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ACHIEVEMENT MOTIVATION AND SELF-EFFICACY AS CORRELATES OF ACADEMIC ACHIEVEMENT IN PHYSICS IN ONITSHA EDUCATION ZONE

[1]Nwankwo, Madeleine Chinyere
mac.nwankwo@unizik.edu.ng
&
[2]Ohaeri, John Ikechukwu
johnikechukwuohaeri@gmail.com
Department of Science Education,
Faculty of Education,
Nnamdi Azikiwe University, Awka, Anambra State, Nigeria

ABSTRACT

Achievement motivation and self-efficacy as correlates of students' interest and academic achievement in Physics among secondary school students in Onitsha Education Zone of Anambra State, Nigeria was investigated. Three research questions guided the study and three null hypotheses were tested at 0.05 level of significance. The study adopted a correlational survey research design. The population comprised 3,259 senior secondary two (SS2) Physics students drawn from 32 public secondary schools in the zone. Simple random sampling technique was used to draw a sample of 396 students, out of which 356 copies of the instruments were validly completed and returned. Two adapted instruments, namely the Physics Achievement Motivation Questionnaire (PAMQ) and Physics Self-Efficacy Questionnaire (PSEQ) were used for data collection, alongside students' first term examination scores in Physics for the 2025/2026 academic session. The instruments were validated by three experts and their reliability coefficients, established using Cronbach's Alpha, were 0.86 and 0.78 respectively. Data were analysed using Pearson Product Moment Correlation and Multiple Linear Regression. Findings revealed a moderate positive and significant relationship between achievement motivation and students' academic achievement (r = 0.559) in Physics. Self-efficacy showed a moderate positive and significant relationship with academic achievement (r = 0.526). The joint relationship of achievement motivation and self-efficacy with academic achievement (R = 0.665) were both moderate, positive and significant, jointly accounting for 35.8% and 44.3% of the variance respectively. Based on the findings, the study concluded that achievement motivation and self-efficacy play important roles in enhancing students' academic achievement in Physics. It was recommended amongst others that teachers should adopt learner-centred instructional strategies that build students' motivation and confidence in Physics.

Keywords: Achievement Motivation, Self-Efficacy, Academic Achievement, Physics

Introduction

Science occupies a central position in national development, driving technological advancement, economic growth and improved quality of life. Through scientific inquiry, nations enhance productivity in vital sectors such as energy, transportation, health, communication and education, while science also supports evidence-based decision-making in responding to global challenges such as climate change and technological disruption (Organisation for Economic Co-operation and Development, OECD, 2025). As a core branch of science, Physics provides fundamental explanations of natural phenomena and links

scientific principles to practical, technological applications. According to Okoye and Nwuba (2024), Physics deals with the characteristics and behaviour of matter and energy, encompassing motion, forces, electricity, magnetism, heat, light and the structure of atoms. Physics comprises several branches, including mechanics, thermodynamics, optics, electricity and magnetism, and modern physics (Tipler and Mosca, 2020), and underpins careers in engineering, medicine, space science and information technology. Given its wide applicability, Physics remains a compulsory subject in the Nigerian secondary school science curriculum.

Despite its indispensable role in scientific and technological development, Physics is widely perceived by students as an abstract, mathematically intensive, and difficult subject, a perception that has been associated with low interest and unsatisfactory academic achievement (Taangahar & Okwori, 2022). This concern is reflected in the pattern of students' performance in the West African Senior School Certificate Examination (WASSCE), as analysis of results over the past decade indicates that achievement in Physics has fluctuated and generally remained below the expected standard, with credit-level passes ranging from approximately 51% to 61% between 2017 and 2023. Such persistent fluctuations in performance have continued to generate concern among educators, parents, researchers, and policymakers, particularly because academic achievement constitutes a major indicator of the extent to which students benefit from educational experiences and attain expected learning outcomes.

Academic achievement refers to the extent to which students successfully attain predetermined educational objectives and expected learning outcomes within a given instructional setting. It represents the measurable level of knowledge, skills, competencies, and intellectual development acquired by learners through participation in formal educational activities and is commonly assessed through classroom tests, examinations, assignments, projects, practical activities, and continuous assessment procedures. Ikwuka, Okoye, Olanikawu and Udenwa (2021) described academic achievement as the outcome of learning experiences reflected in students' performance scores, suggesting that the extent to which learners benefit from instructional processes can be determined through their performance in academic tasks and assessments. Similarly, Enoch and Asogwa (2021) defined academic achievement as the overall level of students' attainment across different aspects of their educational experiences, indicating that achievement extends beyond examination scores to encompass the cumulative development of knowledge, intellectual skills, attitudes, and competencies acquired during the learning process. In Physics education, academic achievement is particularly significant because it reflects students' ability to understand scientific concepts, apply physical principles, solve quantitative problems, and demonstrate competencies expected from classroom instruction. Consequently, the persistent fluctuation and unsatisfactory pattern of students' achievement in Physics suggest that performance in the subject may not be adequately explained by curriculum and instructional factors alone. Rather, students' psychological dispositions and personal attributes may also play important roles in shaping their learning outcomes. This underscores the need to investigate learner-related factors, particularly students' interest and other motivational or psychological characteristics, that may be associated with their academic achievement in Physics.

Several psychological factors have been associated with students' interest and achievement in Physics, among which achievement motivation and self-efficacy have attracted growing research attention (Filade, Bello, Uwaoma, Anwanane and Nwangburka, 2019). Achievement motivation refers to the inner drive that compels an individual to strive for success, accomplish goals and attain a high standard of performance. According to Elliot, Dweck and Yeager (2017), achievement motivation reflects an individual's internal drive to

strive for success, attain goals and demonstrate competence in achievement-related tasks. Students with high achievement motivation tend to exhibit greater persistence, effort and enthusiasm toward learning tasks, even when faced with difficulties, and are more likely to sustain interest and achieve higher academic outcomes than their less motivated counterparts (Mega, Ronconi and De Beni, 2019).

Self-efficacy, on the other hand, refers to an individual's belief in their capability to organise and execute the actions required to successfully perform a task or achieve a goal (Asakereh and Yousofi, 2018). In the context of this study, Physics self-efficacy refers to students' confidence in their ability to successfully learn, understand and perform tasks related to Physics, including solving Physics problems and completing Physics-related activities (Cwik and Singh, 2022). Students with high Physics self-efficacy are more likely to attempt challenging tasks, regulate their learning strategies and maintain interest in the subject, thereby enhancing academic achievement (Schunk and DiBenedetto, 2020).

This study is anchored on two complementary theories. The first, Self-Determination Theory, propounded by Deci and Ryan (1985), explains human motivation in terms of the degree to which behaviour is self-initiated and self-regulated, positing that optimal motivation, engagement and performance occur when three basic psychological needs are satisfied: autonomy, competence and relatedness. In relation to Physics, the theory suggests that when instruction allows students to make choices, explore concepts actively and experience success in problem-solving, students are more likely to find the subject meaningful, thereby developing sustained interest and investing greater effort, persistence and deeper learning strategies that translate into improved academic achievement. The second, Self-Efficacy Theory, propounded by Bandura (1977) as part of his broader Social Cognitive Theory, posits that individuals' judgments of their ability to organise and execute the actions required to attain specific performance goals, rather than actual ability alone, determine how much effort they expend, how long they persist when faced with difficulties and how resilient they are in challenging situations. Applied to Physics learning, students who experience success in Physics tasks and perceive themselves as competent are more inclined to engage willingly, explore concepts further and sustain interest, while those with low self-efficacy tend to avoid difficult tasks and give up easily when confronted with obstacles. Together, Self-Determination Theory and Self-Efficacy Theory provide a coherent framework for understanding how motivational drive and self-belief may relate to students' academic achievement in Physics.

Although previous studies have examined achievement motivation, self-efficacy, interest and academic achievement, these variables have often been investigated in isolation or in varying combinations, and mostly outside the Physics classroom context. There is limited empirical evidence that simultaneously examines achievement motivation and Physics self-efficacy as correlates of both students' academic achievement in Physics, particularly among secondary school students in Onitsha Education Zone of Anambra State. Onitsha Education Zone is characterised by high population density, intense commercial activities and environmental distractions that may negatively affect students' concentration and academic engagement, thereby providing a unique and instructive context for this investigation. It is against this backdrop that this study sought to determine achievement motivation and self-efficacy as correlates of academic achievement in Physics among secondary school students in Onitsha Education Zone, Anambra State. Specifically, the study sought to determine the:

1. Relationship between achievement motivation scores and students' academic achievement scores in Physics.

2. Relationship between self-efficacy scores and students' academic achievement scores in Physics.
3. Joint relationship between achievement motivation scores and self-efficacy scores on academic achievement scores of secondary school students in Physics.

Research Questions

The following research questions guided the study:

1. What is the relationship between achievement motivation scores and students' academic achievement scores in Physics?
2. What is the relationship between self-efficacy scores and students' academic achievement scores in Physics?
3. What is the joint relationship between achievement motivation scores and self-efficacy scores on academic achievement scores of secondary school students in Physics?

Hypotheses

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

1. There is no significant relationship between achievement motivation scores and academic achievement scores in Physics.
2. There is no significant relationship between self-efficacy scores and academic achievement scores in Physics.
3. There is no significant joint relationship between achievement motivation scores and self-efficacy scores on academic achievement scores of secondary school students in Physics.

Methodology

The study adopted a correlational survey research design. The study was carried out in Onitsha Education Zone, one of the six education zones in Anambra State, comprising 32 public secondary schools spread across Onitsha North, Onitsha South and Ogbaru Local Government Areas. The population of the study comprised 3,259 (1,435 male and 1,824 female) senior secondary two (SS2) students offering Physics in the zone. A sample of 396 SS2 Physics students was drawn using simple random sampling technique. Data were collected using two adapted instruments: the Physics Achievement Motivation Questionnaire (PAMQ), Physics Self-Efficacy Questionnaire (PSEQ) and Students' first term achievement scores report in Physics for the 2025/2026 academic session was used as the measure of academic achievement.

The instruments were validated by three experts from the Faculty of Education, Nnamdi Azikiwe University, Awka, Using Cronbach's Alpha, reliability coefficients of 0.86 and 0.78 were obtained for PAMQ and PSEQ respectively. Out of 396 copies of each instrument distributed, 356 were validly completed and returned, giving a return rate that was used for the final analysis. Data collected were analysed using Pearson Product Moment Correlation (PPMC) to answer research questions 1 to 2 and test hypotheses 1 to 2, while Multiple Linear Regression was used to answer research question 3 and to test hypothesis 3. The strength of relationships was interpreted using the guideline proposed by Okoye (2015), where $r = 0.00$ indicates no relationship; $r = \pm0.01$ to ±0.20, low relationship; $r = \pm0.21$ to ±0.49, weak relationship; $r = \pm0.50$ to ±0.69, moderate relationship; $r = \pm0.70$ to ±0.99, high relationship; and $r = \pm1.00$, perfect relationship. For hypothesis testing, the null hypothesis was rejected when $p \leq 0.05$ and retained when $p > 0.05$. Analysis was carried out using the Statistical Package for Social Sciences (SPSS) version 27.

Result Presentation

Research Question 1: what is the relationship between achievement motivation scores and students' academic achievement scores in Physics?

Table 1: Pearson r on the relationship between achievement motivation scores and students' academic achievement scores in Physics

Variables	N	r	P-value	Remark
Achievement Motivation Academic Achievement	356	.559	0.000	Moderate Positive Relationship

The result in Table 1 shows a moderate positive relationship between achievement motivation scores and students' academic achievement scores in Physics, with a correlation coefficient of r = 0.559, indicating that students with higher achievement motivation tend to perform better academically in Physics.

Hypothesis One: There is no significant relationship between achievement motivation scores and academic achievement scores in Physics.

The result presented in Table 1 also reveals that there is a statistically significant correlation between achievement motivation scores and academic achievement scores of students in Physics ($p < 0.01$). Since the p-value is less than 0.05, the null hypothesis is rejected; hence, there is a significant relationship between achievement motivation and students' academic achievement scores in Physics.

Research Question 2: What is the relationship between self-efficacy scores and students' academic achievement scores in Physics?

Table 2: Pearson r on the relationship between self-efficacy scores and students' academic achievement scores in Physics

Variables	N	r	P-value	Remark
Self-Efficacy Academic Achievement	356	.526	0.000	Moderate Positive Relationship

The result in Table 2 shows a moderate positive relationship between self-efficacy scores and students' academic achievement scores in Physics (r = 0.526), indicating that students with higher self-efficacy tend to perform better academically in Physics.

Hypothesis Two: There is no significant relationship between self-efficacy scores and academic achievement scores in Physics

The result presented in Table 2 shows a statistically significant correlation between self-efficacy scores and academic achievement scores in Physics ($p < 0.01$). Since the p-value is less than 0.05, the null hypothesis is rejected; there is a significant relationship between self-efficacy and students' academic achievement scores in Physics.

Research Question 3: What is the joint relationship between achievement motivation scores and self-efficacy scores on academic achievement scores of secondary school students in Physics?

Table 3: Regression analysis of the relationship between achievement motivation scores and self-efficacy scores on secondary school students' academic achievement in Physics

Variables	R	R^2	Adj. R^2	B	SE	LL	UL	Beta	P
Achievement Motivation scores	0.665	0.443	0.440	0.327	0.032	0.264	0.390	0.432	.000
Self-Efficacy scores				0.289	0.032	0.226	0.352	0.382	

Note: *F(2, 353) = 140.212, B (Unstandardized coefficients), SE (Standard Error), LL (Lower Limit), UL (Upper Limit).*

The result in Table 3 shows the joint relationship of achievement motivation and self-efficacy on students' academic achievement in Physics. The multiple correlation coefficient (R = 0.665) indicates a moderate positive relationship, while the coefficient of determination (R^2 = 0.443) reveals that approximately 44.3% of the variation in students' academic achievement in Physics is jointly explained by achievement motivation and self-efficacy scores, with achievement motivation showing a relatively greater association.

Hypothesis three: There is no significant joint relationship between achievement motivation scores and self-efficacy scores on academic achievement scores of secondary school students in Physics.

The analysis in Table 3 shows a moderate positive and statistically significant multiple correlation (R = 0.665, $p < 0.01$). Since the p-value is less than 0.05, the null hypothesis is rejected; there is a significant joint relationship between achievement motivation and self-efficacy scores on students' academic achievement in Physics.

Discussion of Findings

The finding showed a moderate positive relationship between achievement motivation scores and students' academic achievement scores in Physics, suggesting that motivated students are more committed to their studies, invest more effort in understanding difficult Physics concepts and persist in completing academic tasks, leading to improved performance. This agrees with Elliot & Church (2022), who found that achievement motivation strongly predicts academic performance among high school students, and with Adeyemi & Oladipo (2021), who reported a positive relationship between achievement motivation and academic performance among Nigerian secondary school students. The corresponding hypothesis, which revealed a significant relationship, is consistent with these studies, reflecting the generally consistent influence of motivation on students' effort and persistence.

The finding showed a moderate positive relationship between self-efficacy scores and students' academic achievement scores in Physics, indicating that students with higher self-efficacy tend to perform better academically. A likely explanation is that students who believe in their capabilities are more confident in tackling challenging Physics problems, persist longer in their studies and adopt effective learning strategies such as elaboration, self-monitoring and goal-setting, all of which support stronger academic outcomes. This finding agrees with Adeoye & Eze (2021), who found a significant positive relationship between self-efficacy and academic achievement among secondary school students in Lagos and Abuja, and with Kelly & Ireri (2022), who reported a moderate positive relationship between academic self-efficacy

and academic achievement among Form Three students in Kenya. The corresponding hypothesis, which showed a significant relationship, is further consistent with the position of Schunk & DiBenedetto (2020) that self-efficacy beliefs shape the goals students set and the persistence they exhibit when learning tasks become difficult, reinforcing self-efficacy as a dependable psychological correlate of achievement in technically demanding subjects such as Physics.

The finding showed a moderate positive joint relationship between achievement motivation and self-efficacy on students' academic achievement in Physics, with both variables jointly accounting for approximately 44.3% of the variance in academic achievement, and achievement motivation showing a relatively greater association than self-efficacy. This indicates that motivated and self-efficacious students are more persistent, confident and effective in their learning, leading to better academic outcomes. This agrees with Garcia and McElroy (2022), who found that achievement motivation and self-efficacy jointly predict academic achievement among high school students in the United States, and with Yamamoto, Tanaka and Sato (2023), who reported that self-efficacy and motivation significantly influence academic success in STEM education in Japan, with self-efficacy playing a slightly more dominant role. The consistency of these joint findings across different educational contexts underscores the value of addressing both motivational drive and self-belief simultaneously in efforts to improve students' academic achievement in Physics.

Conclusion

Based on the findings, it was concluded that students' achievement motivation and self-efficacy play important roles in enhancing students' academic achievement in Physics within Onitsha Education Zone. Students who are motivated to succeed and who believe in their capabilities are more likely to engage actively in learning tasks, persist through challenges and achieve improved academic outcomes. The joint influence of achievement motivation and self-efficacy further strengthens students' academic achievement, indicating that these variables work together to enhance learning outcomes. Strengthening these attributes through appropriate instructional strategies and supportive learning environments can therefore meaningfully improve students' engagement and performance in Physics.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Teachers should adopt learner-centred instructional strategies that actively engage students in Physics learning, such as practical activities, problem-solving tasks and collaborative learning, in order to enhance students' achievement motivation and self-efficacy.
2. School administrators should provide adequate instructional materials, well-equipped laboratories and supportive learning environments that encourage students' active participation and confidence in learning Physics.
3. Policy makers should develop and implement educational policies that emphasize the integration of motivational and self-efficacy-building strategies into the teaching and learning of Physics at the secondary school level.

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