

Self Efficacy, Locus Of Control And Academic Achievement Of Senior Secondary School Students In Mathematics In Ebonyi State, Nigeria

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Abstract

The study investigated Self Efficacy (SE), Locus of Control (LC) and Academic Achievement in Senior Secondary School Students in Mathematics. Three research questions guided the study and three hypotheses were tested. Correlational survey research design was employed. The population of the study was 8,108 senior secondary school two (SSII) students spread across 204 senior secondary schools in the three Education Zones of Ebonyi State. Multistage sampling procedure was employed. The sample was 811 Senior Secondary School two (SSII) students. Three instruments, General Self Efficacy Scale, Locus of Control Scale and West African Senior School Certificate Examination (WASSCE) Mathematics objective questions were adapted for the use in the study. The instruments were validated by three lecturers; two from Educational Foundations Department and one from Measurement and Evaluation, all in Faculty of Education, Ebonyi State University. The reliability coefficient of Self Efficacy and Locus of Control were analyzed using cronbach alpha. The results were 0.657 and 0.771 respectively. Simple linear and Multiple regression were used to analyze the data while the hypotheses were tested using t-test at 0.05 alpha level. It was revealed that there exists low and high relationship between SE and LC and Academics Achievement. It was recommended that there is need for regular orientations of the students on the role of self efficacy and locus of control in their academic achievement.

Key Words: *Self Efficacy, Locus of Control, Academic Achievement, Gender*

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I. Introduction

The optimal positive psychological outcomes in human beings such as self efficacy and locus of control are fundamentally driven to achieve a meaningful life. The concept of self efficacy was proposed by Albert Bandura who defined it as an individual's confidence in the ability to complete a task or achieve a goal (Bandura, 1997). Self efficacy is therefore one's belief in the ability to act in ways necessary to reach specific goals. It might be seen as a mechanism to explain and predict one's thoughts, emotions and actions and to organize and execute actions in order to attain designated goals. The concern is not fully on the skills and abilities an individual possess rather it is more of what one's beliefs can achieve with the skills and abilities one might possess. Such belief might be vital in assessing one's cognitive strength.

Self efficacy involves determination and perseverance in overcoming obstacles that could disturb the utilization of innate abilities which help to achieve academic goals (Abd & Muhammad 2022). Self efficacy might denote a set of beliefs influencing how people feel, think and motivate themselves about their ability to act in indifferent situations. Such belief could be powered by cognitive, motivational, affective and selection processes. The development of self efficacy is intertwined with one's experiences, competencies and developmental task at various stages of life (Bandura 2010). The individuals' belief in themselves that they can do certain things could be seen as self efficacy.

Such beliefs affect various aspects of human endeavor including academics. People with high self efficacy may approach difficult tasks as challenges to be mastered and overcome instead of being avoided (Ali, Wan & Nobaya, 2017); they set for themselves challenging goals and are committed to them, including sustaining their effort in the face of failures (Asakereh & Yousofi, 2018). The authors noted that such individuals recover their sense of efficacy after academic setbacks, attribute failure to insufficient effort, deficient knowledge and skills and approach threatening situations with convictions that they can exercise control over them.

Conversely, people who doubt their abilities appear to shy away from difficult tasks which are seen as personal threats (Carlie 2018). The author further noted that such people may give up in the face of challenges and could be slow in recovering their sense of efficacy in the face of challenges and might view insufficient performance as deficient aptitude. Such failure could make them lose faith in themselves thereby reducing their output.

Self efficacy is also domain specific or multidimensional (Bandura, 1997). It means that a high sense of efficacy in one domain does not necessarily translate into having similar efficacy level in another domain. One domain could have different levels of efficacy beliefs.

Furthermore, Locus of control is the predisposition in the perception that human lives are full of actions and outcomes. It is the degree to which individuals feel they are in control of challenges facing them (Rotter, 1990). It is the extent people accept that external forces which are beyond their control do not have influence over the outcome of their life challenges. Locus of control represents the degree individuals perceive reinforcing events in their lives to be the result of their own actions, beliefs or abilities (internal locus of control, LOC) or fate, luck (external locus of control, LOC) (Goyzman 2010). Those with internal locus of control control outcomes of their behaviour or destiny; they seek help; make honest effort and think positively (Gore, Griffin and McNierny 2016). While those with external locus of control believe they do not have direct control over the outcomes of their behaviour; they are likely to resign to fate (Ghaizadeh & Bazrafshan, 2014); they blame other individuals and situations for their failure (Chinedu & Nwizuzu 2021).

Locus of control and self efficacy appear to be related to the socially constructed ideas and practices (social attributes and opportunities) associated with being male or female (Adepoju, 2010) which in this study is referred to as gender. Gender systems are differently established in socio cultural contexts which determine what is expected, allowed and valued in boys and girls, men and women in specific contexts. Furthermore, gender, locus of control and self efficacy might combine to predict academic achievement. Baji (2020) studied gender differences in self efficacy and academic achievement of secondary school students in Niger State, Nigeria. The author found out no significant difference in academic self efficacy between male and female students. However, the study revealed that a significant difference exists between academic achievement of male and female students. It appeared that parental support and encouragement and opportunities for females boosted the self efficacy of both male and female students.

Academic achievement is the degree to which a learner has met short or long term educational goals (Okoli & Okigbo, 2021) while Idoko and Agbudu (2021) see it as the proportion of students at a school whose learning currently meets or surpasses the norms for their grade. However, Woji and Charles-Ogan, (2022) saw it as the measuring of students' accomplishment across a range of academic areas. Furthermore, academic achievement might refer to completing educational benchmarks such as Bachelor's Degree or a grade a student receives on a test after the process of teaching and learning in a particular content area (Sheldon 2019). Notwithstanding the different views, academic achievement could be said to mean the result of training, indicating how much learning has taken place, indication of the level of skill and cognitive capacity that students have attained a specific training (Akachukwu & Okoli 2021). The overall aim is to determine the level of success gained by students and level of knowledge needed to be imparted by teachers.

Some students have a favourable idea of mathematics, however they lack the faith (self efficacy) and the feeling that they could perform well in mathematics (Locus of control) (OKafor 2019). The challenge might stem from gender disparities, misconceptions and a lack of confidence. Researcher have found out that males perform better in Mathematics examinations than female (Schenkel, 2020) while others found no gender differences in grasping mathematical concepts. Gender disparity in Mathematics education appears to be decreasing globally. However, it appears the disparity is in relation to the educational level of the students (Sule and Sardauna 2018). The authors observed that at primary and middle school levels, the mathematics achievement scores of male and female were comparable while inequalities in mathematics achievement were seen in the last year of secondary school. (Odogwu & Benedicta 2015; Mazana, Montero & Casmir 2020). Perhaps the disparities witnessed might stem from the methods employed in imparting the concepts and rules of Mathematics. Girls were found to learn Mathematics concepts through co-operative or rule based activities whereas boys employed more of competition with one another in learning Mathematics concepts.

Judging from the theoretical framework of Bandura's self efficacy (1977); Baumeister self regulation (2007); Bernard Weiner attribution theory (1986) and Rotter's social learning (1954), one can accept that learners might have greater tendency to direct their cognitive, psychomotive and affective development when they feel and understand that success is possible by cultivating the proper locus prime, stability of purpose and situation control resolve. However, it is not yet clear the extent such personal resolve (LOC) and feeling (self efficacy) can predict academic achievement of both male and females. Furthermore, the challenge to find out the extent self efficacy and locus of control predict academic achievement becomes more imperative considering the poor performance of students in West African Secondary School Certificate Examination as indicated by West African Examination Council (WEAC, 2021).

II. Research Methodology

The study sought to find out the:

1. Multiple predictive strength of self efficacy and locus of control on the academic achievement of secondary school student in Mathematics
2. Multiple predictive strength of self efficacy and locus of control on academic achievement of male secondary school students in Mathematics
3. Multiple predictive strength of self efficacy and locus of control on academic achievement of female secondary school student in Mathematics.

Three research questions guided the study:

1. What is the multiple predictive strength of self efficacy and locus of control on the academic achievement of secondary school students in Mathematics?
2. What is the multiple predictive strength of self efficacy and locus of control on academic achievement of male secondary school students in Mathematics?
3. What is the multiple predictive strength of self efficacy and locus of control on academic achievement of female secondary school students in Mathematics.?

Three hypotheses were tested:

1. The multiple predictive strength of self efficacy and locus of control on the academic achievement of secondary school students' in Mathematics is not statically significant.
2. The multiple predictive strength of self efficacy and locus of control on the academic achievement of male secondary school students' in Mathematics is not statically significant.
3. The multiple predictive strength of self efficacy and locus of control on the academic achievement of female secondary school students' in Mathematics is not statically significant.

The area of study was Ebonyi State of Nigeria. The state has three Education Zones. It is located in South Eastern Nigeria. It shares boundaries with Benue State to the North, Enugu State to the North West, Abia State to the South East and Cross River State to the East.

The population of the study was 8,108 senior secondary year two (SS2) students spread across 204 senior secondary schools in the three Education Zones (Secondary Education Management Board, SEMB 2023), with 4,203 female and 3,845 male students making up the population.

811 senior secondary year two (SS2) students formed the sample for the study. Multiple stage sampling procedure was adopted. The State was stratified into three Education Zones -- Abakaliki, Onueke and Afikpo Education Zones. From each of the Zones, two Local Government Areas (LGA) were randomly sampled, making a total of six LGAs. From each of the six LGA, purposive sampling was used to sample co-education schools. Each of the six LGA had 9,17,18,10,9,18 co-education schools respectively (SEMB, 2023). Simple random sampling was then employed to sample two co-education schools from each LGA. Twelve co-education schools were therefore sampled for the study. Only SS2 students were involved in the study because they could be anxious of passing Mathematics as a compulsory subject at external Examinations. Disproportionate sampling technique was used to sample 395 male 416 female students which is 10 percent of the population. The number sampled is based on the cultural and occupational similarities of the people of the state.

Three instruments were used for the study. These are:

1. General self efficacy questionnaire (GSE) developed by Jerusalem and Schwarzer in 1981 which was adapted. It has 10 items using scales of 1-4 with response options as thus: Not at all true (1) Hardly true (2) Moderately true (3) Exactly true (4).
2. Locus of Control questionnaire, a 28 item instrument developed by Trice in 1985 was adapted. It was designed for students to tick response options of true or false in line with their agreement or disagreement with the items.
3. Students' Mathematics achievement test obtained from WASSCE Mathematics objective questions of 2019, 2020 and 2021 were administered to the students. Seven questions were drawn from 2019 and 2020 questions respectively while six questions came from 2021. A total of 20 items were used. In 2019 question numbers 3,4,8,10,14,17,20 were selected; in 2020 question numbers 1,3,9,10,13,15,23, were selected while in 2021 numbers 2,5,9,10,13,24 were selected. The choice of the test is because WASSCE is a standardized test. The General Self Efficacy (GSE) and Locus of control (LOC) questionnaire are both standardized instruments and their validity established. The GSE reliability co-efficient ranged from .76 to .90 while Locus of control (LOC) had reliability co-efficient alpha value of $\alpha = .74$ $r = .92$.

The instruments were administered using three research assistants. They were briefed to get permission from the school authorities and work with the Mathematics teachers of the schools sampled for study. The three instruments were administered to the respondents and collected at the spot.

III. Results

The results of data analysis were presented based on the research questions that guided the study and the hypotheses tested.

Research question one: What is the multiple predictive strength of Self-efficacy and locus of control on the academic achievement of secondary school students' in Mathematics?

Table1: Multiple Predictive strength of self efficacy and locus of control on academic achievement of secondary school students' in Mathematics

Computed r	r ²	Adjusted r ²	Std Error
.080	.006	-.004	9.13501

Table 1 above revealed that the computed r was .080 while the r² is .006. It means that there is a high relationship between self efficacy and locus of control on the academic achievement of secondary school students in Mathematics. It further implies that only 0.6% of the academic achievement of secondary school students in Mathematics is predicted by their self efficacy and locus of control.

Hypothesis one: the multiple predictive strength of Self-efficacy and Locus of control on the academic achievement of secondary school students' in Mathematics is not statistically significant

Table 2: significance of the multiple predictive strength of Self-efficacy and Locus of control on academic achievement of secondary school students' in Mathematics

Computed r	r ²	Adjusted r ²	Std Error	Beta	T	Sig of T
.080	.006	-.004	9.13501	.079	1.071	.286

Table 2 above revealed that the computed t value (1.071) is greater than the significance of t (.286). Therefore, the null hypothesis was rejected. It means that the multiple predictive strength of self efficacy and locus control on the academic achievement of secondary school students in Mathematics is statistically significant.

Research Question two: What is the multiple predictive strength of Self-efficacy and locus of control on the academic achievement of male secondary school students' in Mathematics?

Table 3: Multiple predictive strength of Self efficacy and Locus of control on academic achievement of male secondary school students' in Mathematics

Computed r	r ²	Adjusted r ²	Std Error
.123	.015	-.006	9.89525

Table 3 above revealed that the computed r was .123 while the r² is .015. It means that there is a low relationship between self efficacy and locus on academic achievement scores of male secondary school students in Mathematics. This implies that only 1.5% of the academic achievement scores of male secondary school students in Mathematics is predicted by their self efficacy and locus of control.

Hypothesis two: The multiple predictive strength of Self-efficacy and locus of control on the academic achievement of male secondary school students' in Mathematics is not statistically significant.

Table 4: significance of the multiple predictive strength of Self-efficacy and Locus of control on academic achievement of male secondary school students' in Mathematics

Computed r	r ²	Adjusted r ²	Std Error	Beta	T	Sig of T
.123	.015	-.006	9.89525	.092	.848	.398

Table 4 above revealed that the computed t value (.848) is greater than the significance of t (.398), therefore the null hypothesis was rejected. It means that the multiple predictive strength of self efficacy and locus control on academic achievement scores of male secondary school students in Mathematics is statistically significant.

Research Question three: What is the multiple predictive strength of Self-efficacy and locus of control on the academic achievement of female secondary school students' in Mathematics?

Table 5: Multiple predictive strength of Self efficacy and Locus of control on academic achievement of female secondary school students' in Mathematics

Computed r	r ²	Adjusted r ²	Std Error
.161	.026	.007	8.25498

Table 5 above revealed that the computed r was .161 while the r^2 is .026. It means that there is a low relationship between self efficacy and locus on the academic achievement scores of female secondary school students in Mathematics. This implies that only 2.6% of academic achievement scores of female secondary school students in Mathematics is predicted by their self efficacy and locus of control.

Hypothesis three: The multiple predictive strength of Self-efficacy and locus of control on the academic achievement of female secondary school students' in Mathematics is not statistically significant

Table 6: significance of the multiple predictive strength of Self-efficacy and Locus of control on academic achievement of female secondary school students' in Mathematics

Computed r	r^2	Adjusted r^2	Std Error	Beta	T	Sig of T
.161	.026	.007	8.25498	.152	1.520	.132

Table 6 above revealed that the computed t value (1.520) is greater than the significance of t (.132), therefore the null hypothesis was rejected. This means that the multiple predictive strength of self efficacy and locus control on the academic achievement scores of female secondary school students in Mathematics is statistically significant.

IV. Discussion of findings

The results from research question 1, table 1 showed the multiple predictive strength of self efficacy and locus of control on the academic achievement of secondary school students in Mathematics. The computed r was .080 while the r^2 was .006. It shows a high relationship exists between self efficacy, locus of control and academic achievement of secondary school students in Mathematics. It means only 0.6% of the academic achievement of secondary school students in Mathematics was related to their self efficacy and locus of control. Furthermore, result from table 2 revealed that the multiple predictive strength of self efficacy and locus of control on the academic achievement of secondary school students in Mathematics is not statistically significant. The alpha level of 1.071 is greater than significance of t (.286). It had been revealed that self efficacy and locus of control have a positive relationship with academic achievement (Animba, Ezema, Chukwu & Nwobodo, 2022). It was also found out that self efficacy and locus of control significantly predicted secondary school students' academic achievement (Mamah, Eze & Nwankwo, 2021). The findings of the present study is in congruence with the findings of Animba et al (2022) and Mamah et al (2021). The high relationship between self efficacy, locus of control and students' academic achievement could be due to their unwavering confidence to solve difficult academic problems by making the necessary effort and looking for several solutions. It further indicates that the students could deal efficiently with Mathematics academic task; set higher goals in their studies and are prudent in management of their time. It further means that the students have the ability to generate examples to help them understand better the topics taught in the class; would never allow social activities to affect their studies; have the habit of studying everyday with the motivation to achieve success in life. In line with the above findings, Abel and Moyosola (2013) had revealed that academic self efficacy and locus of control jointly predicted academic achievement. In the same vein, the present study agrees with Alade, Alatan and Sokenu (2017) who found a strong and significant relationship between the predictor variables and academic achievement. This is an indication that students' belief in their coping abilities and the desire to improve oneself could make them confront academic tasks as something they can overcome.

The results of the study from table 3 revealed the multiple predictive strength of self efficacy and locus of control on the academic achievement scores of male secondary school students in Mathematics. The computed r was .123 while r^2 was .015. It means a low relationship exists between self efficacy, locus of control and the academic achievement scores of male secondary school students in Mathematics. This implies that only 1.5% of the academic achievement scores of male secondary school students in Mathematics was related to their self efficacy and locus of control. Furthermore, table 4 revealed that the multiple predictive strength of self efficacy and locus of control on the academic achievement scores of male secondary school students in Mathematics is statistically significant. The alpha level (0.05) of .848 is greater than significance of t (.398). It means that the multiple predictive strength of self efficacy and locus of control on the academic achievement scores of male secondary school students in Mathematics is statistically significant. Research findings on self efficacy, locus of control and academic achievement of male secondary school students had revealed a very low relationship between self efficacy, locus of control and academic achievement (Attamah & Okoli, 2021). It was also found out that self efficacy and locus of control predicted academic achievement of male students significantly (Nwamadi & Ekechukwu, 2020). The findings of the present study agree with the findings of Attamah et al (2021) and Nwamadi et al (2020). The low relationship between self efficacy, locus of control and academic achievement of male students could be due to their inability to deal efficiently with unexpected academic tasks. It further means that the students basically come to school because it is expected of them and not because they are interested in the teaching and learning process; they set little or no goals in their study and seem not to manage time prudently.

It also indicates that the students give less attention to their studies; lack personal motivation to achieve success in life; appear to doubt their coping abilities in the face of academic difficulties, and feel they can do nothing to improve their situation

Results from table 5 revealed the multiple predictive strength of self efficacy and locus of control on the academic achievement scores of female secondary school students in Mathematics. The computed r was .161 while the r^2 was .026. It means that there is a low relationship between self efficacy, locus of control and the academic achievement scores of female secondary school students in Mathematics. This implies that only 2.6% of the academic achievement scores of female secondary school students in Mathematics was related to their self efficacy and locus of control. Furthermore, table 6 revealed that the multiple predictive strength of self efficacy and locus of control on the academic achievement scores of female secondary school students in Mathematics is statistically significant. The alpha level of 1.520 is greater than the t value (.132). It means that the multiple predictive strength of self efficacy and locus of control on the academic achievement scores of female secondary school students in Mathematics is statistically significant. Research findings on self efficacy, locus of control and academic achievement of female secondary school students had shown a positive significant relationship between self efficacy and academic achievement but a negative significant relationship between locus of control and academic achievement (Zahra, 2014). It was also found that the interaction effect of self efficacy, locus of control and academic achievement of female secondary school students was not significant (Nehal, 2015). However, the findings of the present study are incongruent with the findings of Zahra (2014) and Nehal (2015). The low relationship between self efficacy, locus of control and academic achievement of female students may be due to the students not forming the habit of studying every day; their non-involvement in group studies; being not open to learn all the school subjects, and not disposed to seek the help of the teachers when necessary. It could also mean that they allow social activities to affect their studies and they do not consider setting good grades in their studies as a right decision. It might also be an indication that the students do not give attention to their studies; they neither plan nor largely determine their goals; they come to school as a routine and probably perceive difficult academic tasks as challenges to be avoided rather than as problems to be confronted.

V. Conclusion

It is concluded that self efficacy and locus of control contribute to predict academic achievement of senior secondary school students. The belief the students have in their ability to manage and solve difficult academic problems; development of self confidence in the control and mastery of situations as well as being able to determine one's own goals are all vital factors for success in academic achievement. However, self defeatism which could be demonstrated through lack of openness to learn all subjects; lack of coping abilities in the face of academic challenges and lack of personal motivation for success impair and often times undermine academic success. The study covered only public senior secondary school students and could not be extended to private secondary school students.

VI. Recommendations

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

- 1.School counselors should organize orientation exercises for the students to enable them appreciate the impact of self efficacy and locus of control on their academic achievement.
- 2.Parents and significant others should be role models for students' self efficacy and locus of control in order to enable the students attain better academic achievement.
- 3.Qualified and effective Mathematics teachers with proper teaching pedagogies should be employed in order to cultivate in students the spirit of self efficacy and locus of control.

VII. Educational Implications

The findings of this study have a number of educational implications. The following implications could be deduced:

Parents, caregivers and teachers have significant roles to play in shaping the mindset and worldview of the students' self efficacy and locus of control. This will help the students to understand that success or failure is largely determined by the efforts invested into academic activity. Furthermore, instructions and lessons that are delivered in a manner that maximize and encourage mastery of experience encourage the development of goal-oriented skills, self-confidence and proper coping strategies which are necessary for quality academic achievement.

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