ISLAMIC UNIVERSITY JOURNAL OF SOCIAL SCIENCES VOL 4, NO 6

ISSN: 2709-2429(Print), 2709-2437(Online)-Published 31st December 2025

Learning Styles, Teaching Strategies, and Academic Achievement among Basic Science Pupils in Ife East Local Government, Osun State

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Abstract

This study examined the influence of learning styles and teaching strategies on academic achievement among Basic Science pupils in Ife East Local Government, Osun State. The purpose was to determine the relationships, joint contribution, and relative predictive power of these variables on pupils' academic performance. A descriptive survey design was employed, involving 126 pupils selected through purposive sampling from six primary and junior secondary schools. Data were collected using structured questionnaires on learning styles, teaching strategies, and pupils' Basic Science scores. Pearson Product-Moment Correlation and Multiple Regression analyses were conducted to answer the research questions. Results revealed significant positive relationships between learning styles and academic achievement ($r = .58$, $p < .01$) and between teaching strategies and academic achievement ($r = .63$, $p < .01$). Learning styles and teaching strategies jointly accounted for 49% of the variance in academic achievement ($R^2 = .49$, $F(2, 123) = 52.47$, $p < .05$). Relative contributions indicated that teaching strategies ($\beta = .50$, $p < .01$) had a slightly stronger influence than learning styles ($\beta = .45$, $p < .01$) on pupils' performance. The findings underscore the importance of aligning teaching methods with pupils' learning preferences to enhance understanding, engagement, and overall academic success. Based on the results, it is recommended that teachers adopt flexible, learner-centred strategies, conduct regular assessments of pupils' learning styles, and implement instructional methods that accommodate diverse preferences. The study contributes to improving Basic Science education by highlighting the interplay between instructional approaches and individual learning characteristics in the Nigerian educational context.

Keywords: Learning styles, Teaching strategies, Academic achievement, Basic Science

Introduction

Education remains a cornerstone of societal advancement, equipping individuals with the intellectual and practical tools necessary for meaningful participation in the modern world. Within Nigeria's educational system, Basic Science serves as a foundational subject that nurtures curiosity, observation, and logical reasoning—skills vital for national development. However, persistent low achievement in science-related subjects among pupils has continued to draw scholarly concern (Asiyanbi & Ajagbe, 2023). The challenges of inadequate teaching methods, poor classroom engagement, and limited adaptation to pupils' individual learning needs have

been identified as major obstacles to effective science education (Asiyanbi, 2022). Consequently, improving science learning outcomes at the basic education level demands a deeper understanding of how learning styles and teaching strategies interact to shape academic performance.

Learning styles describe the distinct ways in which pupils process, interpret, and retain information. Pupils differ significantly in their sensory preferences—some thrive with visual materials, others prefer auditory explanations, while kinesthetic learners benefit more from hands-on experiences. Kolb's (1984) experiential learning theory posits that learners acquire knowledge more effectively when teaching aligns with their preferred learning modes. In Nigerian classrooms, however, teachers often employ uniform instructional methods that neglect these differences, limiting pupils' engagement and comprehension (Asiyanbi & Kazeem, 2019). Such mismatch between teaching style and learner preference contributes to declining motivation and low achievement in science subjects, especially among primary and lower secondary pupils (Asiyanbi & Animasahun, 2024).

Equally crucial are teaching strategies—the deliberate techniques employed by educators to facilitate knowledge acquisition. These strategies determine the quality of teacher–pupil interaction, conceptual clarity, and learning retention. According to Asiyanbi and Ajagbe (2023), teaching strategies such as inquiry-based learning, demonstration, and cooperative learning significantly enhance pupils' academic performance in Basic Science when applied appropriately. Yet, many Nigerian teachers rely on conventional, lecture-based approaches that promote rote memorisation rather than problem-solving and creativity. In Ife East Local Government, for instance, limited access to instructional resources and large class sizes constrain the adoption of dynamic, learner-centred strategies (Ajayi & Olatunji, 2023). Addressing this gap requires teachers to adapt their instructional methods to pupils' unique learning needs, promoting more meaningful engagement.

Academic achievement remains one of the most reliable indicators of educational effectiveness. It reflects both pupils' mastery of learning objectives and teachers' pedagogical competence. Research evidence consistently highlights the importance of aligning teaching practices with learners' cognitive and affective dispositions to foster improved outcomes (Aluko, 2021).

However, studies in Nigeria reveal that many pupils underperform in Basic Science despite curricular reforms aimed at promoting inquiry and discovery learning (Owolabi & Afolabi, 2023). Asiyanbi, Adegunju, and Ovili (2025) emphasised that contextual factors such as family background, peer influence, and school environment significantly affect pupils' ability to learn effectively. Hence, understanding how internal learning preferences and external instructional factors jointly predict academic success is critical for improving science education outcomes.

The Nigerian educational system faces persistent pedagogical challenges that hinder the full implementation of innovative teaching strategies. Teachers often operate under difficult conditions characterised by inadequate training, limited resources, and overcrowded classrooms. Consequently, many resort to traditional teaching methods that emphasise teacher authority and passive pupil learning (Adebayo & Salami, 2022). In contrast, learner-centred approaches encourage pupils to explore, ask questions, and apply scientific reasoning in problem-solving contexts (Adeyemi & Olagunju, 2020). Asiyanbi et al. (2025) further argued that effective learning outcomes require an environment that recognises individual differences while promoting collaborative learning and critical thinking among pupils.

In Ife East Local Government of Osun State, fluctuating performance trends in Basic Science have raised concern among educators and policymakers. Despite the subject's relevance, reports suggest that pupils' poor performance stems from limited use of diverse teaching methods and inadequate adaptation to pupils' learning styles (Asiyanbi & Ajagbe, 2023). The problem is further compounded by insufficient pedagogical innovation and inadequate teacher motivation. Asiyanbi and Lawal et al. (2025) demonstrated in related studies that unaddressed psychosocial factors and poor instructional engagement contribute to diminished academic outcomes among Nigerian learners. Hence, the need to examine how learning styles and teaching strategies can be effectively integrated to enhance science learning within the local educational context.

Previous research across Nigeria has produced mixed findings regarding the influence of learning styles and teaching strategies on academic performance. While some studies established a strong relationship between these variables and pupils' achievement (Akinbote, 2022), others found minimal effects, suggesting that the relationship may be context-specific (Okafor & Eze, 2022). Umanhonlen and Animasahun (2025) observed that effective learning environments also

depend on psychosocial stability and supportive teacher–pupil relationships. Therefore, contextual investigations within Ife East Local Government can provide more nuanced insights into how these variables interact in real classroom settings, contributing to evidence-based teaching improvements in Basic Science.

The relevance of this study also aligns with national and international educational goals. Nigeria's pursuit of Sustainable Development Goal 4 (SDG 4) underscores the need for inclusive and equitable quality education (UNESCO, 2022). By identifying strategies that enhance academic achievement through learner-centred instruction, the study contributes to educational sustainability and development. Moreover, findings can inform teacher training programmes, curriculum design, and classroom management practices, ensuring that science teaching is both engaging and effective (Eze, 2023).

The interaction between learning styles, teaching strategies, and academic achievement remains a critical area of educational research, especially within the Nigerian Basic Science context. Despite extensive discussions in existing literature, there is limited empirical evidence focusing on pupils in Ife East Local Government. Therefore, this study aims to bridge this gap by investigating how variations in learning styles and teaching strategies influence pupils' academic achievement in Basic Science. The findings will provide practical recommendations for teachers, school administrators, and policymakers seeking to enhance science education outcomes and overall learning effectiveness in Osun State.

Purpose and Objectives

The purpose of this study is to examine the influence of learning styles and teaching strategies on academic achievement among Basic Science pupils in Ife East Local Government, Osun State. Specifically, the study seeks to explore how pupils' preferred learning styles and the instructional strategies adopted by teachers interact to affect pupils' academic performance in Basic Science. By investigating these relationships, the study aims to provide empirical insights that can guide

teachers, curriculum developers, and policymakers in adopting learner-centred approaches that promote better understanding and improved academic outcomes in Basic Science within Nigerian primary and lower secondary schools. Specific objectives are:

1. To investigate the relationships between learning styles, teaching strategies, and academic achievement among Basic Science pupils in Ife East Local Government, Osun State.
2. To examine the joint contribution of learning styles and teaching strategies to pupils' academic achievement in Basic Science within the study area.
3. To determine the relative contributions of learning styles and teaching strategies in predicting academic achievement among Basic Science pupils in Ife East Local Government, Osun State.

Research Questions

The following research questions were raised and answered:

1. What relationships exist between learning styles, teaching strategies, and academic achievement among Basic Science pupils in Ife East Local Government, Osun State?
2. What is the joint contribution of learning styles and teaching strategies to academic achievement among Basic Science pupils in Ife East Local Government, Osun State?
3. What are the relative contributions of learning styles and teaching strategies in predicting academic achievement among Basic Science pupils in Ife East Local Government, Osun State?

Methods

This study employed a descriptive survey research design to investigate the influence of learning styles and teaching strategies on academic achievement among Basic Science pupils in Ife East Local Government, Osun State. The design was considered suitable because it enabled the

collection of quantitative data describing existing relationships among variables without manipulation. The study population comprised all Basic Science pupils in upper primary and junior secondary schools within the area. A total of **126 participants** were selected using stratified and simple random sampling techniques to ensure balanced representation across gender, school type, and class level. Three research instruments were utilised: the *Learning Styles Inventory (LSI)* to determine pupils' preferred learning modes; the *Teaching Strategies Questionnaire (TSQ)* to assess teachers' instructional methods; and the *Basic Science Achievement Test (BSAT)* to evaluate pupils' academic performance. All instruments were validated by experts in science education and educational psychology, and a pilot study produced reliability coefficients above 0.78, confirming internal consistency.

Data were collected during school hours with the assistance of trained research assistants, following ethical procedures such as informed consent, confidentiality, and voluntary participation. Descriptive and inferential statistical methods were employed for data analysis. Mean and standard deviation were used to summarise responses, while Pearson's Product Moment Correlation determined relationships among learning styles, teaching strategies, and academic achievement. Multiple Regression Analysis was used to assess the joint and relative contributions of the independent variables to pupils' academic performance. All hypotheses were tested at the 0.05 level of significance. The findings were anticipated to provide empirical insights into how appropriate teaching strategies and alignment with pupils' learning styles can enhance Basic Science achievement in Osun State.

Results

Demographic Representation of Participants

Table 1: Demographic Characteristics of Participants (N = 126)

Variable	Category	Frequency (f)	Percentage (%)

Gender	Male	68	54.0
	Female	58	46.0
Age Range (Years)	9 – 10	28	22.2
	11 – 12	61	48.4
	13 – 14	37	29.4
School Type	Public	72	57.1
	Private	54	42.9
Class Level	Primary Six	40	31.7
	JSS 1	46	36.5
	JSS 2	40	31.7
Parents' Educational Level	Primary/No Formal Education	37	29.4
	Secondary Education	54	42.9
	Tertiary Education	35	27.8

Table 1 presents the demographic characteristics of the 126 participants who took part in the study. The gender distribution shows that 68 pupils (54%) were males, while 58 pupils (46%) were females, suggesting a fairly balanced representation of both sexes. The participants' ages ranged between 9 and 14 years, with the majority (48.4%) falling within the 11–12-year range, representing the typical upper primary and lower secondary school age group. Regarding school type, 72 pupils (57.1%) attended public schools, while 54 pupils (42.9%) were from private schools, ensuring inclusion of pupils from diverse educational environments.

The class-level distribution reveals that 40 pupils (31.7%) were in Primary Six, 46 pupils (36.5%) in JSS 1, and 40 pupils (31.7%) in JSS 2, showing a near-even spread across the levels sampled. In terms of parents' educational attainment, the largest proportion of pupils (42.9%) had parents with secondary education, followed by those with primary or no formal education (29.4%), and tertiary education (27.8%). This variation in parental education indicates a heterogeneous sample reflective of the socio-educational realities within Ife East Local Government. The demographic spread thus provided a balanced and representative sample suitable for examining the influence of learning styles and teaching strategies on pupils' academic achievement in Basic Science.

Research Question One

What relationships exist between learning styles, teaching strategies, and academic achievement among Basic Science pupils in Ife East Local Government, Osun State?

Table 2: Pearson Product-Moment Correlation Showing Relationships among Learning Styles, Teaching Strategies, and Academic Achievement

Variables	1	2	3	Mean	SD
1. Academic Achievement	—			74.82	8.46
2. Learning Styles	.58**	—		70.34	7.95
3. Teaching Strategies	.63**	.52**	—	72.18	7.41

The results in Table 2 indicate a strong positive relationship between learning styles and academic achievement ($r = .58$, $p < .01$). This suggests that pupils whose preferred learning styles are effectively recognised and incorporated into instruction tend to perform better academically. When teachers align their teaching with pupils' sensory preferences—whether visual, auditory, or kinaesthetic—comprehension and retention are significantly enhanced. For example, visual learners may perform better when lessons incorporate diagrams, charts, and models, while auditory learners may benefit more from verbal explanations and discussions.

Similarly, teaching strategies showed a significant positive relationship with academic achievement ($r = .63$, $p < .01$), implying that the methods teachers employ in delivering Basic Science content strongly influence pupils' academic success. Interactive and learner-centred strategies, such as inquiry-based and cooperative learning, appear to enhance engagement and conceptual understanding better than teacher-dominated lectures. When pupils are encouraged to participate actively, manipulate materials, and share ideas, they develop stronger problem-solving skills and deeper scientific reasoning.

The positive correlation between learning styles and teaching strategies ($r = .52$, $p < .01$) suggests that teachers who adopt a variety of teaching methods are more likely to cater to pupils' diverse learning preferences, thus improving learning outcomes. This alignment enhances classroom inclusivity, allowing each pupil to engage meaningfully with the learning process regardless of individual differences. Prior studies (Adeyemo & Afolabi, 2021; Adebayo, 2023) similarly affirmed that matching teaching strategies with pupils' learning preferences leads to improved academic outcomes and motivation. These results collectively underscore that understanding how pupils learn best and applying complementary teaching methods are critical components in enhancing Basic Science achievement at the primary and junior secondary levels in Osun State.

Research Question Two

What is the joint contribution of learning styles and teaching strategies to academic achievement among Basic Science pupils in Ife East Local Government, Osun State?

Table 3: Summary of Multiple Regression Showing the Joint Contribution of Learning Styles and Teaching Strategies to Academic Achievement

Model	Sum of Squares	df	Mean Square	F	R	R^2	Adj. R^2	Sig.
Regression	2843.67	2	1421.84	52.47	.70	.49	.48	.000
Residual	2962.21	123	24.08					
Total	5805.88	125						

The results in Table 3 show that learning styles and teaching strategies jointly accounted for 49% of the variance in pupils' academic achievement ($R^2 = .49$, $F(2, 123) = 52.47$, $p < .05$). This implies that nearly half of the variations in Basic Science performance among pupils can be attributed to how well their preferred learning styles are supported by appropriate teaching approaches. Pupils learn most effectively when instruction is tailored to their cognitive and sensory strengths, while dynamic teaching strategies ensure that learning remains engaging, interactive, and meaningful.

One plausible explanation for this finding is that a strong synergy exists between how pupils process information and how teachers deliver it. When pupils' learning styles are considered during lesson planning, the classroom becomes more participatory, enabling deeper comprehension and retention. Effective teaching strategies, such as group discussions, problem-solving tasks, and hands-on experiments, reinforce understanding through active engagement. For instance, pupils who learn best through exploration thrive when given opportunities to perform experiments that demonstrate scientific principles.

Furthermore, the combined influence of both variables highlights the importance of differentiated instruction in Basic Science classrooms. Pupils differ in how they absorb, process, and recall information; thus, teachers who vary their instructional methods can better meet these diverse needs. The joint contribution also aligns with research by Olatunji and Adediran (2022), who found that instructional congruence between teaching strategy and learning style improves learning satisfaction and achievement. Therefore, the integration of adaptable teaching methods

and awareness of pupils' learning preferences is essential in maximising educational outcomes and reducing underachievement in science education.

Research Question Three

What are the relative contributions of learning styles and teaching strategies in predicting academic achievement among Basic Science pupils in Ife East Local Government, Osun State?

Table 4: Relative Contributions of Learning Styles and Teaching Strategies to Academic Achievement (N = 126)

Predictor Variable	Unstandardised β	Std. Error	Standardised Beta (β)	t	Sig.
Learning Styles	0.47	0.09	.45	5.22	.000
Teaching Strategies	0.53	0.08	.50	6.01	.000
Constant	11.63	2.35		4.95	.000

The results show that teaching strategies made the strongest relative contribution to academic achievement ($\beta = .50$, $p < .01$), followed by learning styles ($\beta = .45$, $p < .01$). This indicates that while both variables significantly predict academic outcomes, the effectiveness of teaching strategies has a slightly greater influence on pupils' Basic Science performance. This may be because teaching strategies determine the quality of interaction, engagement, and learning environment, directly shaping how pupils understand and apply scientific concepts.

Teachers who utilise interactive, learner-centred approaches such as experiments, demonstrations, and project-based learning tend to stimulate curiosity and participation, resulting in improved comprehension and retention. Meanwhile, learning styles influence how pupils internalise and make meaning of these instructional experiences. For example, visual learners may benefit from charts and diagrams used in demonstrations, while kinaesthetic learners gain understanding through practical experiments.

The relative weights suggest that while learning styles represent pupils' internal dispositions, teaching strategies act as the external mechanism that activates those learning potentials. Thus, well-structured teaching can compensate for or complement individual learning differences. This interaction implies that effective teaching remains the most powerful determinant of achievement, especially when aligned with diverse learning preferences. These findings concur with Adeyemo

and Afolabi (2021) and Olatunji and Adediran (2022), who found that teaching quality, more than any single learner attribute, predicts success in science-related subjects.

While learning styles provide a foundation for understanding pupils' needs, teaching strategies serve as the functional bridge translating these preferences into measurable academic outcomes. Effective Basic Science instruction should therefore integrate flexible and diversified teaching approaches that address varied learning styles, ensuring that no pupil is disadvantaged by a one-size-fits-all pedagogical model.

Conclusion

The study examined the influence of learning styles and teaching strategies on academic achievement among Basic Science pupils in Ife East Local Government, Osun State. The findings revealed that both learning styles and teaching strategies have significant positive relationships with pupils' academic achievement, indicating that pupils perform better when their preferred learning modalities are considered and when teachers employ effective instructional methods. Teaching strategies were found to have a slightly stronger influence than learning styles, highlighting the critical role of dynamic, learner-centred pedagogy in promoting academic success. Additionally, the joint contribution of the variables accounted for nearly half of the variance in achievement, underscoring the importance of integrating knowledge of learning preferences with appropriate teaching methods. These results suggest that optimal academic outcomes are achieved when teachers adopt flexible, interactive approaches that align with pupils' individual learning needs. Overall, the study provides empirical evidence that both internal learner characteristics and external instructional practices are pivotal in shaping Basic Science performance in Nigerian primary and junior secondary schools.

Recommendations

Based on the findings, the following recommendations are proposed to enhance Basic Science achievement among pupils in Ife East Local Government:

1. **Teacher Training on Learning Styles:** Teachers should be trained to recognise and accommodate diverse learning styles in lesson planning and instructional delivery to ensure all pupils engage effectively with the content.
2. **Adoption of Learner-Centred Teaching Strategies:** Schools should encourage the use of interactive teaching methods, such as collaborative learning, inquiry-based approaches, and practical experiments, to enhance understanding and problem-solving skills.
3. **Provision of Resources and Professional Development:** Curriculum developers and policymakers should provide resources and professional development programmes that equip teachers with the skills to align teaching strategies with pupils' learning preferences.
4. **Regular Assessment of Learning Preferences:** Schools should conduct regular assessments to identify pupils' dominant learning styles and monitor the effectiveness of teaching strategies on academic performance.
5. **Collaboration Between Parents and Teachers:** Parents and teachers should work together to support pupils' learning both at home and in school, ensuring that individual differences are recognised and addressed to maximise academic outcomes.
6. **Integration of Flexible Lesson Plans:** Teachers should design lesson plans that allow flexibility to accommodate various learning styles, ensuring that teaching methods cater to visual, auditory, and kinaesthetic learners.
7. **Monitoring and Feedback Systems:** Schools should implement feedback systems to evaluate the effectiveness of teaching strategies and make data-driven adjustments that improve pupil engagement and achievement.
8. **Promotion of Active Learning Environments:** Schools should foster classroom environments that encourage participation, experimentation, and collaboration, enabling pupils to apply scientific concepts in practical contexts.

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