor instructional strategy could be a hindrance to the academic achievement of computer studies concepts in Computer Virus, Search Engine, Spreadsheet Packages and Spreadsheet features and terminologies to humanity and its environs. Despite the uniqueness of computer studies, especially in the subject concept of Computer Virus, Search Engine, Spreadsheet Packages and Spreadsheet features and terminologies in secondary schools, students' achievement in the subject has been consistently poor in external examinations (Iniobong, 2018; Oribhabor, 2020).

Achievement connotes performance in a school subject as symbolised by a score on an achievement test. Vargas-Ramos et al (2021) referred to achievement as the level of knowledge, skills, and competencies that a student has acquired in the educational field, which is often evaluated with the grades obtained in the subjects that make up the study plan. Achievement enables teachers to obtain information on the extent to which a student has attained the criterion performance. Nnorom and Odukwe (2021) described achievement as the ability to demonstrate the accomplishment of some outcome for which learning experiences were designed. Suleiman (2023) argued that achievement is the performance outcome that indicates how far a person has progressed in specific goals of activities in instructional settings, such as school, college, and university. Hew (2019) opined that achievement is the extent to which a student, teacher or institution has achieved their short or long-term educational goals. Some researchers believed that achievement is dependent on the teaching method/instructional strategy used in teaching a subject (Vargas-Ramos et al, 2021; Nnorom & Odukwe, 2021).

Teaching method/Instructional strategy encompasses any type of learning technique a teacher uses to help students learn or gain a better understanding of the course material. They allow teachers to make the learning experience more fun and practical, and can also encourage students to take more of an active role in their educational activities (Abulhul, 2021). There are two types of instructional strategies, namely conventional and innovative instructional strategies.

Conventional instructional strategy refers to the traditional way of teaching. This strategy of teaching is textbook-centred, teacher-dominant, and exam-oriented. The emphasis here is mainly on remembering and reproducing facts, principles and theories of learning. There are two types of conventional strategy or method, namely demonstration and lecture methods. Due to the present study, the lecture method will be considered because it will be used in the control group in the present study.

The lecture teaching method is a teaching method where a teacher communicates ideas to learners through direct verbal discourse, sometimes called talk and chalk, making the learning process teacher-centred. With this, the learners become discouraged and passive. The teacher-centred technique, which still goes on in schools, seems to make teaching/learning of computer studies clumsy, uninteresting and ineffective and hence very difficult to achieve its objectives in students' achievement in computer studies (Okoli & Ekebosi, 2019). There is a need to search for appropriate learning strategies that will meaningfully supplement the lecture method already in use. In the words of Sujata (2023), teachers still use a lecture (chalk-talk) method in the classroom to teach students, which can provide only basic knowledge of science and other subjects. Thus, the government invested significant funds into providing schools with computers and internet connections. Today, most secondary schools in Anambra state have computers installed in their laboratories. However, introducing computers into schools generated new opportunities and challenges, and it is difficult to find conclusive evidence on the positive effect of computers on students' learning outcomes. The learning outcomes will be achieved with the use of the computer if the appropriate learning strategy is employed, other than the lecture learning method. Muhammad et al (2021) averred that the

lecture method has a negative effect on teachers, as students develop hatred for computer-related subjects being taught, which gives rise to tenacious failure in those subjects.

To buttress the above points, Okafor (2019) averred that the lecture method is a teacher-centred method, which limits students' participation in listening, answering, asking questions, and taking notes as the lesson progresses. The method is also one-directional and thus discourages teacher-learners and learner-learner interaction. The teacher delivers pre-planned lessons to the students with little or no instructional aid that involve students' activity (Uchechi, 2021**)**. Furthermore, Abah (2020) asserted that secondary school teachers very often teach subjects using the lecture teaching method. This may be because the method is the easiest to deliver, and large amounts of content are usually covered by the teacher using the method. In addition, Abid et al (2022) opined that this may be the reason why the majority of teachers often use this method without recourse to constructive teaching methods that promote the acquisition of scientific and technological skills in learners. Abulhul. (2021) asserted that this approach can no longer be used as it is outdated, has a limited scope, and seems to have failed both at the national and personal levels. The need to introduce alternative instructional techniques that can help overcome the weaknesses associated with the talk and chalk method is, therefore, evident in Abulhul's report. This situation, therefore, calls for exploration of other instructional strategies that were found effective in some other fields and countries (Izuegbunam, 2018).

To buttress the above points, Chijioke et al (2022) opined that innovative instructional strategies applied in teaching and learning of computer practices seem more effective in enhancing learning outcomes than the conventional teaching methods. Chijioke et al further asserted that computer teachers should become more creative in their day-to-day teaching activities by adopting innovative instructional approaches that can make teaching and learning of computer studies more engaging to learners. Stuart (2023) proposed that teachers should use instructional strategies that are helpful in nature and that involve learners' active participation and encourage skill acquisition. Such strategies could generate interest and retention among students in the learning process. This is because it is expected that students' learning of computer studies through using realistic instructional techniques should enhance the inculcation of the generic skills of inquiry, reasoning, conceptualising, problem-solving and communicating (Laleye, 2019). By applying these skills, students are not only expected to construct their knowledge of computer studies but also to establish confidence and positive attitudes toward computer studies concepts of Computer Virus, Search Engine, Spreadsheet Packages and Spreadsheet features and terminologies. One of the ways of achieving this may be through the adoption of student-centred instructional approaches popularly known as student-centred innovative instructional strategy.

Innovative instructional strategy is the broader techniques used to help students achieve learning outcomes, master the content of the course and learn how to apply the content in particular contexts. (University at Buffalo, 2023). In addition, Suaad-Hadi (2021) opined that an innovative instructional strategy is the set of performances that the teacher uses to achieve expected behaviour among learners. Subramani (2017) averred that innovative instructional teaching/strategy comprises the principles and strategies used for instruction to be communicated by teachers to students to achieve the desired learning objectives. These strategies are determined partly by the subject matter to be learned and partly by the nature of the learner. There are many types of innovative instructional strategies, namely: target task, project-based, cooperative, generative, think-pair-share, flipped classroom, inquiry-based, jigsaw and blended learning teaching strategy, among others, that cater for individual needs, differences, learning styles, interests and abilities (Damilola et al, 2023). Mitra (2021) reported that one of the best student-centred approaches to organise learning is the think–pair–share (TPS) instructional strategy**.** With this assertion, think-pair-share will be considered in this study and used in the experimental group. Thus, this study proposes that the cognitive, affective and psychomotor domains of the students may be developed and improved through the think–pair–share (TPS) learning strategy, which happens to be the main independent variable of the present study.

The think–pair–share (TPS) instructional strategy is a collaborative learning strategy where students work together to solve a problem or answer questions about an assigned reading or topic. Innovative instructional strategies like think-pair-share have the ability to enhance students' academic achievement in all fields (Ode et al, 2020). Some students feel safer and more relaxed when talking in small groups, rather than having to speak in front of the entire class. The think-pair-share activity gives students the opportunity to feel more comfortable sharing their thoughts. In addition to fostering social skills, this learning strategy also improves students' speaking and listening skills. When students brainstorm together, each student learns from their partner. Achor and Gbadamosi (2020) observed that Physics students display more retention and achievement when taught with the think-pair-share innovative instructional strategy. This can help students expand their vocabulary as they learn new words from their peers and build on their prior knowledge. Think-pair-share learning with a contextual approach requires

students to be active in learning. TPS is a student-centred learning in which knowledge and concepts are found and built by the students themselves, not by the teacher.

Ogbaga and Osuafor (2022) asserted that the think-pair-share (TPS) strategy is one of the group discussion strategies and a diverse method of learning collaboratively. Furthermore, Ogbaga and Osuafor (2022) stressed that TPS is used to keep all students actively involved in class discussion and provides an opportunity for everyone to share their ideas and answer every question posed by the teacher. As the name implies, think-pair-share entails presenting students with questions or prompts and giving them time to think individually, pairing them up with other students in a cooperative manner to share their views and arrive at a possible answer, and finally sharing their views with the larger class. Some researchers like Ode et al (2020) believe that think–pair–share effectively enhances students' achievement in science subjects and in computer studies, most importantly. Studies such as Ningsih (2019) and Nnorom (2019) averred that the think–pair–share learning strategy engages students in meaningful learning in the classroom as it promotes communication skills, problem solving, critical thinking, teamwork, and motivation to learn, which, in contrast, encourages rote learning and oftentimes, students get bored listening to the teacher. Emmanuel et al (2022) further stressed that the Think-Pair-Share (TPS) instructional strategy is a learner-centred technique that encourages individual students to engage in critical thinking and work cooperatively with other students in the process of knowledge building. As the teacher works to choose appropriate content, it gives the whole lesson preparation and formulation of good cognitive objectives.

In the opinion of Okekeokosisi and Okigbo (2018), TPS is an aspect of cooperative learning strategy that makes use of heterogeneous small groups of students who work together to maximise each other's learning potentials through interest activation and active participation. TPS instructional approach begins with the teacher asking an open-ended question to which there may be a diversity of correct responses. Thereafter, the learners are allowed time to think by the teacher and are directed to think about the questions and how they can be answered. During the time allowed to think, learners turn to their partners and work cooperatively by sharing ideas, discussing, clarifying, and challenging one another to arrive at a reasonable answer that can finally be shared with the entire class. In a classroom setting where the Think-Pair-Share instructional strategy is employed, both the social and cognitive dimensions of students' learning are usually nourished, thereby necessitating discoveries and new knowledge necessary for improved academic performance and retention (Achor et al, 2022). TPS is capable of assisting learners in developing deep knowledge of the subject matter and an internal desire to be competent. Being more willing and less apprehensive about sharing with a larger group gives them the opportunity to change their response if needed and reduce the fear of giving the wrong answer, thereby encouraging them to participate cooperatively and mutually learn between the individuals. Thus, the active participation of the students in TPS has been shown to improve their conceptual understanding, which, in turn, may enhance students' academic achievement in computer studies, regardless of gender.

Notwithstanding the importance of the knowledge of computer studies for both technological and human development, Basic Education Certificate Examination (BECE) Chief Examiners reported 2019-2023 confirmed that weaknesses of students' that enrolled in these respective years are evident in the areas of internet, excel, operating system, computer problem solving skill, graphic package, coral draw, paint environment, spreadsheet package, computer safety and measure, ICT gadgets, computer virus and database. To affirm this, most researchers reported that the poor achievement in computer studies comes as a result of weaknesses in the areas of computer viruses, databases, worksheets, search engines, computer problem-solving skills, internet and spreadsheet packages, due to the persistent use of wrong instructional strategies by the teachers. Lack of active participation of students, in which wrong instructional strategy is promoted among students, often leads to a situation where students complete a course without having knowledge of basic and simple practicals of computer studies.

More so, other studies show that the areas of computer studies where secondary school students experienced these weaknesses formed the basic and essential areas of the subjects. Studies also show that secondary school computer students achieve poorly due to many factors. One of the major factors militating against achievement in computer studies, concepts of Computer Virus, Search Engine, Spreadsheet Packages and Spreadsheet features and terminologies, is the instructional strategy used in teaching and learning the concepts. Similarly, some studies also believed that some instructional strategies, especially the conventional ones, might have proven to be a trait to students' achievement in most secondary school science and technology subjects, including computer studies. Thus, the lecture teaching method seems to be more teacher-centred and less student-centred, with less active student participation during lessons, whereby students feel bored, uninterested and also find subjects such as computer studies topics difficult, which leads to poor achievement in examinations, such as BECE. On this note, the researcher

tends to investigate the effect of the think-pair-share learning strategy as an innovative instructional strategy on secondary school students' achievement in computer studies.

The gap in existing research on the effect of the Think-Pair-Share (TPS) learning strategy on secondary school students' achievement in computer studies lies in the limited focus on its application specifically within this field, as most studies concentrate on broader STEM subjects or active learning methods in general. Additionally, while TPS has been studied predominantly in Western contexts, its impact in diverse educational settings, especially in developing countries with varying levels of technology access, remains underexplored. Moreover, the role of gender differences in achievement when using TPS in computer studies is not sufficiently analysed, despite potential implications for gender equality in technology education. Further, there is a lack of longitudinal studies examining the long-term effects of TPS on skills retention and practical application in the context of computer science. Finally, the integration of TPS with emerging technologies in modern learning environments has not been fully explored, particularly in virtual or hybrid classrooms, where its potential to foster digital literacy could have significant implications for preparing students for the global technology-driven workforce. Addressing these gaps will not only provide insights into the effectiveness of TPS in secondary school computer studies but also contribute to global educational development goals by promoting inclusive, equitable, and sustainable learning practices.

The purpose of this study is to examine the impact of the think-pair-share learning strategy on secondary school students' achievement in computer studies. Specifically, the study aims to determine the difference in the mean achievement scores between students taught using the think pair-share strategy and those taught using the traditional lecture method, as well as to explore any differences in the mean achievement scores between male and female students taught computer studies using the think pair-share strategy.

2. METHOD

2.1 Research Design

The study employed a quasi-experimental design, specifically the pre-test post-test non-equivalent group design. This design was considered appropriate for examining the effect of the Think-Pair-Share learning strategy on students' achievement in computer studies.

2.2 Research Object/Participant

The study was carried out in Anambra State, Nigeria, focusing on the Aguata and Awka education zones. Data collection and implementation were conducted within selected junior secondary schools in these zones during the academic year.

The population of the study consisted of 6,982 Junior Secondary School Two (JSS2) students enrolled in 94 government-owned co-educational secondary schools across Aguata and Awka education zones. A sample of 393 students was drawn using a multistage sampling technique. Stratified random sampling was first applied to divide the state into strata, from which two zones (Aguata and Awka) were selected. From each zone, two schools were randomly chosen, giving a total of four schools.

From the Aguata zone, one school with three intact classes (58 males and 67 females, a total of 125 students) was assigned to the experimental group, while another school with two intact classes (31 males and 54 females, a total of 85 students) was assigned to the control group. From the Awka zone, one school with two intact classes (40 males and 57 females, a total of 97 students) formed the experimental group, while the other school with two intact classes (40 males and 46 females, a total of 86 students) formed the control group.

2.3 Instruments and Data Collection

The instrument used for data collection was the Computer Studies Achievement Test (CSAT). It was validated by experts, and its reliability was determined using the Kuder-Richardson Formula 20 (KR-20), which yielded a coefficient of 0.70. The instrument was administered to the students with assistance from their regular class teachers, who also facilitated the teaching and supervision of the test.

2.4 Data Analysis

Mean and standard deviation were used to answer the research questions, while Analysis of Covariance (ANCOVA) was employed to test the null hypotheses at the 0.05 level of significance.

2.5 Research Procedures

The research procedure involved assigning intact classes in each selected school to either experimental or control groups. The experimental groups received instruction using the Think-Pair-Share learning strategy, while the control groups were taught using the lecture method. Pre-tests were administered before the intervention, and post-tests afterwards. The administration of tests and lessons was supported by the students' class teachers to ensure smooth implementation.

3. RESULT AND DISCUSSION

3.1 Result

a) Research Question 1

What is the difference in mean achievement scores of students' taught computer studies using think pair-share learning strategy and those taught using lecture method?.

Table 1. Mean and Standard Deviation Achievement scores of Computer Students' taught with Think Pair Share and those taught with Lecture Method

		Pretest		Posttest		Mean Gain	
Groups	N	Mean	SD	Mean	SD	Mean Gain	Deference
TPS	211	47.08	10.48	61.33	9.03	14.25	7.38
LM	182	43.33	9.84	50.20	5.38	6.87	

The results in Table 1 show that the pretest and posttest mean achievement scores of students taught Computer studies with the think-pair-share learning strategy were 47.08 and 61.33, while the standard deviation scores were 10.48 and 9.03, respectively. On the other hand, pretest and posttest mean scores of those taught Computer studies with the lecture method were 43.33 and 50.20, and the standard deviations were 9.85 and 5.38. The standard deviation scores for the pretest for both groups were higher than the standard deviations for the posttest. This suggests more variability in the pretest scores of the students than in the posttest scores. More of the scores are near the mean in the pretest than in the posttest. Since the pretest mean is smaller than the posttest mean in both groups, the treatment improved the achievement of the subject generally, since the posttest mean for the experimental group is higher than the posttest mean of the control group, which indicates that the experimental group's treatment is more effective than the control group's. The mean gain score for students taught with the think-pair-share learning strategy is 14.25, while that of the lecture method is 6.87. This represents a mean difference of 7.38 in favour of students taught Computer studies with the think pair-share learning strategy, which implies that students taught with the think pair-share learning strategy achieved better in Computer studies than those taught using the lecture method.

b) Research Question 2

What is the difference in mean achievement scores of male and female students' taught computer studies using think pair-share learning strategy?

Table 2. Mean and Standard Deviation Achievement Scores of Male and Female Computer Students' taught with Think Pair Share

		Pretest		Posttest		Mean Gain	
Gender	N	Mean	SD	Mean	SD	Mean Gain	Difference
Male	98	47.14	7.29	62.93	6.43	15.79	2.29
Female	113	47.00	7.55	60.50	6.94	13.50	

Table 2 shows the mean and standard deviation scores of male and female students taught computer studies with the think-pair-share learning strategy. From the result, the pretest mean achievement score and standard deviation of male students taught computer studies with the think pair-share learning strategy were 47.14 and 7.29, respectively. Their posttest mean achievement score and standard deviation were 62.93 and 6.43, respectively. This gave a mean gain score of 15.79. Also, the pretest mean achievement score and standard deviation of the female students taught with the think-pair-share learning strategy were 47.00 and 6.55. Their posttest mean achievement

score and standard deviation were 60.50 and 8.94, respectively. This gave a mean gain score of 13.50. The standard deviation scores for the pretest for the male and female students were higher than the standard deviations for the posttest. This suggests more variability in the pretest scores of the students than in the posttest scores. More of the scores are near the mean in the posttest than in the pretest. Since the posttest mean score for males is higher than the posttest mean score of females, the male students achieved higher scores than their female counterparts in the use of the think-pair-share learning strategy. However, the mean gain difference between male and female students is 2.29 in favour of male students. This implies that in using the think-pair-share learning strategy, male students achieve higher results in computer studies than their female counterparts.

c) Hypothesis 1

There is no significant difference in the mean achievement scores of students taught computer studies using the think-pair-share learning strategy and those taught using the lecture method.

Table 3. Analysis of Covariance (ANCOVA) of Achievement Scores of Students Taught Computer Studies using Think Pair Share and Those Taught using the Lecture Method

Source	Type III Sum of Squares	df	Mean Square	F	Sig	Decision
Corrected Model	3388.78a	1	3388.78		0.000	
Intercept	53041.538	1	53041.538	40.80	0.000	
Achievement	3161.79	1	3161.79	38.07	0.000	S
Groups	5265.815	1	5265.815			
Error	15696.16	391	83.05			
Total	59215.000	393				
Corrected Total	22027.25	392				

S= Significant, NS = Not Significant

The result in Table 3 shows that there is a significant difference in Computer studies mean achievement scores of students taught with the think pair-share learning strategy and those taught with the lecture method, $F(1, 391) = 38.07$, $p = 0.000$. Since the obtained p-value is less than the stipulated 0.05 level of significance, the null hypothesis, which stated that there is no significant difference in the mean achievement scores of students taught computer studies using the think pair-share learning strategy and those taught using the lecture method, is rejected. This implies that the mean achievement score of students taught computer studies with the think-pair-share learning strategy is higher than the mean achievement score of those taught with the lecture method. This implies that the significant difference is in favour of those taught computer studies with the think-pair-share learning strategy.

D) Hypothesis 2

There is no significant difference in the mean achievement scores of male and female students taught computer studies using the think-pair-share learning strategy.

Table 4. Analysis of Covariance (ANCOVA) of Male and Female Students' Achievement Taught Computer Studies using Think Pair Share

Source	Type III Sum of Squares	df	Mean Square	F	Sig	Decision
Corrected Model	4.367a	2	1.456			
Intercept	1617.95	1	1617.95			
Achievement*Gender and TPS	50.62	1	50.62	20.72	0.000	S
Groups	702.892	1	702.892	4.49	0.037	
Error	7888.27	209	3.089			
Total	10023.85	211				
Corrected Total	378.128	210				

S= Significant, NS = Not Significant

As shown in Table 4, there is a significant difference in mean achievement scores of male and female students taught computer science using the pair-share learning strategy, $F(1,209) = 4.49$, $P = 0.037$. Since the obtained p-value was less than the 0.05 level of significance, it was decided that the null hypothesis, which indicated that there is no

significant difference in the mean achievement scores of male and female students taught computer studies using the think-pair-share learning strategy, is rejected. Hence, the alternative hypothesis is accepted. Since the mean achievement scores of the male students are higher than those of their female counterparts, this implies that the significance difference is in favour of male students.

3.2. Discussion

a) Difference in the mean achievement scores of students taught Computer Studies using the think-pair-share learning strategy and those taught using the lecture method.

The findings of the study showed that students taught Computer Studies with the TPS learning strategy achieved more than those taught Computer Studies with the LM. The finding was in conformity with the findings of Omeje (2024), Abiodun (2022), Okafor and Samuel (2022), Oyemomilara and Ajayi (2025), and Bello and Abdulkarim (2023), who in their various research observed that students who were taught science subjects using the think-pair-share instructional strategy improved academic achievement than those who were taught using LM. Also, the findings of the study were in line with the studies of Okafor and Nzomiwu (2021), who revealed that the TPS instructional strategy is more effective in enhancing students' academic achievement in algebra when compared to the Conventional Method (CM). Similarly, the findings are in consonance with the findings of Karura et. al. (2021) who reported that TPS enhances achievement in Biology than LM.

More so, the findings are in line with groups of researchers who observed a significant difference in achievement between students taught science subjects in an experimental group using TPS and those taught the same concepts in a control group using LM (Achor et al., 2022; Okafor & Nzomiwu, 2021; Adedeji, 2021; Akanmu, 2019; Popoola & Olofinlae, 2023; Okafor & Samuel, 2022; Onanuga et al., 2019). Similarly, the finding is in conformity with Usang and Okoli (2021), who revealed in their study that there was a significant difference in the mean academic achievement scores of the students taught using TPS and those taught using the conventional method in favour of the TPS strategy. The significance of achievement among students taught Computer Studies in this study using the TPS learning strategy and LM, which favoured those taught with the TPS strategy, could be a result of the interaction and pairing attitude that occurred among students in the group, while the TPS learning strategy, unlike the LM, which is teacher-centred. By virtue of this study, this study has joined the group of knowledge that opined that a significant difference in achievement exists between students taught with the TPS learning strategy and those taught with LM in favour of those taught with the TPS learning strategy.

b) There is a difference in the mean achievement scores of male and female students taught Computer Studies using the think-pair-share learning strategy.

The findings of the study showed that male students achieved significantly higher than the female students taught Computer Studies using the TPS learning strategy. The results do not conform to Salako's findings (2020), who revealed that female participants had a better mean gain score than their male counterparts. Significantly, the finding is not in consonance with Omeje (2024), Achor et al., (2022), Adigun et. al. (2019), Dawal (2021), Okpe et. al. (2022), Ephriam (2022), Yakubu (2021), Okekeokosisi et. al. (2023), Okeke and Okolo (2018); Okekeokosisi and Okigbo (2019) who reported in their different studies that there was no significant different in achievement among students taught in experimental group and those taught in control group when moderated by gender.

More so, the finding is not in line with the finding of Karura et al (2021), who revealed that student gender does not affect achievement, and there is no significant interaction effect between TPS, gender and achievement in Biology. However, this is in line with Divine (2020), who revealed that there is a significant influence on the mean achievement of male and female students in computer science. The male students' significant difference in achievement over their female counterparts when taught Computer Studies with the TPS learning strategy could be a result of the fact that the TPS learning strategy promotes student interaction, which is popular among male students in classroom learning (Karura et al., 2021).

4. RESEARCH IMPLICATIONS

This study has provided useful information on the effect of the think-pair-share learning strategy on secondary school students' achievement in computer studies. Findings of the study revealed that the use of the think-pair-share learning strategy facilitates meaningful learning and achievement of Computer studies. The use of think pair-share learning strategy is effective in reducing gender gap in students' achievement in Computer studies and this implies that the regular use of think pair-share learning strategy by Computer teachers in secondary schools could greatly

enhance the achievement of both male and female students in Computer studiesThis study has provided useful information on the effect of think pair-share learning strategy on secondary school students' achievement in computer studies.

Findings of the study revealed that the use of the think-pair-share learning strategy facilitates meaningful learning and achievement of Computer studies. The use of the think-pair-share learning strategy is effective in reducing the gender gap in students' achievement in Computer studies, and this implies that the regular use of the think-pair-share learning strategy by Computer teachers in secondary schools could greatly enhance the achievement of both male and female students in Computer studies.

5. FUTURE RESEARCH DIRECTIONS

This study was limited in scope to Junior Secondary School Two (JSS2) students in Aguata and Awka education zones of Anambra State, which may affect the generalizability of the findings to other levels, subjects, or regions. The use of intact classes rather than randomised individual assignment could have introduced pre-existing differences among students that were not fully controlled. In addition, the study relied on a single instrument, the Computer Studies Achievement Test (CSAT), which measured achievement but did not capture other important outcomes such as students' attitudes, motivation, or long-term retention of knowledge. The short duration of the intervention also restricted the ability to examine the sustained impact of the Think-Pair-Share strategy over time.

Future research should extend the investigation to other subjects and educational levels to validate the broader applicability of the strategy. Longitudinal studies are needed to assess lasting effects on learning outcomes, while mixed-method approaches could provide deeper insights into students' experiences, attitudes, and collaborative skills fostered through Think-Pair-Share.

6. CONCLUSION

The study established that the Think-Pair-Share (TPS) learning strategy significantly enhances students' achievement in computer studies compared to the lecture method. The results revealed that TPS not only improved overall performance but also indicated that male students achieved slightly higher than their female counterparts when exposed to the strategy. These findings highlight the value of moving away from teacher-centred instruction toward collaborative and student-centred approaches that foster active engagement, critical thinking, and long-term knowledge retention.

Beyond the local context, the study carries meaningful implications for global development. Strengthening students' achievement in computer studies through TPS contributes to preparing learners with digital competencies that are essential for participation in the modern knowledge-driven economy. This aligns with the United Nations' Sustainable Development Goal 4, which emphasises inclusive and equitable quality education as a foundation for sustainable growth. The integration of TPS across diverse educational systems can therefore promote equity, bridge learning disparities, and develop human capital capable of addressing technological and developmental challenges worldwide.

In line with these findings, the study recommends that curriculum planners encourage teachers to adopt the think-pair-share learning strategy more frequently in classroom practice. Teachers should also be guided to shift their instructional methods from traditional lectures toward more student-centred strategies, with TPS serving as a practical and effective alternative. Such changes not only enhance the quality of learning in computer studies but also prepare students with the collaborative and analytical skills needed to thrive in an increasingly digital and interconnected world.

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Author Contribution Statement

All authors discussed the research findings, contributed to the drafting of the final manuscript, and approved the final version for publication. Chisom Perpetua Okeke conducted the study, collected and analyzed the data, and drafted the manuscript. Nneka Rita Nnorom and Chinyere Francisca Okafor supervised the research process, provided academic guidance, and offered critical revisions to improve the quality of the work.

Conflict of Interest Statement

The authors declare that they have no conflicts of interest or potential conflicts related to the research, writing, and/or publication of this article.

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