



Academic Resilience as Predictor of Secondary School Students' Attitude to and Performance in Physics in Enugu State, Nigeria

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Abstract

Academic resilience as predictor of secondary school students' attitude to and performance in physics in Enugu State, Nigeria was investigated. Two research questions guided the study while two hypotheses were tested at 0.05 level of significance. Correlation research design was employed in the conduct of the study. The population of the study involved 12,879 Senior Secondary two (SS2) students offering physics in the 297 public secondary schools in Enugu State. A sample size of 388 SS2 Physics students were obtained in the three stages using multi-stage sampling procedure. Two instruments were used for data collections. The unified promotion examination results of SS2 students in 2022/2023 academic year were used to determine the performance scores of the students in Physics. The coefficient of reliability were determined using Cronbach Alpha method and the values obtained are 0.71 for Academic Resilience and 0.77 for Attitude Scale. The data collected were analyzed using moderated multiple regression analysis. The research questions were answered using unstandardized coefficient (B) in the model table, while t- and p-value in the model table were used to test the null-hypotheses. The findings showed that academic resilience predicted attitude of students in Physics but failed to predict performance of students in Physics. There is an independent significant contribution of academic resilience in predicting the attitudes of students but there is no significant contribution of academic resilience in predicting performance of students. The study recommends that Government and school administrators should regularly organize workshops and seminars to train teachers and students on the need to develop a high level of academic resilience.

Keywords: Academic Resilience, Attitude, Performance and Physics.

Introduction

Physics is a core science subject that is taught in senior secondary schools in Nigerian education system. It is one of the fundamental fields of knowledge that underlines the physical universe and applies constantly to people's life in their daily activities. Physics according to Ehimetaor et al (2015) is a physical science that deals with the behavior of matter in relation to energy. According to Anosike and Okigbo (2020), Physics is the process of finding solutions to the fundamental challenges concerning human life based on the existence of phenomenon involving energy and matter by observation, measuring, experimenting, and analyzing, predicting and drawing conclusion. It is also seen as the science of measurement. Physics knowledge has contributed immensely to the production of tools and devices of tremendous advantage to the human race (Sani, 2012). According to Oguama, et al (2020), knowledge of Physics develops in students, the scientific and technological knowledge, skills and attitudes which will assist them to make decisions based on the

observation and experimentation. Geophysics, Medical Physics, Computing Physics, Material Physics, Environmental Physics, Communication, Physics Education, Engineering and Industrial Physics to mention but a few are career courses in institutions of higher learning which cannot be undertaken without the knowledge of Physics at secondary school level.

Interestingly, as important as Physics is, students' academic performance in the subject and their attitudes to the subject at secondary school and other institution of higher learning has not been encouraging. Record of students' performance at Senior School Certificate Examination (SSCE) in Physics conducted by West African Examination Council (WAEC) showed that from 2010 to 2022, less than 50% of the students who enrolled for Physics obtained credit pass and above to secure admission into the university in order to pursue courses that require Physics. The failure rate is recorded in 2013, 2014, 2015 (46.0%, 47.83%, 38.68%) and in 2018 (48.15%) with an improved performance in 2010,

2011 and 2012 (50.2%, 62.6% and 67.2%) and also 2016, 2017, 2019 and 2020 (52.97%, 59.22%, 64.18% and 65.24%). In general, none of the success performance is up to 70% and this cannot be considered an acceptable performance for an important science subject like Physics. This shows that academic performance in Physics and the attitude to the subject is not encouraging.

Academic performance is the result of learning prompted by the teaching activity by the teacher and produced by the students hence, Martinez (2017) stated that academic performance is the product given by the students and it is usually expressed through school grades. Pizarro (2010) referred to academic performance as a measure of the indicative and responsive abilities that express, in an estimated way, what a person has learned as a result of a process of education or training. According to Akinsolu (2014), there are several components of the complex unit called performance. These are learning processes promoted by the school that involve the transformation of a given state, into a new state, and they are achieved with the integrity in a different unit with cognitive and structural elements. From these definitions, academic performance can be seen as the extent to which a learner has accomplished specific goals which were the focus of activities during academic instructions. The academic performance are influenced by certain factors such as the intellectual level, personal psychological traits, motivation, skills, interests, study habits, self-esteem, the teacher-student relationship and attitude of the students towards instruction (Akinsolu, 2014).

Attitude according to Ebuoh (2021) is a mental and neutral state of readiness organized through experience, exerting a directive and dynamic influence upon individuals' response to all objects and situations which is related. Bunkure (2012) affirmed that attitude of a learner is a learner's state of mind which influenced personal action of the individual. Generally, attitude refers to persons' tendency to think, feelings or preferences about an object, based on their belief about the object. From these definitions, attitude could be explained as the tendency of a student to respond in a certain manner towards learning. One major factor believed to influence the attitude to learning and performance in school subjects according to Masten (2014) is academic resilience.

Academic resilience is defined as resistance to or a positive and effective way of coping with situations of risk and adversity during learning. American

Psychological Association (APA, 2014) defined academic resilience as the process of adapting well in the face of adversity, trauma, tragedy, threats or significant sources of stress during learning. According to Masten (2014), academic resilience is the capacity for or the result of a successful academic adaptation despite challenging or threatening circumstances. Luther and Ziegler (2010) earlier described it as a dynamic process which results in positive academic adaptation within a context of severe adversity within the learning environment.

Finally, one of the issues at stake in education today and mostly in science teaching is students' attitude and performance measure in relation to teaching and the overall success of learning outcome. Nevertheless, studies on students' attitude and academic performance have mostly pointed out that students' socio-psychological variables are major predictors yet they have received very little attention if any, in studies especially the one conducted in Enugu state. Available records indicated that students' attitude and performance in Physics is poor despite the appreciable number of qualified Physics teachers among others. What actually would be the cause of this non-challant attitude and low academic performance of students in Physics in Enugu state? The answer to this question motivated the research on academic resilience as predictor of secondary school students' attitude to and performance in Physics in Enugu state, Nigeria.

Purpose of Study

The purpose of the study was to determine academic resilience as predictor of secondary school students' attitude to and performance in Physics in Enugu state, Nigeria. Specifically, the study sought to find out:

1. contribution of academic resilience in predicting the attitude of secondary school students towards Physics in Enugu state.
2. contribution of academic resilience in predicting the academic performance of secondary school students in Physics in Enugu state.

Research Questions

Two research questions guided the study;

1. What is the amount of contribution of academic resilience in predicting the attitude of secondary school students towards Physics?

2. What is the amount of contribution of academic resilience in predicting the academic performance of secondary school students in Physics?

Hypotheses

Two null hypotheses were formulated and tested at 0.05 level of significance.

1. There is no significant contribution of academic resilience on predicting the attitude of secondary school students towards Physics in Enugu state.
2. There is no significant contribution of academic resilience on predicting the academic performance of secondary school students in Physics in Enugu state.

Method

Correlation research design was employed in the study. The design is preferred because data were collected and analyzed using regression analysis in order to ascertain the contributions of Senior Secondary two (SS2) students' academic resilience in predicting their attitude to and performance in Physics. The population of the study is 12,879 SS2 students offering Physics in the 297 Public Secondary Schools. A sample size of 388 SS2 students offering Physics in 2022/2023 academic year was selected from 297 public secondary schools in the state using multi-stage sampling procedure involving purposive and simple random sampling technique.

Two instruments were used for data collection namely; Academic Resilience Scale (ARS-30) and Modified Fennema-Sherman Physics Attitude Scale (PAS). Academic Resilience Scale (ARS-30) was developed by Simon Cassidy in 2016 to measure the Academic Resilience of secondary school students. The researcher adapted the scale to measure Physics students' Academic Resilience attribution of their academic success and failure. The scale is modified so as to fit specifically Physics students in so far as the

original scales were made for general purpose. The scale instrument is a 30-item scale which is adopted for the study. The participants' responses were obtained using 4-point rating scale ranging from strongly agree to strongly disagree.

The modified Physics Attitude Scale (PAS) is a 40-item instruments developed by Fennema-Sherman in 2012 to assess the attitude of secondary school students. These 40 items were selected from the 47 items of the whole scale. The modification is purposefully to fit specifically Physics students in so far as the original scales were made for general purpose. Participants' responses was measured using 4-point rating scale ranging from strongly agree to strongly disagree.

SS2 students' performance scores in Physics for 2022/2023 academic year was used to represent their performance score for the study. The Scores were collected from the result sheets through the school records in the sampled schools.

The instruments were validated by three experts from Nnamdi Azikiwe University, Awka. The reliability of the instruments was established using Cronbach Alpha. The internal consistency reliability coefficient of 0.71 and 0.77 were obtained for ARS-30 and PAS respectively. The researcher with the help of three Physics teachers in the sampled schools, who were briefed and exposed to the objectives of the study, administered the copies of the instruments to the respondents. The respondents were given enough time to express their honest feelings without bias. The copies of the instruments were collected from the respondents immediately after completion to ensure maximum 100% copies retrieved. The data collected for the study were analyzed statistically using regression analysis. In testing the hypothesis statistically at 0.05 alpha level, the t- and p-values in the coefficient table were used. The null hypothesis was rejected when p-value is less than or equal to the significant level of 0.05, ($P \leq 0.05$) otherwise ($p \geq 0.05$), it was accepted.

Results:

Table 1: Contribution of academic resilience in predicting the attitudes of students in Physics.
Coefficients

Model	Unstandardized Coefficients		Standard coefficients		
	B	Std. Error	Beta	t	Sig
Constants	36.114	7.300		4.947	.000
Academic Resilience	.525	.064	.389	8.168	.000

Model table 1 displays the unstandardized coefficient with t and p-values of the contribution of academic resilience in predicting the attitudes of students towards Physics. The table shows an unstandardized coefficient ($B = .525$), this proves that academic resilience predicted 52.5% of the attitude of students towards Physics when other variables was held constant. It is also an indication that 47.5% of the

variation in students' attitudes to Physics is attributed to other factors. The result in Table 1 also shows that Academic resilience contributed positively and significantly in predicting attitude to Physics at ($t=8.168$, $p=.000 < .05$). The hypothesis of no significant contribution of academic resilience in predicting the attitude of students towards physics was rejected.

Table 2: Contribution of academic resilience in predicting the academic performance of students in physics.
Coefficients

Model	Unstandardized Coefficients		Standard coefficients		
	B	Std. Error	Beta	t	Sig
Constants	66.726	11.603		5.757	.000
Academic Resilience	-0.40	.102	-.0022	-3.95	.692

Model Table 2 displays the unstandardized coefficient with t and p-values of the contribution of academic resilience in predicting the academic performance of students in Physics. The table shows that an unstandardized coefficient ($B = -0.40$) was obtained. This proves that for every one point decrease in academic resilience, the academic performance of students' increases by 40%, when other psychological variable were held constant. The result in Table 2 also shows that, ($t = -3.95$, $p = .692 > .05$), the hypothesis is hereby accepted, which implies that academic resilience is not a significant predictor of students performance in Physics in Enugu state.

Discussion:

Results of the study revealed that academic resilience predicted 52.5% of attitude of students to Physics. The hypothesis also showed that academic resilience positively and significantly predicted attitude to Physics. The finding agrees with the finding of (Sahr, 2013 & Mwangi et al 2017) who reported in their respective studies on the relationship between academic resilience, academic performance and attitude of students, proved that there was a significant strong positive relationship between academic resilience and attitudes of students towards learning. This supports the notion that academically resilient students exhibit good attitude during learning in Enugu state. The fact that academic resilience predicted positively to students' attitude towards Physics, indicted that there is need to help secondary school

student' develop good academic resilience towards Physics instruction.

The results also proved that academic resilience did not predict performance in Physics. The hypothesis also proved that academic resilience is not a significant predictor of students' performance in Physics in Enugu state. On the contrary, the finding is not in agreement with the findings of (Nwamgi et al 2013 & Ceyhun, 2020) who in independent studies established that there was a strong positive correlation between academic resilience and academic performance, and that academic resilience positively predicts performance. The result proved that academic resilience does not affect performance of secondary school student in Physics in Enugu state. The contradiction in the result of the study as against some of reviewed work is because secondary school students in Enugu state never studied in extremely harsh and adverse conditions like wars or terrorists attacks as such cannot access their academic resilience.

Conclusion

Based on the findings presented and discussed in the study, it was concluded that Academic resilience significantly predicted attitude of students to learning of Physics but failed to predict the performance of secondary school students in Physics. Therefore, academic resilience affects students' attitude towards Physics but do not affect their academic performance in Physics.

Recommendations:

1. Governments, professional bodies, school managements and administrators should regularly organize seminars, trainings and workshops to equip and train the teachers and students on the needs of developing a high level of academic resilience.
2. Curriculum planners and policy makers should incorporate psychological traits like academic resilience skills in the curriculum and educational programmes in order to promote attitude and performance of students.
3. School counselors from the psychological counseling units established in secondary schools should help to train the students to develop high academic resilience skills in order to cope during losses situations and develop effective leadership skills.

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