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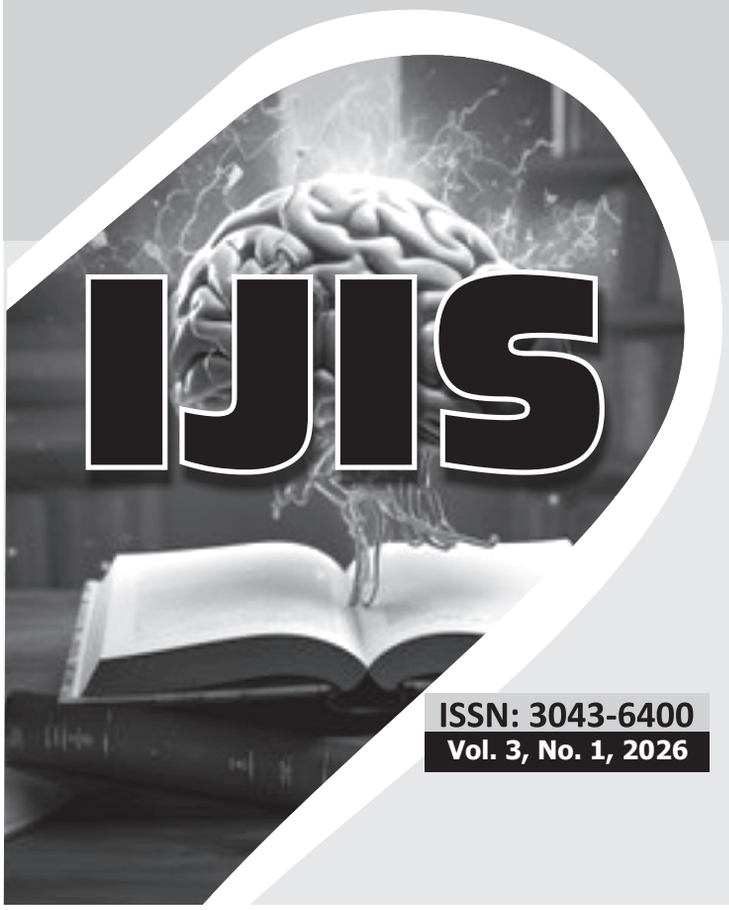

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All correspondence to be addressed to the Managing Editors, Ife Journal of Educational Studies (IJIS), through E-mail (ijisn.2023@gmail.com) and Telephone (08065008779 / 07032480735)

EFFECT OF PEER-ASSISTED LEARNING STRATEGY (PALS) ON STUDENTS' ACADEMIC ACHIEVEMENT IN BASIC SCIENCE.

OSUNLOYE OLAWALE ADEJUMO, DELPHONSO BAMIDELE TOKUNBO, ALUKO FAITH OGHENWVETA, ABOLAJI, TOYIN JOY & AKANDE, OLUWAKEMI JULIANA

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[1]OSUNLOYE OLAWALE ADEJUMO, [2]DELPHONSO BAMIDELE TOKUNBO, [3]ALUKO FAITH OGHENWVETA, [4]ABOLAJI, TOYIN JOY & [5]AKANDE, OLUWAKEMI JULIANA

[1,2,4&5]Department of Natural Science
Lagos State University of Education
Oto/Ijanikin, Lagos.
E-mail: [1]osunloyeoa@lasued.edu.ng [2]delphonsobt@lasued.edu.ng,
[4]abolajity@lasued.edu.ng, [5]akandeoj@lasued.edu.ng,

&

[3]Department of Integrated Science,
School of Science and Technical Education,
Yaba College of Technology,
Yaba Lagos.
E-mail: [3]alukofaith24@gmail.com

Abstract

The study investigated the effect of Peer-Assisted Learning Strategy (PALS) on students' achievement in Basic Science. It also compared the effect of peer-assisted learning strategy on achievement scores of male and female students in Basic Science. The population for the study comprised all basic science students in Ojo Education district V of Lagos State. The sample for the study involved 160 junior secondary school students in Basic Science classes, with a total of 80 students in the experimental group and 80 students in the control group purposively selected from intact classes. The schools were randomly assigned to experimental and the control groups. four (4) intact Junior secondary school two (JSSII) classes were purposively chosen at random from four (4) public mixed secondary schools The study was carried out in some selected Junior Secondary Schools in Education district V of Lagos State. Two research questions and two hypotheses were generated for the study. One hundred and sixty (160)

students from JSS II were selected for the study. They were assigned to experimental and control groups respectively. The experimental group was taught using Peer-Assisted Learning Strategy, while the control group was taught using convectional method. Two research instruments were used for data collection, these were Basic Science Peer-Assisted Learning Achievement Test (BASPALAT), Students Attitude Towards Basic Science (SATBS) (BSPALAT) was developed to test the academic performance of the students while (SATBS) were developed to elicit information on learners' attitude towards Basic Science respectively. Data collected were analysed using mean, standard deviation and t-test. The results obtained from teaching Basic Science with Peer- Assisted Learning strategy significantly improved students post-test academic performance.

Keywords: Peer-Assisted Learning Strategy (PALS), Academic achievement, Basic Science

Introduction

Basic science is one of the science subjects that is compulsory for primary and junior secondary school students and it is a compulsory subject at junior secondary school examination. Basic Science is an expanded and modernized version of integrated science. It combines basic science, basic technology, elements of physical and health education and environmental studies. It is a compulsory component of the Basic Education Certificate Examination (BECE) for junior secondary school students. Basic Science has been made mandatory as a subject for all Nigerian children at the basic education level. The Basic Science concepts are organized into themes and avoid duplication of contents and unnecessary repetition of topics in the different science disciplines, it therefore arouses curiosity and develops scientific attitudes and skills in students. This is to help children to develop reflective thinking and good habits which are needed for scientific method and successful future life (Agogo & Ode,2011).Chima (2021) emphasized that Basic Science is aimed at enabling the child who is exposed to it to acquire the specific science process skills such as observing, organizing information acquired, generalizing on the basis of acquired information, predicting as a result of generalization and designing experiment to check predictions (FRN, 2013). Basic Science is also a subject which is

trusted to grant the students general education and emphasizes the importance of observation for increased understanding of the environment.

Chima (2021) further expatiated that Basic Science is taught at the primary and junior secondary schools so as to catch the pupils' heart young. This is to help children to develop reflective thinking and good habits which are needed for scientific method and successful future life. The Basic Science Curriculum inculcates the right values and norms of the society to foster development. Despite the relative importance of science and technology to the country's quest for technological advancement, there is a continuous trend of poor implementation of the basic science curriculum due to inadequate competencies. Delphonso et. al (2023) explains that teaching still retains the old conservative approach of teachers acting as repertoire of knowledge and students the dormant recipients. She further states that the traditional teacher-centered teaching approach which favours passive reception of knowledge is still in vogue in most of our secondary schools all over the country and such an approach has been criticized for its neglect of students' learning from a variety of sources.

A positive attempt to improve students' learning of Basic Science concept will therefore involve the use of strategies that are tailored towards constructivism that will help to modify students' misconceptions. learning therefore, depends on the use of appropriate thinking strategies that will promote meaningful learning where teachers go about teaching for conceptual change by making use of teaching methods that emphasize constructivist philosophies.

The method of interest in this study is Peer Assisted Learning (PAL) is based on the constructivist learning theory approach.

Peer Assisted Learning (PAL) is an instructional strategy where students work collaboratively to support each other's understanding, acquisition, and application of knowledge within the classroom context (Falola, 2025).This approach emphasises reciprocal teaching, where peers take on complementary roles such as tutor

facilitator or learner, allowing them to consolidate their knowledge by explaining, questioning and reviewing concepts together (Ifinedo et al 2020).

Peer - assisted learning has emerged globally as an instructional strategy that allows students to learn collaboratively by explaining concepts to one another under guided supervision, thereby strengthening comprehension and confidence (Ahmed and Lawal, 2020). While traditional teacher-centered approaches often limit interaction to teachers led explanations and rote memorization, PAL encourages active learning and critical thinking fostering environments where learners feel more confident to articulate ideas, challenge misconceptions, and co-construct knowledge (Falola et al 2025).

In the Nigerian educational context, where class sizes are often large and resources limited, PAL offers an adaptive and flexible strategy that can mitigate the constraints of conventional methods by distributing instructional responsibility among students (Lawrence & Fakuade 2021). The strategy promotes self-regulation, accountability and motivation as students become both responsible for their own learning and responsive to the learning needs of their peers (Morrison et al 2021).Moreover, PAL can help address diverse learning paces, as students who grasp concepts quickly can support slower learners, ensuring more equitable knowledge acquisition (Falola et al 2025).The benefits of peer assisted learning in Junior Secondary school education are multifaceted, encompassing academic, social and psychological domains (Falola 2025).

PALS enhances students' comprehension, retention and application of subject matter, as learners are encouraged to articulate their understanding clarify misconceptions and reinforce learning through peer explanation (Ifinedo et al 2020) studies indicate that students participating in PAL achieve higher tests scores and demonstrate improved mastery of complex concepts compared to those taught through conventional teacher-centered approaches (Jennifer, 2021).

Socially, PAL promotes collaboration, communication and team works skills, as learners engage in structured interactions that require listening questioning and mutual support (Lawrence &Fakuade

2021).

In Nigeria today, the teaching of science in secondary schools is in two categories: Basic science in the junior secondary school and distractive science subjects like Biology, Chemistry, Physics, Agriculture and Geography at senior secondary schools. Atoo (2016) emphasise effective teaching and learning of science (Eriba, 2017).Furthermore, PAL provides immediate feedback, encourages reflective thinking and nurtures a sense of accountability as students are responsible both for their own learning and for supporting their peers (Jennifer, 2021). Another notable advantage is its adaptability to diverse learning styles and abilities, enabling faster learners to deepen understanding by teaching, while slower learners gain tailored support from peers (Ifinedo et al 2021). This dual benefit enhances inclusivity, equity, and participation which are critical in classroom with heterogeneous academic abilities (Lawrence & Fakuade, 2021).The need for continuity and smooth suit through the tide of science course and this has made our policy makers and curriculum experts to make Basic science are and compulsory subject at the junior secondary schools.Basic science is the subject which exposes children in primary schools to learn and understand their environment, observe and explore the world around them.

Nigerian Educational Research and Development Council (NERDC, 2012) affirms teaching methods and strategies among others which largely result into lack of interest by students in science classes lessons have been identified as impediment factors for the PAL also reduces the cognitive load on teachers, allowing them to focus on scaffolding, monitoring and intervening strategically, thereby improving overall instructional efficiency Morrison et al 2021). Based on this understanding, PAL is not merely an alternative teaching method but a comprehensive pedagogical approach that simultaneously cultivates academic achievement, positive learning attitudes and social-emotional growth in junior secondary schools.

However, there is still a lack of research specifically examining the effect of peer assisted learning on academic achievement in secondary students studying Basic Science. This study aims to fill

this gap in the literature by investigating the relationship between peer assisted learning and academic achievement in a sample of secondary students studying Basic Science. By understanding this relationship, educators can better support students in developing peer assisted learning skills and promoting academic achievement in this subject. Also, the integrating of peer assisted learning-based instruction represents a transformative approach in integrated science education, combining collaborative learning with experimental engagement to improve cognitive and affective outcomes (Uzezi & Diya 2020). Peer assisted learning allows students to explain concepts to one another, engage in problem-solving discussions and reinforce understanding through reciprocal teaching, which has been linked to higher achievement and motivation (Uchegbue & Amalu 2020).

Statement of the Research Problem

Despite repeated curriculum reforms and increased emphasis on science education, students performance in basic science at the junior secondary school level in Nigeria continues to decline, raising serious concerns about teaching effectiveness and learning outcomes (Federal Ministry of Education, 2024).Convectional lecture methods will often fact to create opportunities for peer discussion scientific reasoning and active engagement. It has been noticed that the convectional lecture based (teacher-centered) instructional methods dominate basic science classrooms, often characterized by role memorization, minimal students interaction, and limited opportunities for active engagement, peer discussion, scientific reasoning, inquiring or collaborative problem-solving. Such approaches fact to address the construct nature of learning in basic science, where conceptual understanding requires active construction of knowledge through dialogue, exploration of misconceptions, and application to real-life scenarios. Therefore, this study seeks to address this problem by evaluating the effects of Peer-Assisted Learning (PAL) on students achievement in basic science.

Purpose of the Study

The main purpose of this study was to investigate the effect of peer assisted learning instructions on students' academic achievement in

basic science. Therefore, the specific objectives of the study are to:

(i) determine the effect of peer-assisted learning strategy and conventional method on students' academic achievement in Basic Science.

(ii) compare the effect of peer-assisted learning strategy on the achievement scores of male and female students in Basic Science.

Research Questions

This study was guided by the following research questions.

(i) What is the performance of students exposed to peer-assisted learning strategy and convictional method on students' academic achievement in Basic Science?

(ii) What is the effect of peer-assisted learning approach on the achievement scores of male and female students in Basic Science?

Hypotheses

In the context of the above objectives the following research hypotheses will be tested:

$\mathbf{H_{o1}}$: There is no significant difference in the mean achievement scores of students exposed to Peer Assisted Learning strategy and those exposed to conventional method.

$\mathbf{H_{o2}}$: There is no significant difference between mean achievement of male and female students taught Basic Science using Peer Assisted Learning strategy.

Methodology

The study employed a quasi-experimental design, with a pretest, posttest and control group. The study population comprised of all basic science students in Ojo Education district V of Lagos State. The sample for the study involved 160 junior secondary school students in Basic Science classes, with a total of 80 students in the experimental group and 80 students in the control group. The schools were randomly assigned to experimental and the control groups. four (4)

intact Junior secondary school two (JSSII) classes were chosen at random from four (4) public mixed secondary schools in Ojo Education district V of Lagos State. The instrument used were basic science Peer-Assisted Learning Achievement test (BSPALAT) and self-designed questionnaire on Students Attitude Towards Basic Science (SATBS) which was a structure type made up of Strongly Agreed, Agree, Strongly Disagree and Disagree. The questionnaire was divided into two section "A and B". section "A" comprises personal data of the respondents while section B is made of twenty questionnaires relating to Attitude of students towards Basic science while twenty objectives test items on forces and energy was designed to determine the effects of PAL on students' academic achievement in basic science.The self-designed BSPALAT and SATBS on Peer-Assisted Learning instruction was given to two experts on science education. For vetting after which necessary corrections were made according to suggestions before administering the instrument to the targeted population. The instrument was therefore subjected to reliability test using test re-test procedure to obtain a reliability coefficient of 0.50, t-Test statistical analysis was used to analyse the data collected. The data collected was analysed using t-test statistical analysis for testing null hypothesis generated for the study.

Results

Ho_1: There would be no significant difference in the mean achievement scores of students exposed to Peer Assisted Learning strategy and those exposed to convectional method.

Table 1:T-test for the academic achievement scores of Students taught Basic Science using Peer Assisted Learning Strategy and Conventional teaching methods.

GROUP	N	X	S.D	T-CAL	T-CRIT	DF	SIGN LEVEL	DEC
Control group	80	14.80	52.70	3.48	1.90	78	0.05	Rejected
Experimental group	80	3.76	12.96	3.48	1.90	78		

The table shows that the calculated t-value (3.48) was greater than the critical/table value (1.90) at 0.05 level of significance.

Hence, the null hypothesis (HO_1) which says that there would be no significant difference in the mean achievement scores of students exposed to peer-assisted learning strategy and those exposed to conventional method was therefore rejected. It was also revealed from the table that students exposed with Peer-Assisted Learning strategy have higher mean score (14.80) than those with convectional method (3.76).

HO_2: There would be no significant difference between the mean achievement scores of male and female students in basics science. With a means score (2.90)

Table II: There is no significant difference between mean achievement of male and female students taught Basic Science Peer-Assisted Learning Strategy.

GROUP	N	X	S.D	T-CAL	T-CRIT	SIGN LEVEL	DEC
Male	80	5.96	50.64	2.65	1.20	0.05	Rejected
Female	80	2.90	16.09	2.65	1.20		

The table shows that the calculated t-value (2.65) was greatest than the critical table value (1.20) at 0.05 level of significance. Hence, the null hypotheses (H02) was therefore rejected.

Thus, the alternative hypotheses was upheld.

This shows that male students with mean score (5.96) perform better in Basic Science than their female counter.

This simply implies that there is a significant difference in the mean achievement scores of students exposed to Peer Assisted Learning and those exposed to conventional method.

Discussion of Findings

The study investigated the effect of peer assisted learning strategy on students' academic achievement in basic science and two hypotheses were generated and tested.

H_o1: States that there is no significant difference in the mean achievement scores of students exposed to Peer Assisted Learning strategy and those exposed to conventional method.

The results finding of the study revealed that there was a significant difference in the academic achievement of the students taught by Peer-Assisted learning method than there taught by traditional method. The findings of this study are related to the research findings of some authors in recent years and in assertion with (UzeziDeya, 2020) which indicates that such approaches enhance retention of information, facilitate problem-solving and encourage experimentation thereby producing learners who are not only knowledgeable but also capable of applying concepts in novel contexts.

H_o2: There is no significant difference between mean achievement of male and female students taught Basic Science using peer assisted learning approach. The males had a slightly higher mean score than the females. This may be due to differences in motivation and learning styles between boys and girls. For example, boys may be more motivated by competition and individual achievement, this is in line with (Onyeka et al 2021) which says that students exposed to integrated approaches out perform their peers taught through conventional methods with significant gains observed in both test scores and practical assessments.

Conclusion

In view of the above results, it implied that the Peer Assisted Learning strategy produced the best result. Indicating that this approach is the best suitable to produce a change in the assimilation of biology concepts and theories. And Peer Assisted Learning strategy creates an idea situation for teaching science subjects and especially basic

science. In Peer Assisted Learning students work collaboratively on tasks or problem-solving activities, engaging in discussions, negotiating solutions and collectively constructing meaning with in the classroom context.

Recommendations

It is therefore recommended that more peer group learning should be incorporated and encourage during basic science lesson because it permits peer tutoring, cooperation and interactions. It is also recommended that government should organize capacity building programme for basic science teachers on peer assisted learning strategy.

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