



LEARNING STYLE PREFERENCES AND ACADEMIC RESILIENCE AS CORRELATES OF SECONDARY SCHOOL STUDENTS' ACADEMIC ACHIEVEMENT IN PHYSICS IN ENUGU STATE

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ABSTRACT

This study investigated the relationship between learning style, academic resilience, and secondary school students' academic achievement in Physics in Enugu State, Nigeria. A correlational research design was adopted. Two research questions and two null hypotheses guided the study. The population comprised 12,329 Senior Secondary School Two (SS II) Physics students in 292 public secondary schools, from which a sample of 711 students was selected using purposive, proportionate, and simple random sampling techniques. Data were collected using the Learning Style Inventory (LSI), the Academic Resilience Questionnaire (ARQ), and students' Physics achievement scores. The instruments were validated by three experts in educational sciences and psychology, and Cronbach's alpha reliability coefficients of 0.71 (LSI) and 0.75 (ARQ) were obtained. Data were analysed using the Pearson Product-Moment Correlation Coefficient at the 0.05 level of significance. The findings revealed that learning style and academic resilience each had a positive and statistically significant relationship with students' academic achievement in Physics. The study concluded that students with more effective learning style preferences and higher levels of academic resilience tended to achieve better academic outcomes in Physics. It was recommended that teachers support students in identifying effective learning strategies while fostering academic resilience through classroom practices and guidance programmes to improve achievement in Physics.

Keywords: Academic Resilience, Academic achievement, Learning Styles, Physics

Introduction

Physics is a core science subject that explains the fundamental principles governing matter, energy, motion, and their interactions. As one of the foundational sciences, it underpins technological innovation and scientific advancement, making it indispensable to national development. At the secondary school level, Physics equips students with critical thinking, analytical reasoning, quantitative, and problem-solving skills that are essential for further studies and careers in engineering, medicine, computer science, architecture, and other science- and technology-related fields (Ugwu, Fagbenro, & Akano, 2019). Despite its importance, students' academic achievement in Physics has remained persistently low, particularly in external examinations. In Enugu State, only 49.60%, 49.32%, and 48.74% of candidates obtained credit passes in Physics in the 2022, 2023, and 2024 West African Senior School Certificate Examination



(WASSCE), respectively (WAEC Results for Enugu State, 2022, 2023, & 2024; Sakata, 2024). This consistent pattern of low achievement continues to raise concerns among educators, policymakers, parents, and other stakeholders, despite interventions such as the recruitment of qualified Physics teachers and the integration of digital technologies into classroom instruction (Nwigboji & Okafor-Agbala, 2025; Nwajagu & Asiegbu, 2022; Oguezie, 2025). The persistence of this problem suggests that factors beyond instructional resources and teacher quality may influence students' achievement in Physics. Consequently, there is a need to investigate learner-related factors, particularly learning styles and academic resilience, which may be associated with students' academic achievement in Physics.

Learning style preference refers to an individual's preferred way of receiving, processing, organising, and applying information during learning activities (Duru, 2021; Xing, 2023). As an important learner characteristic, it reflects how students naturally engage with instructional content and classroom experiences. Recognising students' learning style preferences enables teachers to adopt instructional approaches that accommodate diverse learning needs, potentially improving students' engagement, comprehension, and academic achievement. Empirical studies have reported that learning style preferences are associated with students' learning outcomes and academic achievement across different educational contexts (Moser & Zumbach, 2018; Chen & Chen, 2018; Magulod Jr., 2019). Among the various frameworks for understanding learning preferences, the Visual, Auditory, Read/Write, and Kinesthetic (VARK) model proposed by Fleming is one of the most widely used. The VARK model classifies learners' preferences into four modalities: visual, auditory, read/write, and kinesthetic, each representing a distinct way in which learners prefer to receive, process, and retain information (Desire, 2019).

Visual learners, for instance, prefer information presented through images and other visual representations such as charts, diagrams, graphs, maps, videos, and presentation slides, which facilitate their understanding of concepts (Nja et al., 2019). In Physics, visual representations of abstract concepts can enhance conceptual understanding. Auditory learners, in contrast, learn more effectively through listening and verbal interaction, benefiting from lectures, discussions, oral explanations, and audio recordings. Read/write learners prefer text-based instructional materials, including textbooks, handouts, note-taking, and other written resources. Kinesthetic learners, on the other hand, learn best through active engagement in practical activities such as laboratory experiments, demonstrations, simulations, and hands-on tasks. Although learners may exhibit a dominant preference, they often employ a combination of these learning modalities depending on the instructional context. Similarly, kinesthetic learners, also referred to as tactile learners, prefer acquiring knowledge through physical interaction and hands-on experiences. They learn most effectively through demonstrations, experiments, simulations, case studies, exploration, and other practical activities that actively engage them in the learning process (Raju & Madhuru, 2022). In Physics, kinesthetic learners are likely to develop a deeper understanding of concepts through laboratory experiments and other experiential learning activities. Nevertheless, students' academic achievement in Physics may depend not only on their learning style preferences but also on their level of academic resilience.

Academic resilience refers to students' ability to adapt successfully to academic challenges, recover from setbacks, and sustain positive academic performance despite adverse circumstances (Romano et al., 2021). It enables learners to overcome academic difficulties, remain motivated,



and view challenges as opportunities for growth (Olusoji et al., 2021; Ojeleye et al., 2023). Academically resilient students are more likely to persevere through demanding learning tasks, maintain sustained effort, and achieve better academic outcomes despite experiencing obstacles or failure (Abubakar et al., 2021). In Physics, where students frequently encounter abstract concepts and complex problem-solving tasks, academic resilience may play a crucial role in sustaining engagement and improving academic achievement (Uzoma et al., 2022).

Although learning style preferences and academic resilience have been widely investigated in relation to students' academic achievement, empirical findings remain inconclusive. While some studies reported significant positive relationships between these variables and students' academic achievement (Adeyemi, 2019; Halim et al., 2021; Uzoma et al., 2022), others found weak or non-significant relationships (Xiaojie & Xianmin, 2016; Anosike & Okigbo, 2023). These inconsistencies suggest that the relationships between learning style preferences, academic resilience, and academic achievement may vary across educational contexts. Moreover, there is limited empirical evidence on the relationship between these variables and secondary school students' academic achievement in Physics in Enugu State. This gap in the literature provided the rationale for the present study.

Statement of the problem

Despite sustained efforts to improve the teaching and learning of Physics in public secondary schools, students' academic achievement in the subject has remained persistently low in Enugu State, as reflected in recent West African Senior School Certificate Examination (WASSCE) results. This continued poor performance has raised concerns among educators, parents, and policymakers, suggesting that improvements in instructional practices alone may not be sufficient to enhance students' achievement in Physics. Consequently, attention has shifted towards learner-related factors that may be associated with academic achievement, particularly learning style preferences and academic resilience. Although these variables have been widely studied in different educational contexts, empirical findings remain inconclusive, and there is limited evidence on their relationship with secondary school students' academic achievement in Physics in Enugu State. This gap in the literature necessitated the present study, which investigated the relationship between learning style preferences, academic resilience, and secondary school students' academic achievement in Physics in Enugu State.

Purpose of the Study

The purpose of this study was to determine the relationship between learning style preferences, academic resilience, and secondary school students' academic achievement in Physics in Enugu State. Specifically, the study sought to determine:

1. The relationship between secondary school students' learning style preferences and their academic achievement in Physics in Enugu State.
2. The relationship between secondary school students' academic resilience and their academic achievement in Physics in Enugu State.



Research Questions

The following research questions guided the study:

1. What is the relationship between secondary school students' learning style preferences and their academic achievement in Physics in Enugu State?
2. What is the relationship between secondary school students' academic resilience and their academic achievement in Physics in Enugu State?

Hypotheses

The following null hypotheses were formulated and tested at the 0.05 level of significance:

1. There is no significant relationship between secondary school students' learning style preference and their academic achievement in Physics in Enugu State.
2. There is no significant relationship between secondary school students' academic resilience and their academic achievement in Physics in Enugu State.

Methods

This study adopted a correlational research design to examine the relationships among learning style preferences, academic resilience, and students' academic achievement in Physics without manipulating any of the variables. The study was conducted in Enugu State, Nigeria, due to the persistently low performance of students in Physics in the Senior School Certificate Examination (SSCE) between 2022 and 2024. The population comprised 12,329 Senior Secondary School Two (SS II) Physics students in 292 public secondary schools during the 2025/2026 academic session.

A sample of 711 students was selected using a multistage sampling procedure involving purposive, proportionate, and simple random sampling techniques. First, three education zones (Awgu, Nsukka, and Udi) with relatively high enrolment of SS II Physics students were purposively selected. Subsequently, 10% of public secondary schools within the selected zones were proportionately sampled, after which students were selected through simple random sampling to obtain the required sample size.

Data were collected using two adapted instruments: the Learning Style Inventory (LSI) and the Academic Resilience Questionnaire (ARQ), while students' Physics termly examination scores were used as the measure of academic achievement. The instruments were validated by experts in Science Education and Educational Measurement and Evaluation. Internal consistency reliability was established using Cronbach's alpha, yielding coefficients of 0.71 for the LSI and 0.75 for the ARQ.

Data collection was carried out with the assistance of 17 trained Physics teachers who served as research assistants. Out of 711 copies of the questionnaire administered, 680 were correctly completed and returned, representing a 95.6% response rate. Data were analysed using the Pearson Product-Moment Correlation Coefficient to determine the relationships among the variables. All hypotheses were tested at the 0.05 level of significance.



Results

Research Question 1: What is the relationship between secondary school students' learning style preferences and their academic achievement in Physics in Enugu State?

Table 1: Pearson r on the Relationship between Secondary School Students' Learning Style Preferences and their Academic Achievement in Physics

Source of Variation	N	r	Remark
Learning Style Preferences Academic Achievement	680	0.605	High Positive Relationship

Results in Table 1 show that there is a high positive relationship existing between secondary school students' learning style preferences and their academic achievement in Physics in Enugu State. This is evident by the value of Pearson's Correlation Coefficient r , which is 0.605.

Hypothesis One: There is no significant relationship between secondary school students' learning style preference and their academic achievement in Physics in Enugu State.

Table 2: Test of Significance of Pearson Relationship between Secondary School Students' Learning Style Preferences and their Academic Achievement in Physics

Source of Variation	N	r	P-value	Remark
Learning Style Preferences Academic Achievement	680	0.605	0.00	Sig.

Analysis in Table 2 shows that there is a significant relationship between secondary school students' learning style preferences and their academic achievement in Physics. The result shows a strong positive and statistically significant relationship ($r = 0.605$, $n = 680$, $p < .05$). This implies that students with more defined or effective learning style preferences tend to achieve higher scores in Physics.

Research Question 2: What is the relationship between secondary school students' academic resilience and their academic achievement in Physics in Enugu State?

Table 3: Pearson r on the Relationship between Secondary School Students' Academic Resilience and their Academic Achievement in Physics

Source of Variation	N	r	Remark
Academic Resilience Academic Achievement	680	0.638	High Positive Relationship

Results in Table 2 show that there is a high positive relationship existing between secondary school students' academic resilience and their academic achievement in Physics in Enugu State. This is evident by the value of Pearson's Correlation Coefficient r , which is 0.638.



Hypothesis Two: There is no significant relationship between secondary school students' academic resilience and their academic achievement in Physics in Enugu State.

Table 4: Test of Significance of Pearson Relationship between Secondary School Students' Academic Resilience and their Academic Achievement in Physics.

Source of Variation	N	r	P-value	Remark
Academic Resilience Academic Achievement	680	0.638	0.00	Sig.

Table 4 shows the relationship between academic resilience and students' academic achievement in Physics. The result reveals a strong positive and statistically significant relationship ($r = 0.638$, $n = 680$, $p < 0.05$). This implies that students with higher levels of academic resilience tend to record better achievement in Physics.

Discussion

Students' Learning Style Preferences and their Academic Achievement

The findings of the study revealed a positive and statistically significant relationship between students' learning style preferences and their academic achievement in Physics in Enugu State. This implies that students who demonstrate more effective or well-aligned learning style preferences tend to achieve higher scores in Physics. In essence, appropriate learning style preferences are associated with improved academic performance in Physics.

This finding is consistent with the results of Halim et al. (2021), who reported a significant positive relationship between learning style preferences and students' learning outcomes in Physics. Similarly, Dennis and Ndege (2024) found that visual, auditory, and kinesthetic learning preferences were significantly related to students' achievement in Chemistry, while Salas and Doronio (2024) reported a significant relationship between learning style preferences and students' achievement in Mathematics. Collectively, these findings suggest that learning style preferences are associated with students' academic performance across science-related subjects. In the same vein, Sakata (2024) observed a statistically significant positive relationship between learning style preferences and students' academic achievement, while Nja et al. (2019) also reported a significant correlation between learning style preferences and academic performance. These convergent findings reinforce the position that learning style preferences are meaningfully associated with students' academic achievement.

Students' Academic Resilience and Academic Achievement

The findings of the study revealed a positive and statistically significant relationship between students' academic resilience and their academic achievement in Physics in Enugu State. This indicates that students with higher levels of academic resilience tend to achieve better performance in Physics. In essence, academic resilience is associated with improved academic achievement among secondary school students.

This finding may be explained by the fact that academically resilient students are better able to maintain motivation, persist in the face of academic challenges, and regulate emotional responses to difficult learning situations, thereby supporting sustained academic engagement and performance.

The result is consistent with Sridevi (2024), who reported a significant positive relationship between academic resilience and academic achievement among adolescents. Similarly, Kelly and



Ileri (2022) found a strong and positive association between academic resilience and academic achievement, while Amzil (2023) observed that high-achieving students tend to demonstrate greater academic resilience than their low-achieving counterparts. In the same direction, Halimi et al. (2024) reported that academic resilience is positively associated with academic success. Collectively, these findings suggest that academic resilience plays an important role in students' academic functioning, particularly in challenging subjects such as Physics.

Conclusion

The study concluded that students' learning style preferences and academic resilience are significantly related to their academic achievement in Physics among secondary school students in Enugu State. These variables therefore represent important correlates of academic achievement in Physics within the study context. The findings suggest that attention to learning style preferences and the development of academic resilience may be relevant considerations in efforts aimed at improving students' academic outcomes in Physics.

Recommendations

1. Physics teachers should employ diverse teaching strategies that accommodate students' different learning style preferences during classroom instruction.
2. School counsellors should organise guidance and counselling programmes that help students develop academic resilience for effective coping with academic challenges.
3. School administrators should provide a supportive learning environment that encourages students to develop effective learning habits and resilience.
4. The Ministry of Education and other educational stakeholders should organise periodic workshops and seminars for teachers on learner-centred instructional approaches and strategies for fostering students' academic resilience.

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