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EFFECT OF GALLERY WALK STRATEGY ON STUDENTS' ACADEMIC ACHIEVEMENT IN SENIOR SECONDARY SCHOOL PHYSICS IN LAGOS STATE

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Abstract

This study determined the effect of gallery walk strategy on student academic achievement in senior secondary school physics in Lagos State. The study adopted the pretest-posttest control group, quasi-experimental design. 210 SSII Biology students from two (4) co-educational schools in Mushin and Oshodi Local Government Areas of lagos State were randomly assigned to treatment group. The instrument used were Physics students Achievement Test (r=0.84), Physics student Emotional Intelligence Scale (r = 0.82) *and Teachers Instructional guides on gallery walk strategy and lecture method. Two Research Questions and hypotheses guided the study. Descriptive statistics of means and standard deviation were used to answer the research questions and inferential statistics of Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. The results of the study showed that gallery walks strategy enhanced students' academic achievement in physics concepts than lecture method. There is a significant difference between the academic achievement mean scores of the students exposed to physics concepts using gallery walk strategy and compare with their counterpart taught using lecture method. There was no significant difference between the academic achievement mean scores of high and low emotional intelligence students exposed to physics concepts using gallery walk strategy in physics and compare with their counterpart taught using lecture method. Based on the findings, physics teachers should adopt gallery walk strategy to teach the physics students, so that they can learn faster and better as it could foster confidence in the students and improve their academic achievement.*

Keywords: Gallery walks strategy, Academic achievement, Emotional intelligence and physics concepts

Introduction

Physics is the science of understanding matter, energy and their interrelationship. Physics is needed in various fields – agriculture, astronomy, geology, engineering and technology, and communication, among other fields. Therefore, it remains a core subject to be taught and learnt by generations of students. Siddiqui and Khan, (2016) attested that Nigerian Educational Research and Development Council stated that concepts to be taught in the Physics curriculum at the secondary school level are perceived as abstract and difficult by students. According to Karaca (2013); Fasanya (2023) Physics is beyond learning or defining terms because it utilises mathematical measurements and observations to understand the natural world and its relation to daily activities (Eren & Gurdal, 2010). Omeodu (2019) highlights advancements in physics to enhance its influence, fostering critical thinking, analytical reasoning, and inquiry skills through the theme approach in modern physics curriculum. Physics offers students an opportunity to think critically, reason analytically and acquire the spirit of inquiry. The current Physics curriculum in the Senior Secondary school level is structured on the thematic approach, which emphasises the understanding of basic concepts and principles. Physics has the following main aspects: mechanics, heat (thermodynamics), waves (light and sound), electromagnetism (electricity, electric fields, magnetic fields and magnetism), relativity and others such as conservation principle, energy quantization and duality of matter, fields at rest and motion, interaction of matter, space and time and wave motion without material transfer. Mechanics, as a subset of Physics, focuses on the movement of objects influenced by forces, including situations where a body remains stationary.

According to the West African Examinations Council (WAEC) Chief Examiners' report, over the years, candidates have shown very weak performance, mainly in some aspect of physics such as mechanics, heat and waves, Students in physics face confusion about mechanics and waves, particularly in understanding heat and temperature, thermal expansivity, anomalous water expansion, change of state, specific heat capacity, latent heat, and heat transfer. As such, it can be deduced that there is an inconsistency as well as the weak performance in these aspects of Physics as seen to be difficult by students in secondary schools, should not be ignored as they may jeopardise students admission chances into tertiary institutions within the country and outside for the study of Physics education and other Physics-related courses. Studies have shown that students' academic achievement in Physics has been reported to be below expectation Ukoh and Abiola, (2017). Such an outcome has dire implications as they affect economic, security, national and human development in Nigeria.

Table 1 gives a detailed representation of the performance in Physics at the Senior Secondary School Certificate Examinations (SSCE) conducted by WAEC.

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Table 1: Statistics for Entries and Result for May/June WASSCE Physics for 2010-2019.

Year	No of Candidates	Credit (A1-C6) in %	Pass (D7-E8) in %	Fail (F9) %	Total Fail
2010	463755	51.27	26.40	18.27	44.67
2011	563161	63.94	24.30	11.76	36.0
2012	624658	68.74	22.06	09.20	31.26
2013	636857	46.62	27.62	22.92	50.54
2014	644391	60.21	24.83	12.58	37.41
2015	605248	40.02	25.36	34.62	59.98
2016	666901	76.27	16.05	5.52	21.57
2017	709043	53.08	27.41	17.39	44.82
2018	731990	78.40	13.95	7.65	21,60
2019	746640	76.95	14.69	8.36	23.05

Source: Statistics Office, West African Examinations Council. Yaba Lagos Nigeria (2021)

The table 1 showed the percentage of credit passes and failure from year 2008 to 2019. There was a slight increase in the quality of results from the WAEC Physics examination in the past. Between 2011 and 2015, around 60% of Physics candidates for the examination achieved credit and distinction. Before 2011, the percentage of high achievers in the subject was lowered. However, a 40% failure rate is still very high for a subject that students learn for 3 years before the WAEC examinations are due. However, in 2016 the performance of students improved greatly to about 76%, only for it to dwindle again to a poor record of 53% in 2017. The best result so far in Table 1 was in 2018, with 78.40% but a slight decrease to 76.95% in 2019. The overall average performance of students who scored A1-C6 from 2006 to 2019 is 58.06%. Stakeholders at the school, home, education boards, research and government bodies should be concerned about the low achievement rates as it may not help realise the goals of science education.

The WAEC Chief Examiners' Reports for the years 2011 to 2015 indicated that the high failure rate in Physics is from candidates who are unskilled in problem-solving. To explain further, when candidates are faced with problems related to mechanics, waves and heat, they could not correctly utilise formulas, equations, arithmetic processes and unit conversion to solve the problems. The Chief Examiners'Report (2018) showed that most of the students were unable to explain scientific phenomena correctly under waves and heat. Also, the Chief examiners' report (2014) showed that a number of candidates display a lack of basic mathematical and critical thinking skills and creativity with which to attempt questions confidently with little or no error, to mention but a few. Other identified areas of weakness from the Reports are topics such as Motion, Simple Harmonic Motion, Machines, Projectile, and Friction. Some students mentioned change in temperature instead of temperature; Some mistook specific latent heat for specific heat capacity; Majority of students who attempted these questions either avoided this or got confused right from the onset; Performance was so low (2018). Majority of students started correctly with the formula ivt = ml but got it all wrong in substitution (2019).

The Chief examiners for Physics also recommended that teachers should not only state principles and laws of Physics but also emphasise the possible application of these principles to everyday activities and demand explanations to enable students to apply the fundamental principles of physics to real situations (WAEC, 2015 and 2019). Teachers should encourage students to study Physics and not cram Physics (WAEC, 2016); Physics instruction must discourage rote learning and fortify classroom instructions with appropriate demonstrations (WAEC, 2018). These suggestions have been examined by many previous studies and these studies emphasised that teachers' adoption of conventional strategies (Bello, 2012 and Owolabi and Oginni, 2013), continuous use of teacher-centred strategies despite the call for learner-centred strategies (Ukoh, 2012; Aderonmu & Obafemi, 2015; Osondu, 2025).

Research in Physics education over the years has tried to unravel the reasons behind poor achievement in Physics and the ways to mitigate it. Fasanya et al (2025) emphasised the continued use of lecture method by Physics teachers despite the call for learner-centred instructional strategies as a reason for students low success level in Physics. Studies by Ezeudu (2013) revealed that the level of students' participation during teaching and learning enhances their academic achievement and their attitude to Physics. Students' academic achievement is their academic capacity measured through standardized tests and examinations (Adeyemi, 2011). Students' achievement in Physics examinations at different levels of education is a source of dismay (Ugwuanyi et al., 2020). One of the suggested active instructional strategies is Gallery Walk Strategy. Adewumi (2021) defined Gallery walks Strategy as a teaching and learning strategy that allows students' to be actively engaged as they walk throughout the classroom. They work together in small groups of three to six share ideas and respond to meaningful questions, documents, images, problem-solving situations or texts. The scholar attributes the usage of gallery walk strategy to the science subject, Ogundiwin et al (2025) confirmed it that gallery strategy is an exciting strategy that for promote class discussion in the science classroom. Adewumi (2021) reported that gallery walks strategy enable learners to improve their

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work through the use of feedback from multiple sources such as peer s, teachers and experts. During gallery walks according to Mark (2014) and David (2015) students explore multiple texts or images that are placed around the room.

Carolyn (2012) opined that gallery walk is a discussion strategy that engages groups of participants as they examine and respond to a document; often this document (or items) is displayed on a wall and the participants move as a group from one to the next station. The teacher use gallery walk strategy as a way to have students share their works with peers, examine multiple documents or respond to a collection of quotations, this is supported by Ahmed et al (2023); Adewumi and Akanbi (2023) who confirmed that gallery walks is a way of sharing of knowledge by students after they have read something or done research or as a way for students to share research or to generate discussion on a topic or concept. Gallery walk strategy introduced students to new materials that will help them to obtain specific information that will allow them to develop cognitively. According to David (2015) a traditional gallery walk requires teams of students to rotate between stations to answer or build on other teams' answers at each station. Once all teams have visited each station oral presentation and discussion by the class follows. Mark (2014) asserted that the gallery walk approach fosters collaborative work among students, encouraging them to actively participate in synthesizing key concepts, reaching a consensus, and enhancing their skills in writing and public speaking. The gallery walk discussion strategy is student-centred and activity oriented.

Francek (2015) stated that in a Gallery Walk, small groups of learners will spend a limited amount of time (about 5 minutes) on an individual problem or task presented to them on a large Post-it note, that is, a white spread sheet where students can write. Using a colour-coded marker, they write their contribution to the solution of the problem on the Post-it note. At the end of five minutes, a bell sounds, and they move to the next Post-it note. There they will find both a new problem and the contributions of all the previous groups in different colours. The task at hand now requires them first to review the validity of the other groups' work and then to contribute new information towards the solution of the task or problem at hand. After all Post-it notes have been viewed at least once by each group, the group at the last station provides the rest of the class with an oral summary of the problem and the solutions offered by all groups. The moving round of students brings about excitement rather than sitting down passively in receiving the concepts, the colourful materials being used, pictures and diagrams, they see before providing answers with the use of color-coded markers. Hendri and Retika (2017) reported that learning and retention are easier for students when they are active participants in the learning process.

Not only is teaching strategy associated with the students' achievement but some other variables are too. This study is interested in the students-centred emotional and psychological variables because it has been established that students' variables have an association with their achievement. For the purpose of this study, emotional intelligence is considered psychological factors. Emotional intelligence is considered a moderator variable just like self-efficacy as psychological factors in the study. It can be conceptualized as the ability of students to understand their emotions and by the virtue of that understanding relate with people around them both old and young. In this study, emotional intelligence is introduced as a moderator variable. It was brought into the study to investigate its moderating effect between chosen interventions and students' academic achievement. Emotional intelligence is an attribute that makes a student capable of relating with peers and learner support successfully.

In this relationship, students will be able to learn and ask questions without bias or sentiments. As per Johnson (2016), emotional intelligence encompassed a collection of skills that aid in effectively evaluating and controlling emotions, as well as utilizing emotions to achieve optimal outcomes in academic, professional, and personal spheres. Individuals with high emotional intelligence possess the ability to accurately comprehend emotional matters, effectively navigate stressful situations, and regulate their emotions in a positive manner. They demonstrate a sense of equilibrium, empathy, self-awareness, and sociability. Furthermore, they exhibit strong will power and are driven by internal motivation. This attribute can significantly contribute to enhancing their focus and level of commitment. Students with high emotional intelligence often have confidence to meet their learner support after classes to ask further questions on the topics taught. Knowing how to learn plays a crucial role in learning Physics. Farooq (2017) identified these other factors: Confidence, self-control, self-awareness, capacity to communicate, and ability to co-operate. Therefore, ensuring to make provision for the social and emotional growth needs of learners will help them learn better (Naki, 2009). This research work seeks to find out the effect of Gallery Walks strategy will have on students Achievement in physics. It also, examined the influence of emotional intelligence of the students on physics.

Statement of the Problem

The past performance of students in the Physics examinations set by the West African Examination Council (WAEC) and the National Examinations Council (NECO) has shown a slight improvement. Based on the WAEC Chief Examiners Report, over the years, that the students have shown low performance in some aspects of Physics. Evidence abounds those students over the years displayed poor grasp of the theoretical bases of Physics concepts and low level of problem-solving skills in mechanics, heat and waves to be precise. Specifically, most of the students were unable to explain correctly the concepts of mechanics,

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heat and waves in Physics and as such display the absence of some foundational knowledge that should make them skilled in Physics. This foundational knowledge includes mathematical skills (in the form of the arithmetic processes and conversion of units), critical thinking skills, creativity in attempting questions confidently with little or no error, to mention but a few that have been traced to students' attitudes by past scholars in Physics education. Also worthy of note is that majority of students who attempted the questions on these aspects either avoided them, skipping such questions and when attempted, they could not give correct answers or got confused from the onset.

There is therefore the need to explore other modes of teaching, such as Gallery walk strategy, to see what works better. Research so far that has concentrated on Gallery walk strategy indicates that students' performance improved in the subjects that have been studied so far Biology, Integrated science, Mathematics, English studies, Chemistry and Social studies. The strategy under focus is learner-focused, foster interaction and critical thinking, and makes learning interesting for students; these will improve performance indices. Therefore, it is necessary to research the efficacy of Gallery walk strategy on achievement of Physics students. In this study, the moderating variable of emotional intelligent was examined.

Purpose of the Study

The purpose of this study was to investigate the effect Gallery walk strategy on student academic achievement in senior secondary school Physics in Lagos State. Specifically, the study sought to:

1. Determine the difference between the achievements mean score of the students exposed to gallery walk strategy in physics and compare with their counterpart taught using conventional strategy.
2. Find out the effect of gallery walk strategy and emotional intelligent on student achievement in physics.

Research Questions

Two research questions were raised to guide the study.

1. What is the difference between the academic performance mean scores of students taught physics using gallery walk strategy and those taught using lecture method?
2. What is the difference between the academic performance mean scores of high and low emotional intelligence of students taught physics using gallery walk strategy and those using Lecture method?

Research Hypotheses

To guide the study two null hypotheses were formulated and were tested at 0.05 level of significance:

H_{01}: There is no significant difference between the achievement mean score of students taught physics using gallery walk strategy and compare with their counterpart taught with lecture method.

H_{02}: There is no significant difference between the achievement mean scores of high and low emotional intelligence students taught physics using gallery walk strategy and compare with their counterpart taught with lecture method.

Methodology

This study adopted the pretest-posttest control group quasi experimental research design. Lagos state is divided into three senatorial districts – Lagos East, Lagos Central and Lagos West. Lagos West was randomly selected and was used. Two Local Government Areas were randomly selected and four secondary schools were randomly selected from all secondary schools making use of table of random numbers, two schools per local Government Area. Students from intact classes were used for the research study. One experimental group and one control group were used per school. Four instruments were used for the study. They include: Physics students Achievement Test (r=0.84), Physics students Emotional Intelligence Scale (r = 0.82) and Teachers Instructional guides on Gallery walks Strategy and Lecture Method. The researchers administered the instruments to pre-test the students and their scores were recorded. The researchers exposed the experimental 1 to physics concepts using Gallery Walk Strategy while control group was taught with lecture method. The treatment lasted for six weeks. The means and standard deviation were used to answer all the research questions while the research hypotheses were tested with inferential statistics using Analysis of Covariance (ANCOVA) at 0.05 level of significance.

Results

Research Question 1: What is the difference between the academic performance mean scores of students taught physics using gallery walk strategy and those taught using lecture method?

Table 1: Descriptive Statistics of Performance Associated with Treatment

Treatment	N	Mean scores Pre-test X1	SD1	Mean scores Post-test X2	SD2	Means Gain	Mean Difference
Gallery Walk Strategy	49	31.30	8.61	58.69	10.75	+27.39	8.09
Lecture	61	30.11	8.28	49.44	8.15	+19.33	

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method			
	3.69	17.58	+13.89
Mean Difference			

Table 1. shows that the pre-test and post-test mean scores of students taught with gallery walk strategy (experimental group) was 23.01 and 42.23 with standard deviation of 1.63 and 1.23 respectively. While the pre-test and post-test means score of students taught with lecture method was 19.32 and 24.65 with standard deviation of 1.90 and 1.98 respectively. From the above analysis, there is a mean gain of 19.22 for the experimental group and 5.33 for the control group. The experimental group has a mean gain difference of 13.89 from the control group. This indicated that students taught physics using gallery walk strategy performed better in physics than their counterpart taught with lecture method.

Research Question 2: What is the difference between the academic performance mean scores of high and low emotional intelligence of students taught physics using gallery walk strategy and those using Lecture method ?

Table 2: Descriptive Statistics of Performance Associated with emotional intelligence (high and low)

Treatment	N	Mean scores Pre-test X1	SD1	Mean scores Post-test X2	SD2	Means Gain
High	60	29.00	1.53	43.44	0.87	+22.11
Low	50	33.29	1.78	39.88	0.59	+17.06
Mean Difference		1.49		3.56		+5.05

Table 2: shows that the pre-test and post-test mean scores of high and low emotional intelligence students taught physics using gallery walk strategy (experimental group). From the analysis, the pre-test and post-test scores of high emotional intelligence students taught physics were 21.33 and 43.44 with standard deviation of 1.53 and 0.87 respectively. While the pre-test and post-test means score of low emotional intelligence students taught physics were 22.82 and 39.82 with standard deviation of 1.78 and 0.59 respectively. From the above analysis, there is a mean gain of 22.11 for the high emotional intelligence students taught physics and 17.06 for the low emotional intelligence students taught physics. The high emotional intelligence students taught physics has a mean gain difference of +5.05 over low emotional intelligence students taught physics

H_{01}: There is no significant difference between the achievements mean score of students taught physics using gallery walk strategy and compare with their counterpart taught with lecture method.

Table 3 Analysis of Covariance (ANCOVA) of Post-Achievement by Treatment and Emotional Intelligence

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4566.237	2	1614.	19.645	0.001	0.209
Intercept	2576.759	1	2576.759	308.312	0.000	0.353
Pre-Test	2079.363	1	2079.363	24.881	0.003	0.008
Treatment	2110.624	1	2110.624	49.060	0.001*	0.095
Emotional Intelligence	53.919	2	26.960	0.925	0.397	0.006
Error	97231.200	74	29.135			
Total	11311.000	78				
Corrected Total	12298.820	76				

R S * denotes significant $p<0.05$

The analysis of data in Table 3 shows that the value associated with the calculated value of F (49.060) for the effect of gallery walk strategy on the academic achievement of students in physics is 0.001. Since this value (0.001) is less than the 0.05 level of significance. Thus, null hypothesis is thereby rejected and the alternative hypothesis is accepted; which means that there is a significant difference between the post-test scores of the students exposed physics concepts using gallery walk strategy and compare with their counterpart taught with lecture method.

H_{02}: There is no significant difference between the achievement mean scores of high and low emotional intelligence students taught physics using gallery walk strategy and compare with their counterpart taught with lecture method.

The analysis in Table 3 shows that the value associated with the calculate value of F (0.925) for the effect of emotional intelligence on students' academic achievement in physics concepts is 0.397. Since this value 0.397 is greater than 0.05 level of significance, the null hypothesis was accepted. Thus, there is no significant difference between the mean performance score

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of high emotional intelligence and emotional intelligence students exposed physics concepts using gallery walk strategy and compare with their counterpart taught with lecture method.

Discussion of the Findings

Evidence obtained from Table 3 of this study shows that gallery walk strategy has a significant effect on students' academic achievement in physics. The students exposed to physics concepts using gallery walk strategy performed better than those taught with lecture method. This result is not surprising because gallery walk strategy involves a systematic approach in guiding students through the process of Create and post questions; Group the students, assign roles, and stress team building; Assign stations and begin comments; Rotation and Oral presentation. The gallery walk strategy encourages learners to explore the content through the use of group learning to comprehend physics concepts easily. The result of the findings is in line with study of Ogundiwin et al (2025); Nomsoo et al. (2021); Adewumi (2021); Nwanekezi et al. (2018); Dinata and Anggraini (2017); Ridwan (2019) who concluded that the use of the gallery walk instructional strategy enhances students' understanding of concepts and furthermore, it improves participation, teamwork, and overall academic performance.

The findings revealed enhanced achievement for both high and low emotional intelligent students were equal when the gallery walks strategy was utilized. Additionally, there were no significant differences in the academic achievement mean scores of high and low emotional intelligent students. This indicates that emotional intelligent does not significantly impact the academic performance of students in physics when using the gallery walks strategy. The finding is in line with Rupande (2015) who reported that emotional intelligence plays a crucial role in facilitating personal growth and success in student academic achievement in an educational setting.

Conclusion

Based on the findings of this research study it can be concluded that gallery walk strategy is superior to lecture method. Gallery walk strategy has a significant effect on students' academic achievement in physics. The strategy improved student academic achievement in physics concepts far better than lecture method. It can also be concluded that emotional intelligence has no significant effect on students' academic achievement when exposed to physics concepts using gallery walk strategy. This means that both the high and low emotional intelligence students perform excellently when taught physics concepts using gallery walk strategy. Therefore, gallery walk strategy proved to be non-discriminatory for it is emotional intelligence friendly thereby enhancing academic achievement of both high and low emotional intelligence students at near equal level.

Recommendations

From the results of this study the following recommendations are therefore made:

1. Physics teachers should always adopt gallery walk strategy for teaching their students. This will enable the students to cater for themselves in their classrooms and hence, improve their learning outcomes.
2. Short time training, workshops and seminars should be organized by NGO, ministries of education and related government agencies for training of teachers on how to make use of gallery walk strategy for teaching physics effectively
3. Based on this finding the high and low emotional intelligence students should be encouraged to vigorously pursue most of the physics-based courses since most of the physics concepts can now be explain using gallery walk strategy for it helps to concretize physics abstract concepts such concepts will be easily conceptualized.

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