

Students' Self-Efficacy and Self-Control as an Innovative Way of Improving Students' Academic Achievement in Physics.

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ABSTRACT

This study investigated students' self-efficacy and self-control as an Innovative ways of improving students' academic achievement in Physics. The study made use of three research questions and three hypotheses. The study was carried out in Orl Education Zone 2 of Imo State. The study applied correlation research design. The population of the study comprised of 749 senior secondary school II Physics students for 2025/2026 academic session, with sample of 189 Physics students from 6 secondary schools in two local government area, this was drawn using multi-stage sampling technique. Three instruments for data collection; self-efficacy questionnaire (S-EQ), Self-Control Questionnaire (S-CQ) and Physics Achievement Test (PAT) were used. The internal consistency reliability indices of S-EQ and S-CQ were determined to be 0.86 and 0.82 respectively using Cronbach alpha while the internal consistency reliability of (EAT) was 0.75 using KR-20. Pearson Product Moment Correlation and Multiple Regression were adopted to answer the research questions and test the hypotheses at 0.05 alpha level. The result shows that self-efficacy and self-control significantly predict students' academic achievement in Physics. From the findings, it was recommended among others that, the students should believe in themselves for their success and remained determined as this will help to improve their academic achievement in Physics.

INTRODUCTION

The unsatisfactory state of affair in students' academic achievement in Physics has captured researchers concern, compelling researchers to seek for remedy to students' academic achievement in Physics. According to Shuaibu, Haruna and Ekpo (2025), Physics can be defined as a subject that deals with energy and matter as well as their measurement and interactions. Additionally, Unamma, (2026) and Onah (2023) defined physics as that branch of science concerned with the laws governing the universe, energy and matter and their interactions. Conceptually, physics can be defined as the systematic study of energy, motion, matter and their interactions using experimentation, observation and mathematical reasoning to comprehend and give details about natural phenomena. Okere, I. J. et. al., explained that Physics is a secondary school subject that connect students in understanding natural phenomena through mathematical analysis, conceptual reasoning and experimentation.

Considering Nigerian Educational Research and development council (NERDC 2012), the objectives of introducing physics as a subject in secondary school include but not limited to; provides basic literacy in Physics for functional living in the society, acquire basic concepts and principles of Physics as a preparation for further

studies, acquire essential scientific skills and attitudes as preparation for technological application of Physics, Stimulate and enhance creativity. For these objective to be established there is need for students to understand Physics and do well in their academic achievement.

Unfortunately, students' academic achievement in Physics has not been encouraging. This is evident in West African Examination Council (WAEC) chief examiners report 2021, 2022, 2023, 2024 and 2025 that students has been performing poor in their examination making students academic achievement not encouraging. Efforts has been made by the government to improve students' academic achievement by establishing infrastructural facilities in the secondary schools in Orl Education Zone 2 of Imo State, yet students' academic achievement remain poor. According to Danjuma (2021), academic achievement is described as the measure of students' acquisition of some element of skills at the end of teaching and learning experience. Additionally, Onukwufor & Ugwu, (2017) as well as Okere, Onoja, Ezeokoye and Ugwu (2024) addressed that academic achievement is the act of showing whether learning which is refers to as the goal of teaching and learning has taken place or not as well as the extent to which learning has taken place. Conceptually, Academic achievement is the estimation of learning outcome always shown as scores, grade, grade point, average and ranks. Danjuma (2021) stated factors that are likely to affect students' academic achievement in physics to be students' interest, location, gender and task persistent. López and Marco (2022) addressed that academic achievement of the students can be affected by so many factors, including academic stress, interest, self-control and self-efficacy.

Self-efficacy is that internal self-satisfaction and strong believes that an individual will carry out task by his or herself. Ugwuanyi, Okeke and Ageda (2020) described that Self-efficacy is the intrinsic, natural, inherent or inborn ability of a person to believe in task or assignment which he or she can easily carry out without much stress. Self-efficacy explains the degree or level of believe or thought which students or learners have indicated that they can successfully execute task adequately in their academic activities and other areas or discipline they found themselves. Brown, Armstrong and Thompson (2018) addressed that self-efficacy can be defined as self-trust, self-confidence and self-reliance in oneself. This implies that the individual believed in his or her capacity to carry out a task which the person could execute without any element of doubt whatsoever and at the ending of the day, the task is being carried out by same person. Okoro, Nwagbo, Ugwuanyi and Ugwu (2022) pointed out that self-efficacy is the inherent ability of a person to carry responsibilities which such individual can carry out with an ease. In this study, Self-efficacy is considered as an individual's confident and self-reliance. Self-efficacy plays an essential role in the amount of effort a person put to a particular assignment. Therefore, an individual found with high levels of self-efficacy on a given task could be flexible and persistent when such individual is facing difficulties, setback and challenges. This strong believe will keep the person moving and achieving greatly.

According to researchers that carried out studies relating to self-efficacy and students' academic achievement stated that self-efficacy actually have a relationship with students' academic achievement. This statement is not far from the truth because a study conducted by Ugwuanyi, Okeke and Ageda (2020) on motivation and self-efficacy as predictors of Learners' Academic Achievement in Physics, unfold that students' self-efficacy has a significant relationship with students' academic achievement. This implies that a positive relationship exist between students academic achievement and students' self-efficacy. Again, Odo, Ezeudu, Agbedo and Okere (2026) who conducted a study on examining students' self-esteem and self-efficacy on academic achievement in Chemistry, finding shows that a positive significant relationship exist between self-efficacy and academic achievement in Chemistry. Since self-efficacy has positive relationship with academic achievement of high school students, it is also possible that academic achievement of students can be influenced by factors like self-esteem and self-control. According to Marliyah and Novera (2019) self-control is the skill, the ability and the attitude possessed by an individual to regulate as well as to control his own behaviors, emotions and thought toward a particular thing so as to achieve a specific objective. This implies that peoples' emotion and thought need to be controlled for them to achieve a particular objective. However, if people cease to control their thought and behavior, they may not be able to achieve their objectives. Okere, Ugwuanyi, Ezeokoye (2025) pointed out that self-control is an individuals' personal initiative to regulate his feelings, and actions while enduring temporal conflict with the motive of achieving rewarding goals. By implication, there are lots of obstacles on the way to success. For you to achieve your dream, you must be ready to control your actions and as one can equally face

conflict in the process of attaining her goal, there is need to identify the best way to control your actions and finally take care of your thoughts to achieve the stated goals and objective.

However, Self-control is the ability to prevail or take precedence over challenges and difficulties to achieve a well defined goals and objectives. Duckworth, Taxer, Eskreis-Winkler, Galla and Gross (2019) see self-control as that self-initiated capacity of an individual to fail to accept instantaneous impulses with the view to maintain an individual's value and to achieve long-lasting objectives. Duckworth, Taxer, Eskreis-Winkler, Galla and Gross stated that for people to achieve a meaningful goal in life those people needs to maintain values and learn to avoid being control by external factors because there are many temptations facing everyone in the society. Hence, if students want to achieve high in their academic achievement, there is need for them to have self-control.

Operationally, self-control could be defined as the ability to concentrate on task and remain focused event at the presence of distraction. Considering students' academic achievement in Physics, self-control could be seen as the ability to regulate one's behaviors, emotions and thoughts so as to stay focused, goal-oriented and diligent, during the process of teaching and learning Physics. Self-control encapsulates the ability to delay action but make decisive decisions based on rational and critical thinking instead of been driven by immediate desire alone. Bai, Wang, Huo and Huo (2023) pointed out that Self-control plays an important role in performance of students as well as academic achievement of students. Bai, Wang, Huo and Huo (2023), however, added that a few ways in which self-control can influence students' performance in science related subjects like Physics among others include; test preparation, study habit, time management, avoiding procrastination and tackling challenges. This means that there is no need for students to keep procrastination but the students need to plan their studies very well and follow their plans. Again, there is need for students to manage their time very well, plan and prepare for their test adequately for them to attain a reasonable achievement. If the students refuse forming nice study habit and manage their time well, such students' academic achievement will remain poor. But if students form nice study habit and manage their time very well, by taking care of challenges and eliminate all forms of procrastination, the students will attain high level of academic achievement. However, researchers who worked on students' academic achievement and self-control variables addressed that the two variables have something in come. According to Marliyah, and Novera (2019), self-control is one of the factors that can easily influence students' academic achievement. Marliyah, and Novera (2019), also stated that there is a positive significant relationship between self-control and students' academic achievement. In addition, Achtziger and Bayer (2022) addressed that there is a positive significant relationship between self-control and students' academic achievement. Again, Achtziger and Bayer (2022) added that students that are self-controlled, well motivated and have some element of self-confidence, those students' academic achievement will increase more than those that do not possess these qualities. These explanations pointed out by these authors on the importance of self-control attracted the researchers for the addition of the variable self-control in this study. However, by exerting self-control, individuals regulate impulses and maintain focus on desired outcomes, even when faced with obstacles. Moreover, self-control helps to sustain self-efficacy over time by facilitating adherence to plans and strategies. Thus, the interplay between self-efficacy and self-control in enhancing the consistent pursuit of goals, thereby leading to improvement in academic achievement of students (Bai, Wang, Huo & Huo, 2023).

Purpose of the study.

1. To find out the relationship between students' academic achievement in Physics and self-efficacy.
2. To find out the relationship between students' academic achievement in Physics and self-control
3. To find out the amount of variation in students' academic achievement in Physics that is attributed to self-efficacy and self-control.

Research questions

1. What is the relationship between achievement in Physics and self-efficacy?
2. What is the relationship between achievement in Physics and self-control?
3. What is the amount of variation in achievement in Physics that is attributed to self-efficacy and self-control?

Hypotheses

H₀₁: There is no significant relationship between achievement in Physics and self-efficacy

H₀₂: There is no significant relationship between achievement in Physics and self-control

H₀₃: Self-efficacy and self-control are not significant predictors of students' academic achievement in Physics.

METHODOLOGY

Design of the study; the study made use of correlation research design. This design was adopted because it allows researchers to establish relationship between two or more variables (Nworgu, 2015). Therefore, seen suitable in this study because the study required in elucidating the relationship that exists between self-efficacy, self-control and academic achievement of Secondary School Students in Physics in Orlu Educational zone one of Imo State.

Population of the Study; The population of this study comprised of 749 from Uguta LGA; 207 students in 10 schools, Ohaji/Egbema LGA; 158 students in 14 schools, Oru East LGA; 172 students in 9 schools, Oru West LGA; 212 students in 9 schools, making total of 749 Physics students in 42 public secondary schools found in Orlu Educational zone 2 Imo State. (Source: Secondary Education Management Board Owerri, 2026).

Sample and Sampling Technique; The sample size of 189 was used in the study. This was done using multistage sampling technique. At the first stage, simple random sampling technique was used to select two (2) Local Government Areas; Oru East LGA and Oru West LGA. This was done to give all the local government equal chance to be selected. At second stage, purposive sampling was used to sample 3 schools each. Finally SSS2 physics students in each of those schools were sampled.

Instruments for Data Collection; Three instruments; Self-efficacy Questionnaire (S-EQ), Self-control Questionnaire (S-CQ) and Physic Achievement Test (PAT) were used in the study. S-EQ and S-CQ were developed by the researchers. S-EQ and S-CQ contains 20 items each related on a four-point scale. 4-Strongly Agree, 3 -Agree, 2 -Disagree and 1 – Strongly Disagree. S-EQ and S-CQ were employed to measure students' Self-efficacy and self-control. Physics Achievement Test (PAT) which contains 20 items was also constructed by the researchers with the use of test blueprint. PAT contains instruction and options letter A-D with one as the key or right option. PAT was developed from 4 topics from SS2 students' scheme of work. The topics were selected because they are the major topics in Physics among others that appeared in Physics students' scheme of work. However, these topics were pointed out as four among the areas where students are having failure in Physics. Each correct item in PAT was assigned one mark. The instrument was constructed to measure the students' academic achievement in Physics.

Validation of the instrument

The instruments were validated by three experts, one expert from Physics education and two expert from Research Measurement and Evaluation from the Department of Science Education, Faculty of Education, Alex Ekwueme Federal University Ndufu-Alike Ikwo. The experts were requested to validate the instrument with respect to clarity of items, ambiguity of items, clearly stated items, proper numbering, accurate spelling, adequate sampling of items and whether items appeared only once and are able to measure what they were supposed to measure.

Reliability of the Instruments; to estimate the reliability of the instruments, trial testing was conducted using the developed instruments. This was done by administering the instruments on 25 SS2 students in one school from Orlu Education Zone one which is not part of the study but close the study area. Hence, may have similar characteristics with the sampled area. The internal consistency reliability of S-EQ and S-CQ was established using Cronbach-alpha. The Cronbach-alpha approach was used because the instruments were polytomously scored; meaning instruments with no right or wrong answer. Consequently, the reliability co-efficient of 0.86 and 0.82 were obtained for S-EQ and S-CQ respectively while the reliability of PAT was established using

Kudder-Richardson 20 (KR-20). This method was adopted because it is suitable for establishing internal consistency reliability of instruments that are dichotomously scored. Although, the reliability co-efficient of 0.75 was obtained.

Method of Data Collection; At first, the researchers created good relationship with the Physics teachers in the sampled area. Thereafter, submitted a letter of permission to conduct a research in those sampled schools. Again, the researchers requested they should be assisted by physics teachers in the school as research assistants. The request was granted by all the sampled schools. Consequently, the research assistants were briefed on the system for data administration and collections. Subsequently, the research assistants and the researchers made use of face-to-face method of data collection and administered the instruments to the respondents. This method was used to ensure maximum return of the instrument as well as to enable the researchers address respondents' questions at the point of interacting with the instruments. The research assistants played a very important role by helping the researchers to score the instruments immediately the respondents finished interacting with the instruments. The instruments; self-efficacy questionnaire and self-control questionnaire were scored thus; 4 = Strongly Agree, 3 = Agree, 2 = Disagree and 1 = Strongly Disagree but the achievement test was scored 0 for wrong answer and 1 was scored for each correct answer. Therefore, Minimum score obtainable was 0 while the maximum score was 20.

Method of Data Analysis; Pearson product moment correlation was used to answer research question 1 and 2 but 3 was addressed using multiple regression. Again, Pearson product moment correlation was used to test hypotheses 1 and 2 but regression ANOVA was used to test the null hypothesis at 0.05 alpha level. Based on (Nworgu, 2015) propositions, a correlation co-efficient of 0.00 to 0.20 was considered very low, 0.2 to 0.40 deemed low, 0.4 to 0.60 moderate, 0.60 to 0.80 was deemed high but 0.80 and above was considered very high.

RESULTS

Research question 1: What is the relationship between achievement in Physics and self-efficacy?

Table 1; Summary of Pearson product moment correlation between Physics students' academic achievement and self-efficacy

Variables	Students' Self-Efficacy	Academic Achievement
Students' Self-Efficacy	1	0.187
Significance (2-Tailed)	—	0.010
N	189	189
Academic Achievement	0.187	1
Significance (2-Tailed)	0.010	—
N	189	189

Correlation is significant at the 0.05 level (2-tailed).

Table 1 shows a correlation coefficient of 0.187. This means a low positive relationship between students' self-efficacy and students' academic achievement in Physics, although the result is significant. Therefore, the hypothesis was rejected.

Hypothesis one; There is no significant relationship between achievement in Physics and self-efficacy

Table one above shows the P-value or Sig of 0.010. Since the P-value is less than the level of significant of 0.05, the researchers reject the null hypothesis which said that there is no significant relationship between achievement in Physics and self-efficacy. Hence, the researchers conclude that there is a positive statistical significant relationship between achievement in Physics and self-efficacy.

Research question 2: What is the relationship between achievement in Physics and self-control?

Table 2; Summary of Pearson product moment correlation between achievement in Physics and self-control

Variables	Self-Control	Academic Achievement
Self-Control	1	0.193
Significance (2-Tailed)	—	0.008
N	189	189
Academic Achievement	0.193	1
Significance (2-Tailed)	0.008	—
N	189	189

Correlation is significant at the 0.05 level (2-tailed).

Table 2 shows a correlation coefficient of 0.193. This means a low positive relationship between students' achievement in Physics and self-control, although the result is significant. Therefore, the hypothesis was rejected..

Hypothesis two

Table two above shows the P-value or Sig of 0.008. Since the P-value of 0.008 is less than the level of significant 0.05 set as a benchmark, the researchers reject the null hypothesis which said that there is no significant relationship between students' achievement in Physics and self-control. Hence, the researchers conclude that there is a positive statistical significant relationship between students' academic achievement in Physics and self-control.

Research Question 3: What is the amount of variation in achievement in Physics that is attributed to self-efficacy and self-control?

Table 3: Output regression analysis for the variation in achievement in Physics that is attributed to self-efficacy and self-control.

Model	N	R	R ²
Students' Attitude and Interest	189	0.266	0.071

Result in Table 3 shows the regression analysis of the relationship between students' self-efficacy, self-control and their academic achievement in Physics. The result shows a correlation coefficient (r) of 0.26. This implies a positive relationship between students' self-efficacy, self-control and students' academic achievement in Physics. The coefficient of determination (R²) associated with the correlation coefficient of it was 0.07. This implies that 7% variation in students' academic achievement in Physics is attributed to self-efficacy and self-control. The result indicates that 93% of variation in students' academic achievement in Physics is attributed to other factors order than students' self-efficacy and self-control.

Table 4: Regression ANOVA result of students' academic achievement in physics as predicted by self-efficacy and self-control

Sources	Sum of Squares	Df	Mean Square	F	Sig.
Regression	4568.344	2	2284.172	7.094	0.001

Residual	59891.466	186	321.997	—	—
Total	64459.810	188	—	—	—

a. Dependent Variable: Physics Achievement b. Predictors: (Constant), self-efficacy, self-control

Result in table 4 shows ($F(1,188) = 7.094, p = .016$) for prediction of students' academic achievement in Physics with the combination of student self-efficacy and self-control. Since the probability value of 0.001 is less than the alpha level of 0.05 set as a benchmark for decision making, the null hypothesis is rejected. Therefore, the researchers conclude that students' self-efficacy and self-control are significant predictors of students' academic achievement in Physics.

DISCUSSION OF FINDINGS

The Relationship Between Students Self-Efficacy and Students Academic Achievement in Physics

The findings of this study stated that there is a relationship between students' academic achievement and students' self-efficacy. The hypothesis also reviewed that self-efficacy had a positive statistical significant relationship with students' academic achievement in Physics. The findings may have been as a result of the fact that when students believe in themselves, the students tend to take on responsibility without compulsion even in academics which will improve those students academic achievement.

The findings of this study is related to the findings of Ugwuanyi, Okeke and Ageda (2020) who pointed out that there is a statistical significant relationship between students self-efficacy and students academic achievement. The finding of the study is also in line with the study conducted by Odo, Ezeudu, Agbedo and Okere (2026) who also addressed that there is a statistical significant relationship between students' self-efficacy and students' academic achievement. The findings of this study appeared in this way because self-independent propels actions that will improve students' academic achievement in Physics.

The Relationship Between Students Self-Control and Students Academic Achievement in Physics

The findings of this study pointed out that there is a relationship between students' academic achievement and students' self-control. The hypothesis also reviewed that self-control had a positive statistical significant relationship with students' academic achievement in Physics. The findings could have appeared like this because when students are self-disciplined, those students will participate actively in academics which enhance students' academic achievement in Physics.

The finding of this study is in agreement with the findings of Duckworth, Taxer, Eskreis-Winkler, Galla and Gross (2019) who addressed that there is a statistical significant relationship between students' self-control and students' academic achievement. The finding of the study is also in consonant with the study conducted by Bai, Wang, Huo and Huo (2023) who also concluded that there is a significant relationship between students' self-control and students' academic achievement. The findings of this study displayed in this way because self-control creates focus in students, encourages determination and active engagement which helps to improve students' academic achievement in Physics.

CONCLUSION OF THE STUDY

The findings of the study displayed that students' self-efficacy and self-control have a significant relationship with secondary school students' academic achievement in Physics. Based on the findings, conclusions were made which include that; since students' self-efficacy and self-control significantly predict academic achievement in Physics, researchers, stakeholders, parents and school counselors among others can conclude that students who believe in themselves for their success, regulate their activities and remain focused will do well in their academic achievement but those who could not focus and not determined will not do well academically, particularly in Physics.

RECOMMENDATIONS

1. The management of schools should make ensure they teach students self-reliance as this will help to enhance students' academic achievement.
2. Teachers should mentor students very well on the need for self-regulations as this will help the students to be focused in their academics.
3. Students should believe in themselves for their success and remain determined by so doing academic achievement of students will be improved.
4. Teachers should equally teach students time management so as to avoid procrastination among students and to promote students' academic achievement, particularly in Physics
5. School administrators should always emphasize on students becoming self-reliance and self-independent. By so doing, student academic achievement will improve.
6. counselors should always bring to the knowledge of the student' that procrastination is an enemy of success. Hence, the will propel students to always pick of their academic task as at when do, thereby improving the students' academic achievement.

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