Self Efficacy And Locus Of Control As Predictors Of Academic Achievement Of Male And Female Students

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Abstract
The study investigated self efficacy and locus of control as predictors of academic achievement of male and female students in mathematics. Three purposes and three research questions guided the study. Three hypotheses were also tested. Correlation survey research design was employed. The population of the study was 8,108 senior secondary school two (SSII) students, from 204 senior secondary schools in Ebonyi State, Nigeria. 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 and used for the study. Three lecturers from Faculty of Education, Ebonyi State University, Abakaliki validated the instruments. The reliability coefficient of the GSE and LOC were analyzed using Cronbach alpha. The results were 0.667 and 0.771 respectively. Simple linear regression was used to analyze research questions while the hypotheses were tested using t-test at 0.05 alpha level. The result indicated among other things that self efficacy predict mathematics academic achievement of male and female students while locus of control does not significantly predict academic achievement of male students but it significantly predict academic achievement of female students in mathematics. It was recommended among others things, that teachers and parents should encourage both male and female student to take responsibility of their success and failures.
Keywords: *Self efficacy, Locus of control, academic achievement, gender, self-esteem.*

I.   Introduction

Self Efficacy (SE) which refers to an individual's confidence in being able to complete a task or achieve a goal was developed by Albert Bandura (Banshura 1977). Bandura noted every individual is primarily motivated to achieve a purposeful life notwithstanding the impediments facing the individual. It is the individuals' belief in their ability to organize and act in the ways necessary to reach specific goals which is called self efficacy, SE is part of the self-system comprising ones attitudes, abilities, and cognitive skills (Bandura 1986). It is the foundation of human functioning. Bandura affirmed that it is not enough for one to possess the requisite knowledge and skills to carry out a task, the individual should also be convinced of exhibiting the required behaviour under challenging circumstances. Ferguson (2017) and Maliha and Sarwat (2019) also asserted SE is the capacity to overcome obstaces and finish a task.

SE is different from self esteem, self worth and self confidence. Self esteem which is overall perception of ones values, is concerned more with "being" (feeling okay as you are) while self Efficacy is more concerned with "doing" (feeling you are up to a challenge) self worth is at the core of ones thought, feeling and behaviours; it is tied to how one view their worthiness as human beings (Gulseren &Hamdi, 2017), the feeling that one deserves to be accepted and treated with respect and dignity. Self confidence is a feeling of competence in some specific areas which do not necessarily indicate what the assurance is about (Roberts, Nerstad & Lamyre, 2018). It follows that students who have self esteem, self worth and self confidence might succeed in challenging tasks, therefore the above psychological constructs could aid in the development of self efficacy.

Self efficacy is categorized into high (strong) and low (poor) (Bandura 1977). According to Bandura people with high level of self efficacy for a task at hand usually remain steadfast and resilient while those who have low SE usually withdraw from difficult task or avoid it completely. In line with the above views Izuchi and Onyekuru (2017) affirmed that students with low self efficacy are at risk academically. Further research by Habok, Magyar, Nemeth and Csapo (2020) hold that one with strong self efficiency for a given task might persist more whereas one with poor self efficacy for a task may give up easily.

Self efficacy is rooted in four sources: mastery experience, vicarious experience, social persuasion and psychological state. Mastery experience comes through persistent effort. It is not surprising that Kolodenko (2015) noted that in human endeavour some failures and challenges serve to prove that success needs consistent effort. Some students might end hardship and could recover from academic setback once they are confident and convinced they have ability to achieve academic excellence.

Vicarious experiences help to develop and boister self efficacy (Abd, Andi & Mohammad, 2020). Perceived similarity to the models could have much impact on how modeling affects perceived self efficacy. Furthermore, the conduct and outcome of the models might have less impact on people's perceived self efficacy if they view the models as being extremely different from themselves. Competent role modds seem to offer observers the practical skills and technique for handling challenges through their conduct and verbally communicated pattern of thinking.

Self efficacy is also boosted by social persuasion (Adnan & Abdolatif, 2018). The verbally convinced individual can exert more effort and keep it up for long time than one who welcomes self doubts and focus on their flaws when confronted with challenges (Adnan & Abdolatif, 2018). It seems more challenging to strengthen than to weaken strong ideas in ones personal efficacy using social persuasion. Furthermore, those who have been convinced that they are incapable avoid difficult activities that might develop their potentials, and give up easily amidst challenges (Umesh & Sam, 2018). It follows that disbelief in ones ability could produce behavioural validation by limiting activities and possibly diminish motivation. The authors further affirmed that effective efficacy builders usually create conditions that could lead them to success and further refrain from failure oriented situations. Such people, they noted, measure success by focusing on self improvement, instead of victories against rival.

The psychological dispositions and emotional mood also shape ones self efficacy (Bakari & Aisha, 2017). The level of tension and stress responses can indicate the extent one can successfully perform a task or not. Exhaustion, complaints and pains often reveal physical debility as one engages in strength and stamina demanding activities. Ones perception of effectiveness can also be influenced by ones mood. An upbeat mood increases perceived self efficacy while a downward mood decreases it (Ajude, 2024). Reducing stress reactions, changing one's negative emotional tendencies, and changing how individuals interpret their physical states are ways that enhance self efficacy. People who are plagued by self doubt might view their arousal as a discomfort while those with a high sense of self efficacy would see it as facilitating their performance. Self efficacy could therefore be a key for academic achievement of students.

When students are self driven to learn they are more likely to achieve their goals when they have an experience that boost their self efficacy. How goals, tasks and obstacles are tackled by students reveal the role of self efficacy in academic achievement. Students with high sense of self efficacy seem to show greater interest in academic activities, have a stronger sense of commitment to their interest, bounce back from academic setbacks and disappointment quickly; they see difficult academic challenges as tasks to be mastered (Alpay & Gamze 2020). When they experience failures, highly efficacious students would attribute it to lack of effort. It means students who are high in self efficacy might attempt challenging tasks more often; they can persist longer at a given task, and exert more effort. According to Bandura (1986) it is their perception that their abilities caused the achievement which affects the outcome rather than their actual abilities.

In constrast to the above, students with low self efficacy would view academic challenges as dangers to be avoided. They might avoid setting goals, and could show little commitment to tasks; they usually give up without a fight in the presence of obstacles (Asakereh & Yousf, 2018). Students with low self efficacy would be more prone to like failure, lack the confidence to succeed in their academic pursuit consequently they would feel sad, less resilient and less likely to recover from academic setbacks. It is not however certain the extent gender relate to self efficacy.

Gender refers to socio-cultural construct, traits, actions and roles which society assigns to men and women (Lazarides & Lauman 2019) taking into account their biological features. Gender might also refer to a variety of identities that do not fit into preconceived notions of male and female (Baba, Banus & Adamu, 2020). Because it is a social construct it might mean many things for different cultures and can evolve over time.

Despite traditional stereotypes which hold that there are gender differences in science, technology, engineering and mathematics, De Gioannis (2022) revealed that male students do not perform better than female students in mathematics. It might be argued that the perception of the genders is determined by the information from social surroundings. (Setioko & Ding, 2023); parents' perception of their children would also influence the self efficacy of the students (Jaf et al, 2023). Furthermore, Carlsson and Nilson (2020) and Berasateg; (2023) found that girls exhibit higher levels of mathematics anxiety than males hence girls have more negative attitude toward mathematics. Gender self efficacy and locus of control may explain course selection patterns which might account for under representation of women in mathematics related courses. It follows that where females believe they cannot succeed in mathematics such altered perception may subsequently manifest itself in lower grades or

avoidance of mathematics. While males might have higher internal locus of control (Serin et al 2018) females tend to have a higher external locus of control.

It has been observed that secondary school students have varying levels of confidence in their abilities for success in mathematics. Some females appear to express doubt in their capabilities whereas some male students seem to be over confident. What is not certain, therefore, is the extent self efficacy and locus of control predict senior secondary school students academic achievement in mathematics. Four research questions ginded the study:

Four research questions guided the study:
- How does self efficacy predict academic achievement of male students in mathematic?
- How does self efficacy predict academic achievement of females students in Mathematics?
- How does focus of control predict academic achievement of male secondary school students in mathematics?
-How does locus of control predict academic achievement of female secondary school students in mathematics.

Four hypotheses were tested
- Self efficacy does not significantly predict academic achievement of male secondary school students in mathematics.
- Self efficacy does not significantly predict academic achievement of female secondary school students in mathematics.
- Locus of control does not significantly predict male academic achievement of secondary school students in mathematics.
- Locus of control does not significantly predict female academic achievement of secondary school student in mathematics.

II.   Research Methodology
The study adopted the correlation research design. The area of study was Ebonyi state of Nigeria. It is bounded by 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 study was 8,108 senior secondary year two (SS2) students from 204 secondary schools (4,263 females and 3,845 males). The sample consist of 811 students. Multi stage sampling procedure was adopted to sample the students. The state was stratified into three zones-Abakaliki, Onueke, and Afikpo education zones. From each zone, two local government Areas (LGA) were sampled using non proportionate sampling technique. The total number of Local Government Area was 6. From each Local Government Area, purposive sampling was used to sample co-educational schools. The total number of co-educational schools in each of the six Local Government Area were 9, 17, 18, 10 9, 18, respectively (SEMB, 2024). Simple random sampling and non proportionate sampling were used to sample two schools from each Local Government Area for the study. Total number of sampled schools was twelve (12). From each of the twelve schools sampled non proportionate sampling technique was used to sample 395 males and 416 female students. The number sampled was due to the cultural homogeneity of the people in the area of study (Ajude & Mgboro, 2024).

Three instruments were employed for the study:
(1) General self efficacy (GSE) questionnaire, developed by Jerusalem and Schwarzer (1981). It has 10 items with scales of 1-4. The response pattern is; not at all true (1) Hardly true (2) Moderately true (3) Exactly true
(2) Locus of control questionnaire developed by Trice (1985). It has 28 items with the response options of true or false.
(3) Students' Mathematics achievement test which was adopted from WASSCE Mathematics objective questions of 2019, 2020 and 2021. Seven questions were adopted from 2019 and 2020 respectively while six questions were adopted from 2021. WASSCE questions 3,4,8,10,14,17,20 were adopted from 2019, questions 1,3,9,10,13,15,23 were adopted from 2020, questions 2,5,9,10,13,24, were adopted from 2021. A total number of 20 items were used.

Validation of Instrument
The GSE and locus of control questionnaire (LOCQ) were standardized and their validity was established. The total number of the items in GSE, and LOCQ was 10 and 28 respectively. In the present study the number of items in GSE and LOCQ was 10 and 15 respectively. However, because some modifications were made in the present study, the instruments were re-validated by three lecturers from Ebonyi State University, Abakaliki. They examined the content and their appropriateness for measuring what they were expected to measure including the suitability of the language used.

Reliability

The internal consistency of the GSE and LOCQ in the present study was 0.657 and 0.771 respectively. Cronbach's alpha was used to analyzed the data. The entire instrument yielded an alpha index of 0.750. Each of the instruments was administered to a samples of 25 SII students from non-study area. After two weeks interval they were re-administered to the same group of students. This was to establish the internal consistency of the items.

Method of Data Collection

Four research assistants helped the researcher to administer the instruments. The assistants were briefed to give the three instruments to the respondents at the same time. The assistants worked with the mathematics teachers of the students in administering the instruments. 45 minutes was used by the students to respond to the items.

Method of Data Analysis

Simple linear regression was used to analyze the data. The t-value was used to determine the magnitude and direction of the relationship while the square value was used to determine the extent of achievement that was caused by the predictor variables. The null hypotheses were tested at 0.05 level of significance using test of significance of relationship.

III. Results

The results of data analysis are presented below based on the research questions that guided the study.

Research Question 1: How does self-efficacy predict academic achievement of male secondary school students' in Mathematics?

Table 1: Predictive strength of self efficacy on academic achievement of male secondary school students' in Mathematics.

Computed r	r^2		Adjusted r^2	Std Error
.086	.007		-.003	9.88049

Since the computed r was .086 and the r^2 was -.007 it means a high relationship exist between self efficacy and academic achievement of male students in mathematics. Based on the result only 0.7% of academic achievement of the students in mathematics is predicted by their self-efficacy.

Research Question 2: How does self efficacy predict academic achievement of female secondary school students' in Mathematics?

Table II: Predictive strength of self-efficacy on academic achievement of female secondary school students' in Mathematics.

Computed r	r^2		Adjusted r^2	Std Error
0.64	.004		-.005	8.30677

The computed r was 0.64, the r^2 was .004. It means a high relationship exist between academic achievement and self efficacy of the female students in mathematics. It also implies that only 0.04% of academic achievement of the female students is predicted by their self efficacy.

Research Question 3: How does locus of control predict academic achievement of male secondary school students' in mathematics?

Table III: Predictive strength of locus of control on academic achievement of male secondary school students' in mathematics

Computed r	r^2		Adjusted r^2	Std Error
	.059	.003	.007	9.90149

The computer r was 0.59 while r^2 was .003. It shows a relationship exist between academic achievement and locus of control of male students in mathematics. However, only 0.03% of their achievement in mathematics is predicted by locus of controls.

Research Question 4: How does locus of control predict academic achievement of female secondary school students' in mathematics?

Table IV: Predictive strength locus of control on academic achievement of female secondary school students' in Mathematics.

Computed r	r^2		Adjusted r^2	Std Error
.159	.025		.016	8.21798

The computed r was .159 while r^2 was .025. It means a very low relationship exist between achievement of females in mathematics and their locus of control.

Ho1: Self-efficacy does not significantly predict academic achievement of male secondary school students' in Mathematics.

Table V: Significance of the predictive strength of self-efficacy on academic achievement of male secondary school students' in mathematics

Computed	r^2	Adjusted r^2	Std Error	Beta	T	Sig of T
.086	.007	-.003	9.88049	-.086	-.842	.402

The computed t value was -.842, greater than significance of t (.402). Therefore the null hypothesis was rejected. Self efficacy significantly predict academic achievement of male secondary school students in mathematics.

Ho2: Self-efficacy does not significantly predict academic achievement of female secondary school students' in Mathematics.

Table VI: Significance of the predictive strength of self-efficacy on academic achievement of female secondary school students' in Mathematics.

Computed r	r^2	Adjusted r^2	Std Error	Beta	T	Sig of T
.064	004	-.005	8.30677	.064	.655	.514

The computed value .665 was greater than significance of t. (.514). The null hypothesis is therefore rejected. It means that self efficacy significantly predict academic achievement of female secondary school students in mathematics.

Ho3: Locus of control does not significantly predict academic achievement of male secondary school student's in Mathematics.

Table VII: Significance of the predictive strength of locus of control on academic achievement of male secondary school students' in Mathematics.

Computed	r^2	Adjusted r^2	Std Error	Beta	T	Sig of T
.057	.003	-.007	9.90149	.057	.554	.581

The computed t value .554 was less than the significance of t (.581). The null hypothesis was therefore upheld. It means locus of control does not significantly predict the academic achievement of male students in mathematics.

Ho4: Locus control does not significantly predict academic achievement of female secondary school students' in Mathematics.

Table VIII: Significance of predictive strength of 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
.159	.025	.016	8.21798	.159	1.643		.103

The computed t value (1.643) was greater than significance of t (.103). The null hypothesis is therefore rejected. It follows that locus of control significantly predict academic achievement of female secondary school students.

IV.   Discussion Of Findings

The discussion of findings is presented according to the research questions and hypotheses presented in the study. Research question one sought to find out how self efficacy predict academic achievement of ale secondary school students in mathematics. Table I revealed the computed r was .086 the r^2 was .007. It means

there is a high relationship between self efficacy and academic achievement, however only 0.7% academic achievement of the students in Mathematics was related to their self efficacy. Result on table V, hypothesis one showed that the predictive strength of self efficacy on the academic achievement of the students in mathematic is not statistically significant since the t-value -.842 is greater than significant of t (.402).

The findings of the study revealed a positive relations exist between self efficacy and academic achievement of the male students. Male students were found to have positive attitudes in mathematics and mathematic related subjects (Ghasemi, Barley and Safadel, 2020). The high level of expectation which parents and teachers have about the males might have also boosted their self efficacy in mathematics achievement, (Titilayo, Oloyede and Adekunle 2016; Abd, Andi and Muhammad, 2020; Ajude & Mgboro, 2024). However, it was revealed only 7% of academic achievement of male students was related to self efficacy. It means that though improvement in academic self efficacy will be accompanied by improvement in academic achievement, other factors might exist which help students to improve their academic achievement. Students can perform better in academic achievement due to self efficacy however their self efficacy appear to be stifled by teacher self efficacy and location of their study Durowoju and Onuka (2015) had discovered that teacher self efficacy and location of school impacted positively on students academic achievement.

Research question two focused on finding out how self efficacy predict academic achievement of female secondary school students in mathematics. Table II showed the computed r was .064 while the r^2 was .004. It means self efficacy is positively related to academic achievement of the female students. However, only 4% of academic achievement of female students is related to their self efficacy. Hypothesis two, table vi reveal that computed t value was. 655 while the significance of t was .514. It means the predictive strength of self efficacy on academic achievement of female students is not statistically significant. The finding which revealed a relationship between self efficacy and academic achievement of female students imply that female students have the confidence to solve mathematics challenges, they can set higher goals, they can be motivated to achieve their everyday task. However, the result in the present study revealed the predictive strength of self efficacy on mathematics academic achievement is not significant. It can therefore be deduced that females self efficacy in the study area may be chocked by the perception of their parents, the cultural restrictions to challenging roles and activities (Muntom & Retelsdorf 2019, Setioko & Ding, 2023). Furthermore girls were reported to exhibit high level of mathematics anxiety (Berasategi, 2023) which lead them to have negative attitude towards mathematics. The lower expectation that parents, teachers and sometimes counselors hold for the female might also discourage the females from studying mathematics and other mathematics related courses (Gonzalez-Perez et al, 2022).

Result from research question three table III revealed a relationship exist between academic achievement and locus of control of male students in mathematics. Hypothesis three table vii revealed that locus of control does not significantly predict academic achievement of male students in mathematics. Success and failures in school activities are based on different factors within the individual, school and family (Ajude 2024). The present finding support Olatunji and Sa'adiya (2018) who discovered that a low relationship exist between locus of control and academic achievement of secondary school students. However, Ben (2018) discovered that locus of control was a significant predictor of academic achievement. It follows therefore that psycho-physiological environment might be factors to be considered in order to enhance locus of control and academic achievement of students.

The findings of the study based on research question 4 table IV indicated that a very low relationship exist between achievement of female students in mathematics and their locus of control. Furthermore, hypothesis 4 table VIII revealed locus of control significantly predict academic achievement of female secondary students in the study area. The present finding support Ben (2018) and Akume and Anyanwu (2021) who found that locus of control significantly predict academic achievement in mathematics. However the present result contrast with the findings of Abel and Moyosola (2019). They discovered that locus of control was not a good predictor of academic achievement.

Mathematics appears to be a male oriented course. The subject demands freedom to explore the environment, to think critically, and independently. The above qualities are usually not expected of the females (Ajude 2024), Moreover Ajude opined that females have higher level of external locus of control, hence they might depend more on others to help them pass mathematics. It follows females ability to succeed in mathematics would be based more on the extent they take responsibility of their personal decisions, the extent they are given freedom to explore the environment and think critically. Unfortunately the cultural environment of the study area does not encourage independence, freedom to interact with the environment and critical thinking enhance more conformity to external rules and judgment. According to Mgboro (2004) Giligan noted that females assertion of their rights can lead to danger, criticism and abandonment, therefore they depend on others in order to survive.

V.   Conclusion

The study examined self efficacy and locus of control as predictors of academic achievement of male and female students. The study was carried out in order to discover the predictive strength of self efficacy and locus of control on mathematics academic achievement of the students. Based on the findings of the study it was

concluded among other things that a high relationship exist between male self efficacy and academic achievement, and self efficacy significantly predict male achievement in mathematics, a very low relationship exist between achievement of females in mathematics and locus of control.

VI. Recommendations

The study recommended that teachers and parents should encourage their male and female students to take personal responsibility of their success and failures. The psycho-social environment of the students should encourage independent, and critical thinking including freedom to explore the environment in order to enhance the self efficacy and locus of control of male and female students.

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