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The effect of gallery walks on the Biology students' performance in Nigerian senior secondary school

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Abstract

The purpose of this research was to understand how the gallery walks method impacts the academic achievement of Biology students at the Senior Secondary level in Isin Local Government Area of Kwara State in Nigeria. The researchers utilized the pretest-posttest control group quasi-experimental design. The sample population included 103 SSII Biology students from two schools within Isin Local Government Area of Kwara State, Nigeria, who were randomly assigned to the treatment group. The instrument utilized was the Biology Student Performance Test (r=0.81). This research study followed two guiding research questions and hypotheses. The research questions were answered with descriptive statistics of means and standard deviations, while the hypotheses were tested using inferential statistics of Analysis of Covariance: all at 0.05 significance level. The findings from this research indicated that the use of the gallery walks method enhances students' performance in Biology compared to the lecture method. There exists a considerable difference concerning the average academic performance of students taught biology using the gallery walks method in contrast to those taught using the lecture method. The authors concluded that biology teachers should implement the gallery walks technique in instructing biology at the senior secondary level in order for students to learn more effectively and rapidly; also, the method is able to enhance students' self-esteem while improving their academic achievements.

Keywords: academic performance in Biology, gallery walk, gender, self-esteem

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INTRODUCTION

In Nigeria, Biology is one of the science subjects offered at the Senior Secondary Schools level. Biology concerns the study of all living organisms. Ahmad et al. (2018) and Adewumi et al. (2024) report that Biology is the science of life. Biology, as a discipline, is very interesting and captivating, and has always captured scientific attention for centuries. Biological science is crucial to our world because the basis of our origin and existence on earth lies within its depths. It affects each individual's life significantly and impacts virtually all facets of human existence; it helps human life in many ways (Adewumi, 2024). It is instrumental, particularly in the fighting of diseases, the protection and preservation of the environment, and the creation of food. The advances in the area of biology have resulted in high standards of living for the people in terms of food and wellbeing. Because of the hybrids in both plant and animals, crop yield is on the increase as they can resist drought, diseases, and infections.

The objectives to be achieved with Biology as outlined by Nigerian Educational Research and Development Council (NERDC, 2018) include, but are not limited to: Developing Understanding of specific biological concepts fundamental for positive co-existence in a world under science and technology; understanding on the problems of sex, reproduction, growth, pollution, health in relation to the benefit it poses to society; Building skills of application of knowledge in science on day-to-day functioning of self and the community in the area of health, agriculture and extension services; to provide for advancement in technology; to automate the discarding of superstitions in a technologically efficient manner, and develop environmental consciousness.

Even with a well-defined goal for Biology curriculum at the teaching subject level, senior secondary school students still struggle with concepts like genetics, enzymes, and chromosomes. According to Adewumi et al. (2024), senior secondary school students identify genes, chromosomes, Mendelian genetics, and endocrine glands as 'problematic' topics. Students are likely to develop an aversion to such biology topics because most students have a high tendency to ignore responding to questions on such concepts during exams. As noted in the Chief Examiner's Reports, WAEC, in 2018-2022, students shied away from questions involving the genetics diagram, and of the few who attempted it, most got it wrong (WAEC, 2022). Adewumi and Adeoye (2023) indicate that students actively avoid answering questions on genetics in public examinations. The WAEC Chief Examiner's Report (2018-2022) highlights the following as some of the observed weaknesses among students: low command of biological vocabulary and the inability to articulate essential biological vocabulary phrases.

It has been documented that students of Biology in Isin Local Government, Kwara State, Nigeria, have faced some challenges due to the lack of appropriate teaching and learning methods the teachers employed for the subject.

Nigeria has witnessed a consistent decline in its students' academic achievement in the subject of Biology at the senior secondary school level, with students year after year performing worse on science subject external exams (Sodangi et al., 2022). We also think that the major contributing to the lack luster performance of students in Biology stems from a combination of shortage of appropriately trained teachers, over-sized classes, and an outdated pedagogical approach with a heavy reliance on lectures.

The inappropriate teaching strategies practiced by a majority of biology teachers have been cited as the major contributory factor to the students' dismal performance in biology (Jibrin et al., 2016; Bamidele & Yoade, 2017). Other researchers have proposed that biology should be taught using creative teaching methods (Tamimi, 2020; Jibrin et al., 2021; Adewumi & Adeoye, 2023; Yanan & Lei, 2022; Adewumi et al., 2024; Adewumi & Ogundiwin, 2021; Awolere, 2015; Adewumi & Adejoke, 2023).

One of the recommended active teaching methods to be used is gallery walks strategy. David (2015) describes gallery walks strategy as a student-centered teaching and learning strategy that enables students to become physically active by moving around the classroom. Students form small groups of three to six where they share ideas and respond to meaningful questions, documents, images, problem-solving situations, or texts.

The scholars Nwanekezi et al. (2018) and Ridwan (2019) confirmed its attribution to the science area as an exciting strategy to promote class discussion. John (2015) revealed that gallery walks strategy enables learners to improve their work through feedback from multiple peers, as well as their

teachers and even subject experts. Nomsoo et al. (2021), Ridwan (2019), David (2015), and Adewumi (2021) observed that during the gallery walks, students explore a variety of texts or images that are displayed around the classroom. Nwanekezi et al. (2018) reported that gallery walks enable groups of participants to discuss documentative items with active participation as they reflect on the documents displayed which participants examine and respond to while moving as a group from one document display to another.

The instructor implements gallery walks as a means to have learners present their pieces of work to their classmates, examine several documents, or interact with a set of quotations. This is corroborated by John (2015) who asserted that gallery walk is a form of knowledge sharing where students actively participate after they have done some reading or research, or share research to stimulate discussion concerning a particular topic or concept. As noted in class, the gallery walks method is a useful approach for evaluating students' comprehension of the content being taught (Edel-Malizia, 2015). The method of gallery walks enabled students to learn new materials which aid in acquiring certain information that could foster their cognitive development. According to David (2015), a classic form of the gallery walks method requires that students work in groups and rotate in answering or adding to one another's responses at various stations. After every group has completed each station, the class engages in guided presentations followed by discussions.

When concentrating on the students' performance, the issue of gender was also considered. It has been noted that gender refers to the amount of masculinity and feminists found in human beings. As described by Adigun et al. (2015), gender refers to range of distinctions between masculine and feminine populations, including physical, biological, mental, and behavioral attributes. There exists a controversy regarding the performance of gender categories in biology subjects. This is verifiable because there is a general belief among Nigerians that males are more superior to females in academic performance, cognition, and even in sports. This misconception has led to certain vocations being assigned to a particular gender. Oludipe (2016) argues that male students outperform female students, while Eze et al. (2021) suggests that there are no differences in the academic performance of gender groups in science subjects and even found that female students outperform males in sciences. This research examined the impact of gallery walks on the academic achievement of Isin LGA Senior Secondary School Biology students in Kwara State, Nigeria. Gender as a moderating variable was also investigated.

Problem statement and study purposes

While life sciences open doors to many careers, they were noted with concerns in Biology Performance Issues by Public Examiners' Reports of WAEC and NECO. These reports not only indicated lack of students' performance in biology but also pointed towards limited students' understanding of biological concepts. Teachers have tried to resolve these issues through various methods which include fostering teacher-student rapport, managing the teaching environment, controlling sensory input, communication changes, role play interventions, among other methods aimed at improving the teaching and learning of science.

There are still a number of underlying issues that have not been resolved in learning Biology. These may include domestic issues, teaching approaches, schooling conditions, psycho-emotional factors such as gender, emotional intelligence, mental acuity alongside learning preferences, which this study examined. Unfortunately, there have been few studies comparing these factors

and students' performance in Basics, Chemistry, and Mathematics, leaving a gap concerning biological concepts. Therefore, it is crucial to conduct further research in discovering effective instructional methods for teaching biological concepts to students. The past research on the Gallery Walks Strategy exhibited almost no focus on the moderating influence of gender on senior secondary schooling. The strategy has also been applied in other areas. Based on this, the study, therefore, examined the effect of gallery walks on academic performance of senior secondary school Biology student in Isin local Government Area, Kwara State, Nigeria. The moderating variable of gender was also examined.

Therefore, this study aims to investigate the effect of gallery walks on academic performance of Biology students in senior secondary schools in Isin Local Government Area, Kwara – State, Nigeria. Specifically, the study sought to determine the difference between the academic performance mean scores of students taught biology using gallery walks method and compare with their counterpart taught using lecture method. This study also examined the difference between the academic performance mean scores of male and female students taught biology using gallery walks method.

RESEARCH METHOD

The study employed the pretest-posttest control group quasi-experimental research design. The study population was the set of all senior secondary students within Isin Local Government Areas of Kwara State, Nigeria. This study sample comprised MBA students at the level 111 (SS2) in the number of 103 with 45 females and 58 males. Participants for the study were chosen using simple random sampling. For the study, I randomly selected two (2) schools. A self-made examination called the Biology Performance Test (BPT) was administered to students as a measuring tool during the study. This instrument has two major sections: Section A and B. Section A was for students' biodata information and section B contained twenty (20) items of a four (4) options multiple-choice test. One (1) biology teacher from secondary school who was a WAEC/NECO examiner, and two (2) university lecturers, one from science education and the other from test and measurement validated the instrument. The marking schemes and lesson plan were made by the researcher which both were evaluated for face validity and appropriateness for the two groups. The Biology Performance Test Instrument was pilot-tested to ascertain reliability. A reliability index of r=0.81 was obtained.

Both students in the experimental and control groups were given the biology performance test (BPT). The results of the experiment were analyzed using descriptive and inferential statistics. The entire process spanned a length of seven weeks. The means and standard deviation answered 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 AND DISCUSSION

Results

Students' performance taught using gallery walk compared to lecture method

The students' performance mean score in Biology both at the classroom taught using gallery walk method and at the classroom taught by using lecture method is presented in Table 1.

Table 1. Students' performance mean score in Biology

Treatment	N	Mean scores Pre-test		Mean scores Post-test		Means
		X1	SD1	X2	SD2	Gain
Gallery walks method	44	38.50	10.41	69.41	18.23	+30.91
Lecture method	58	27.12	7.12	38.37	11.20	+11.25
Mean Difference	103	11.38		31.04		+18.75

As depicted in Table 1, the experimental group's (gallery walks method) pre-test and post-test mean scores were 38.50 and 69.41 respectively. In comparison, the control group's (lecture method) pre-test and post-test means were 27.12 and 38.37. The analysis above indicates a mean gain of 30.91 for the experimental group and 11.25 for the control group. The difference in mean gain between the experimental group and control group is 18.75. This shows that students taught biological concepts through the gallery walks method outperformed those instructed via the lecture method.

Performance between male and female students

We also compared the students' performance across gender, as presented in Table 2.

Table 2. Students' performance associated with gender

Gender	N	Mean scores Pre-test		Mean scores Post-test		Means
		X1	SD1	X2	SD2	Gain
Male	45	38.02	8.89	61.42	11.61	+23.40
Female	58	41.11	10.45	65.74	12.82	+24.63
Mean Difference	103	3.09		4.32		+1.23

Table 2 indicates the preliminary and final assessment average scores of male and female students who were taught using the gallery walks method (experimental group). According to the analysis, the average scores of male students on the pre-test and post-test were 38.02 and 61.42 respectively. Female students on the other hand had these mean scores 41.11 and 65.74. Considering the analysis above, it can be concluded that female students outperform male students irrespective of the issue at hand or context through the gallery walks method. The difference between the average gain scores of males and females is 23.40 and 24.63 respectively. The difference in their average gain is 1.23 in favor of female students.

Students' performance difference between teaching methods

We drew a hypothesis as follows.

> H01: There is no significant difference between the performances mean scores of students taught biology using gallery walks method and compare with their counterpart taught with lecture method.

The results of the covariance analysis towards the students' performance is presented in Table 3. From Table 3, the impact of the gallery walks method on biology students' academic performance correlates with a retrieved F value of 78.139, which has a p-value (significance level) of 0.001. Given that 0.001 < 0.05, the null hypothesis is rejected while the alternative is accepted. This indicates that significant differences exist in the average post-test scores of

students taught biology using the gallery walks method compared to those taught using the lecture method.

Table 3. Analysis of covariance of post-performance by treatment and gender

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4546.237	2	3117.17	13.632	0.004	0.102
Intercept	3531.317	1	3286.250	207.345	0.000	0.210
Pre-Test	3013.373	1	3036.149	39.531	0.001	0.004
Treatment	3120.624	1	3120.624	78.139	0.001*	0.073
Gender	53.919	2	26.960	0.917	0.671	0.006
Error	87231.200	102	29.135			
Total	11211.000	103				
Corrected Total	12398.820	103				

Denotes significant p<0.05.

Students' performance difference between genders
We drew a hypothesis as follows.

> H02: There is no significant difference between the performance mean score of male and female students taught biology using gallery walks method.

In Table 3, it can be seen that the value attached to the effect of gender on students' academic performance in biology is 0.671 for the calculated value of F (0.917). Because this figure 0.671 exceeds the significance level of 0.05, the null hypothesis was accepted. Therefore, there is no difference of consequence between the academic performance mean scores of male and female students who are taught biology concepts using the gallery walks method.

Discussion

The findings indicate that the use of the gallery walks technique has a profound impact on the academic achievement of students in biology. Students who were taught biological concepts through the gallery walks method performed better than those who were taught using the lecture method. The primary reason as to why gallery walks is more effective than lecture methods was because it promotes total involvement of all group members and their experiences are recognized and they exchange ideas among themselves. This may stem from the fact that the gallery walk participatory interactive stations had pictorial representations concerning various stages of biological concepts being reviewed which, in all likeliness, augmented meaningful learning.

Apart from that, students discussed the contents of each gallery walk using the provided materials, and so they became informed by each other. Students adopted some form of responsibility for their learning. The performance of students in the various tasks provided during lessons showed that Gallery Walks place the learner at the center of lesson delivery enabling learners participate actively during the lesson. This also means that the methods improve learners' performance in various concepts of biology.

The findings of Nomsoo et al. (2021), Nwanekezi et al. (2018), John (2015), Dinata and Anggraini (2017), Ridwan (2019), Chin et al. (2015), David (2015), and Tan and Alcantara (2017) firmly conclude that the use of the gallery walk instructional strategy enhances students' understanding of concepts and

concepts. Furthermore, it improves participation, teamwork, and overall academic performance.

The findings revealed enhanced performance from male and female students equally when the gallery walks method was utilized. Additionally, there were no significant differences in the mean academic performance scores of male and female students. This indicates that gender does not significantly impact the academic performance of students in Biology when using the gallery walks method. These findings are in agreement with Adewumi et al. (2024), Mbaba (2019), and Okwor et al. (2016), who noted that male and female students did not diverge in achievement across science subjects. However, this finding contradicts Olatoye et al. (2022), Ajibade (2019), and Iwendi (2012), who argued that gender is a determining factor in academic performance in several subjects.

CONCLUSION

This study's findings suggest that the gallery walks method is more effective than the lecture method for teaching biological concepts to senior secondary school students in Isin Local Government Area, Kwara State, Nigeria. The gallery walks method surpasses the lecture method in improving student academic performance in biology. It can further be observed that the students' gender does not play any significant role in affecting academic performance when students are taught biological concepts using the gallery walks method. This indicates that all learners, regardless of gender, excel when biological concepts are taught through gallery walks. Based on the findings of this study, the following recommendations were made, gallery walks method should be implemented by teachers to improve performance of students in biological concepts which teachers/students viewed as hard to teach and learn. Gallery walks foster equitable participation among male and female students in the social construction of knowledge. Lectures should not dominate the teaching of practical subjects like biology because their limited capacity to develop psychomotor and critical thinking skills is detrimental to such courses.

REFERENCES

Adewumi, G. S. (2024). Effect of problem-solving strategy on students' academic performance in genetic concepts in biology in senior secondary school in Kogi State Nigeria. *Journal of Language and Culture in Education, 2*(1), 106-114.

Adewumi, G. S. (2021). Effects of gallery walks and mind mapping strategies on students' achievement in genetic concepts in biology in Kwara State Nigeria. *UI Postgraduate College*. http://hdl.handle.net/123456789/1751

Adewumi, G. S., & Adejoke, A. A. (2023). Effect of two instructional strategies on students' science process skills in some selected abstract concepts in biology in Kwara State Nigeria. *Journal of Science, Technology and Mathematics Pedagogy, 1*(1), 242-258.

Adewumi, G. S., & Adeoye, G. A. (2023). Interaction effects of two instructional strategies and mental ability on students' achievement in genetic concepts in biology in Kwara State Nigeria. *Journal of Science, Technology and Mathematics Pedagogy, 1*(1), 69-81.

Adewumi, G. S., & Ogundiwin, O. A. (2021). Effects of gallery walks and mind mapping strategies on students' attitude to some concepts in genetics in biology in Kwara State Nigeria. *Educational Issues Development and Innovations* (pp. 365-373). National Open University of Nigeria.

Adewumi, G. S., Ogundiwin, O. A., & Adeoye, G. A. (2024). Effects of flipped classroom strategy on retention ability of senior secondary school students in abstract concepts in biology in Kwara State Nigeria. *CUSTECH International Journal of Education, 1*(1), 40-54.

Adewumi, G. S., Akanbi, A. A., & Muraina, K. O. (2024). Effect of two instructional strategies on students' achievement at selected abstract concepts: A case study on Biology Learning in Kwara State Nigeria. *Journal of Pedagogy and Education Science (JPES), 3*(2), 140-151.

Adigun, J., Onihunwa, J., Irunokhai, E., Sada, Y., & Adesina, O. (2015). Effect of gender on students' academic performance in computer studies in secondary schools in New Bussa Borgu Local Government of Niger State. *Journal of Education and Practice, 6*(33), 1-7.

Ahmad, S. I., Abubakar, B. B., & Yau, S. (2018). Biology education a panacea for sustainable national development. *Frontiers in Environmental Microbiology*, *4*(2), 71-74. https://doi.org/10.11648/j.fem.20180402.14

Ajibade, D. (2019). Sex differences and students' academics performance and in secondary school in Imeko Afon LGA of Ogun State. *International Journal of Research in Education, 6*(2), 82.

Awolere, S. (2015). Effects of experiential and generative learning strategies on studentsacademi achievement in environmental concepts. *Journal of Human Ecology, 56*(3), 251-262.

Bamidele, E. F., & Yoade, F. B. (2017). Effects of modes of computer animation instructional packages on students' performance in OSUN state secondary schools' biology. *International Journal of Innovation and Research in Educational Sciences, 4*(4), 496-501.

Chin, C. K., Khor, K. H., & Teh, T. K. (2015). Is gallery walk an effective teaching and learning strategy for biology? In E. G. Daniel (ed.), *Biology education and research in a changing planet: Selected papers from the 25th Biennial Asian Association for Biology Education Conference* (pp.55-59). Springer.

David, W. R. (2015). Maximize a team-based learning gallery walks experience herding cats is easier than you think. *Advance in Physiology Education, 39*(4), 411-413.

Dinata, H., & Anggraini, R. W. (2017). The use of gallery walk to enhance the speaking achievement of ninth grade students. *Journal of Language and Literature, 6*(1), 50-56.

Edel-Malizia, S. (2015). Teaching and learning with canvas pedagogical approaches. *PennState*. https://sites.psu.edu/pedagogicalpractices

Eze, T. I., Onwusuru, I. M., & Ginigeme, O. O. (2021). Gender-relative effect of project-based learning method on academic performance and retention of technical college students in basic electricity. *NAU Journal of Technology & Vocational Education, 6*(1), 85-98.

Iwendi, B. C. (2012). Effects of gender and age on mathematics achievement of secondary school students in Minna Metropolis Nigeria. *JOSTMED, 9*(1), 215-223.

Jibrin, A. G., Ibrahim, M., & Zayum (2016). Effect of peer-tutoring on the academic performance of upper basic students in basic science in Dengi Metropolis of Plateau State. *Journal of Nigerian Association of Teachers of Technology, 11*(3), 44-46.

Jibrin, A. G., Abba, H. A., & Mohammed, I. (2021). Effects of cooperative learning instructional strategy on the academic performance of biology students in senior secondary schools in Azare Metropolis. *International Journal of Educational Research and Policy (IJERPM), 4*(1), 683-691.

John, S. (2015). *Take digital strategy as a dimension at everything in Tate paper*. Retrieved from https://www.fate.org.uk/research/publications/tate-papers/19/tate-digitalstrategy.

Mbaba, U. G. (2019). Encouraging gender equality in secondary education: Implications of teaching strategies and students' gender on academic performance in introductory technology. *Journal of Curriculum Studies, 10*(4), 61-73.

NERDC. (2018). *Senior Secondary School Curriculum: Biology for Senior Secondary Schools 1-3*. Nigerian Educational Research and Development Council Press.

Nomsoo, M. M., Bello, G., & Sulaiman, M. M. (2021). Effects of gallery walk instructional strategy on senior school students' achievement in cell division in Ilorin Nigeria. *Journal of Biology Education, 4*(2), 109-123.

Nwanekezi, A. U., Chimene, W., & Kinikanwo-Samuel, E. (2018). Effects of gallery walk teaching strategy on the academic performance of students in basic science concepts in Rivers State. *International Journal of Applied Research, 4*(12), 253-257.

Okwor, U. U., Agu, T. J., & Ukwuaba, P. U. (2016). The effect of charts use on students performance in nutrition (Biology). *College Students Journal, 2*(4), 46-57.

Olatoye, R. A., Aderogba, A. A., & Aanu, E. M. (2022). Effect of co-operative and individualized teaching methods on senior secondary school students' achievement in organic chemistry. *Pacific Journal of Science and Technology, 12*(2), 310-319.

Oludipe, O. I. (2016). Gender difference in Nigerian junior senior secondary students' academic performance in basic science. *Journal of Education and Social Research, 2*(1), 93-99.

Ridwan, M. (2019). Gallery walk: An alternative learning strategy in increasing students' active learning. *The Journal of Literature, 16*(1), 49-63.

Sodangi, U., Isma'il, A., & Abdulrahaman, A. (2022). Perception of secondary school science and mathematics teachers on professional development participation in Zamfara State Nigeria. *Integrity Journal of Education and Training, 6*(2), 37-45.

Tamimi, R. I. S. (2020). Effectiveness of project-based learning on students' performance and motivation towards English in an EFL environment. *Hebron University Research Journal, 15*(2), 237-268.

Tan, C. S., & Alcantara, N. B. (2017). Gallery walk technique in teaching selected topics in English and learners' performance. *International Journal of Advanced Research, 5*(3), 1000-1002. http://doi.org/10.21474/IJAR01/3598

WAEC. (2022). *Chief examiner's report*. Lagos: WAEC Press.

Yanan, Z., & Lei, W. (2022). A case study of student development across project-based learning units in middle school chemistry. *Disciplinary and Interdisciplinary Science Education Research, 4*(5), 1-20.

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