



LOCUS OF CONTROL AS CORRELATES OF MATHEMATICS ACHIEVEMENT AMONG SENIOR SECONDARY SCHOOL HIGH ABILITY STUDENTS IN CALABAR METROPOLIS OF CROSS RIVER STATE, NIGERIA

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ABSTRACT

This study adopted correlational survey design to established the relationship between the locus of control and Mathematics academic achievement of senior secondary school high ability students in Calabar Metropolis of Cross River State, Nigeria. Two research questions were posed which were translated into two null hypotheses. Multiple sampling approaches including stratified, and purposive sampling approaches, teacher nomination check list, school record were used to select a sample of 100 students for the study. Two instruments titled "Locus of Control questionnaire (LCQ) and Mathematics Achievement Test (MAT) were developed by the researcher and validated by experts and used for data collection. Then reliability of the questionnaire using Cronbach Alpha reliability estimate ranges from .84 for internal locus of control to .86 for external locus of control while the reliability estimate of the high ability Students' Mathematics achievement test was established through Kuder Richardson formula K-R20 which gives .85. This therefore imply that both internal and external locus of control influence Mathematics achievement of high ability students. The hypotheses were tested using Pearson Product Moment. Correlation Coefficient. All hypotheses were tested at .05 level of significance. The findings of the study revealed that internal locus of control and external locus of control individually relate to academic achievement in Mathematics of high ability students in Calabar Metropolis of Cross River State, Nigeria. It was therefore concluded that Mathematics achievement of high ability students depends on their internal and external locus control. Based on finding and conclusion of the study, it was recommended amongst others that educational institutions should integrate programs that promote an internal locus of control among high ability students. This should include training in goal-setting, self-reflection, and self-regulation strategies to help students recognize the impact of their efforts on their academic outcomes.

KEYWORDS: Locus of control, internal, external, High ability, Mathematics achievement.

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INTRODUCTION

High ability students, often referred to as gifted or talented students, are individuals who demonstrate exceptional abilities or potential in one or more areas compared to their peers. These areas can include, high cognitive capabilities, creative talent, academic excellence problem solving skills (Ogar, Ibok, Odey, Joseph, Unimuke, & Ungie, 2023). Despite the recognized potential of high ability students in mathematics, most of them do not achieve at expected levels. According to Ibok, Ogar, Bassey, Williams, and Essien (2024), more than half of the high ability students who sat for senior secondary school examination between the years 2015 to 2024 performed below average. The persistence poor performance in Mathematics in both internal and external examination among the students in Nigeria is a major sources of worry to many concern educator and parents. This problem can be persistent even with high ability students (especially among those not identified) if not checked which seriously jeopardize the aims and objectives of the government on the education for students with high ability aimed to be provided for the interest of the nation's economic and technological development. More often high ability students who performed below expectation feel that their efforts in learning Mathematics have little impact on their success, leading to a passive approach to learning and a tendency to attribute failures to factors beyond their control. Most of their actions from belief resulted in decreased motivation, poor performance and increased anxiety when faced with challenging learning of Mathematics tasks. Many of them experienced higher anxiety levels in mathematics negatively influence their academic performance in schools and they struggle academically particularly in learning mathematics, as they did not take responsibility for their learning. Those with a weak internal locus of control tend to demonstrate lower levels of motivation, resilience and academic performance in mathematics (Ogar, Ibok, Odey, Joseph, Unimuke, & Ungie, 2023). Some of them with a pronounced external locus of control often perform poorly in mathematics and they likely attributed their academic achievement to external factors, such as luck or the influence of others, which can diminish their motivation and performance (Ibok, & Unoh, 2019).

Locus of control play an importance role in shaping students' academic experiences, achievement and outcomes, particularly in mathematics, where high ability students often encounter rigorous challenges. This psychological construct influences how students perceive their ability which could influence their academic success, motivation, persistence, and performance (Ibok, Ogar, Bassey, James, & Udo, 2024). **Nguyen and Tran (2020)** found that locus of control is a psychological concept that describes how individuals perceive the causes of their successes and failures . it is a degree to which individuals believe that they can control events affecting them. In the study conducted by Davis and Lee (2016) found that locus of control reflects the extent to which people attribute their successes or failures to internal factors (like their own abilities) versus external factors (like luck or the influence of others). The relationship between locus of control and mathematics achievement shows that students who attribute their performance to external factors tend to experience more anxiety, further hindering their academic achievement(**Hassan & Ali, 2016**; Ibok, Ogar, Bassey, Williams, & Essien, 2024).

Locus of control is categorized into two types: internal locus of control and external locus of control. Internal locus of control is generally associated with a belief that one's efforts, actions or decisions can lead to success. Students with an internal locus of control are likely to attribute their successes in mathematics to their hard work, effort, and strategies. This mindset fosters resilience, motivation, and a proactive approach to learning. High ability students with an internal locus of control often demonstrate higher levels of achievement in mathematics because they are more likely to engage in effective study habits, seek help when needed, and persist through challenges (Ibok, & Unoh, 2019). **Students with a strong internal locus of control were more likely to engage in effective study habits, leading to improved performance in mathematics assessments. Miller et al. (2019)** opined that high ability students with an internal locus of control exhibited greater resilience and adaptability, which are vital for mastering complex mathematical concepts. A study conducted by Smith et al. (2018) found that students with an internal locus of control demonstrated higher mathematics performance, as they were more

likely to engage in self-regulated learning strategies. This aligns with findings from Johnson and Lee (2020), who found that high-ability students with an internal locus of control were more resilient in the face of academic challenges, leading to better outcomes in mathematics. Moreover, Garcia and Rojas (2021) stated that an internal locus of control in students can enhance their motivation and engagement in mathematics, which is important for achieving high levels of performance. A study conducted by Chen et al. (2022) found that interventions designed to shift students' locus of control from external to internal significantly improved their mathematics scores. Encouraging an internal locus of control may not only improve academic performance but also equip students with the resilience needed to navigate the complexities of advanced mathematics education. Wang, Chen, and Liu (2022) found that high ability students with a strong internal locus of control exhibited greater academic resilience and higher mathematics achievement, highlighting the importance of self-efficacy in educational settings. Huang and Chen (2020) examined the impact of parental involvement on the locus of control in high ability students and found that supportive parenting practices could enhance students' internal locus of control, which in turn positively influenced their mathematics achievement. Patel et al. (2021) examined the effects of developing an internal locus of control on mathematics achievement among gifted students and found that an internal locus of control led to improved mathematics performance, reinforcing the importance of this psychological trait in educational settings. Zhang et al. (2017) found that those with an internal locus of control were more likely to set higher academic goals in mathematics, which in turn correlated with higher achievement levels. Rogers and Smith (2018) found that those with an internal locus of control experienced lower levels of burnout, as they felt more in control of their academic paths, leading to better performance in mathematics. Individuals with an internal locus of control believe they have the power to influence their life events and outcomes. They tend to take responsibility for their actions and are more likely to engage in proactive behaviors. Individuals believe they have control over their life circumstances and that their actions significantly influence outcomes. They tend to take responsibility for their successes and failures.

High ability students with an internal locus of control are more likely to engage in effective learning strategies, persist in challenging tasks, and seek help when needed. This proactive attitude can lead to higher mathematics achievement

External Locus of Control is the belief that external forces, such as fate, luck, or other people, have control over one's life. Those with an external locus of control tend to attribute their successes or failures to external circumstances rather than their own actions. This may lead to feelings of helplessness and a lack of motivation and dependency on external factors (Ibok, Ogar, Bassey, Williams, & Essien, 2024). Zhang, Wang, and Liu,(2017) found that students with an external locus of control may struggle with mathematics, as they might believe that their performance is largely determined by luck or external conditions. This belief can lead to lower motivation and achievement in mathematics. They may feel powerless to change their situation. High ability students with an external locus of control may struggle with mathematics achievement, as they are less likely to take responsibility for their learning and may give up more easily when faced with difficulties (Hassan & Ali, 2016; Ibok, Ogar, Bassey, James, & Udo, 2024).

Zhang, Wang, and Liu (2018) research on the correlation between external locus of control and academic outcomes in mathematics for high ability learners and found that students who attributed their successes and failures to external factors showed lower motivation and achievement in mathematics. Miller and Smith (2016) investigated how external locus of control affects academic performance in mathematics among gifted students and found that students with a higher external locus of control tended to have lower mathematics achievement due to a reliance on external factors rather than personal effort. Khan, Ali, and Patel(2020) found that an external locus of control was negatively correlated with academic achievement, suggesting that students who felt less in control of their outcomes performed worse in mathematics. Patel and Kumar (2021) examined the relationship between external locus of control, anxiety, and mathematics achievement among gifted students and found that students with a strong external locus of control experienced higher levels of anxiety, which negatively impacted their performance in mathematics. Liu,

Zhang, and Wang (2017) found that an external locus of control was associated with decreased intrinsic motivation, leading to poorer mathematics performance. Raza and Khan (2021) examined the effects of external locus of control on the academic resilience and mathematics achievement of gifted students and found that a higher external locus of control was linked to lower resilience, negatively impacting mathematics performance. Huang, Chen, and Li (2023) found that students with a higher external locus of control were less resilient and had poorer academic outcomes in mathematics. Research conducted by Alshahrani and Alhassan (2019) found that students with an external locus of control often experience higher anxiety levels, which negatively impacts their academic performance. Those with an external locus of control feel that their lives are controlled by external factors beyond their influence. They may believe that their success or failure is determined by luck or the actions of others.

Purpose of the study

The main purpose of the study was to investigate the relationship between locus of control and academic achievement in Mathematics of high ability students in Calabar Metropolis of Cross River State, Nigeria

Statement of hypotheses

The following null hypotheses were formulated for the study:

- i) There is no significant relationship between the internal locus of control and Mathematics achievement of high ability students
- ii) There is no significant relationship between the external locus of control and Mathematics achievement of high ability students

METHODOLOGY

The study area was Calabar Metropolis which include Calabar South and Calabar Municipality of Cross River State, Nigeria. The research design used for this study was the correlational survey design. Correlational survey design is a research methodology used to examine the relationships between two or more variables without manipulating them. This design helps researchers understand how changes in one variable may be associated with changes in another. The researchers used this design to established the relationship between locus of control (in terms of internal locus of control and

external locus of control) and academic achievement in Mathematics of high ability students in Calabar Metropolis of Cross River State. The population for the study consists of all the SS1 high ability students in public secondary schools in Calabar Metropolis of Cross River State. Multi stage sampling procedure was adopted for the study which consisted of stratified sampling technique, purposive and simple random sampling techniques. Stratification was used on the basis of Local Government Area so as to give adequate representation of the subjects in each Local Government Area and equal opportunity for all the schools in the different Local Education Authorities to be selected. From the each selected schools, researchers used school Mathematics Record and Teacher Nomination Checklist to select a sample of 100 high ability students for the study. The instruments used for data collection were the questionnaire titled "Locus of control " and achievement test in Mathematics. The questionnaire was made of 14 items, with 7 items to measure each sub-level in terms of internal locus of control and external locus of control.

. The questionnaire was based on four point scale of strongly agreed, agreed, disagreed and strongly disagreed. Mathematics Achievement Test was made up of 50 items constructed by the researchers with help of two experts in Mathematics education. The items were constructed based on SSS 1 Mathematics syllabus with four options A, B, C, D. A correct answer attracts one mark while incorrect answer attracts zero (0)mark. The instruments were face-validated by two experts in Measurement and Evaluation, two experts in special education and two Mathematics Educators, both from the University of Calabar. Corrections were pointed out by the experts and adjusted by the researchers and the document was considered valid. The reliability of the questionnaire using Alpha Cronbach Method was .84 for internal locus of control and .86 external locus of control while the reliability estimate of the high ability Students' Mathematics achievement test was established through Kuder Richardson formula K-R20 which gives .85. Since the reliability index is above 0.50, the estimates were considered high enough for the study. The Statistical Package for Social Sciences (SPSS) computer programme was used to analyze the data collected. The

hypotheses were tested using Pearson Product Moment Correlation Coefficient was for the three hypotheses. All hypotheses were tested at .05 level of significance.

Presentation of results

The result of the analysis is presented in Tables 1 and 2. The hypotheses were tested at .05 significant level.

Ho₁ There is no significant relationship between the internal locus of control and

mathematics achievement of high ability students. The independent variable in this hypothesis is internal locus of control while the dependent variable is academic achievement in Mathematics of high ability students.. In testing this hypothesis, mean, standard deviation of internal locus of control and academic achievement in Mathematics of high ability students were computed, compared and correlate using Pearson Product Moment Correction . The results are presented on Table 1.

Table 1: Person Product Moment Correlation of the relationship between internal locus of control and Mathematics achievement of high ability learners.. (N= 100)

Variables	N	Mean	SD	r-value	p-value
Internal locus of control	100	19.876	2.453	.813	.000
Mathematics achievement	100	39.987	4.865		

*Significant at the .05 level, df =98

The result presented on Table 1 shows that there is a significant positively high relationship between the internal locus of control and academic achievement in Mathematics of high ability students (r=.813; p=.000). With this result, the null hypothesis was rejected while the alternative was retained at the 0.05 level of significance. The positive r-value indicated that the they stronger internal locus of control, the better the academic achievement in Mathematics of high ability students they tend to be. On the other hand, when there is a weak internal locus of control, the poorer their academic achievement in Mathematics of high ability students tend to be.

Ho₁ There is no significant relationship between the external locus of control and mathematics achievement of high ability students. The independent variable in this hypothesis is external locus of control while the dependent variable is academic achievement in Mathematics of high ability students.. In testing this hypothesis, mean, standard deviation of external locus of control and academic achievement in Mathematics of high ability students were computed, compared and correlate using Pearson Product Moment Correction . The results are presented on Table 1.

Table 1: Person Product Moment Correlation of the relationship between external locus of control and Mathematics achievement of high ability learners.. (N= 100)

Variables	N	Mean	SD	r-value	p-value
External locus of control	100	17.992	2.123	.754	.000
Mathematics achievement	100	39.987	4.865		

*Significant at the .05 level, df =98

The result presented on Table 1 shows that there is a significant positively high relationship between the external locus of control and Mathematics achievement of high ability students ($r=.754$; $p=.000$). With this result, the null hypothesis was rejected while the alternative was retained at the 0.05 level of significance.

The positive r -value indicated that the they more external locus of control, the poor the academic achievement in Mathematics of high ability students they tend to be. On the other hand, when there is no external locus of control, they better their academic achievement in Mathematics of high ability students tend to be.

DISCUSSION OF FINDING

The result of hypothesis one shows that there is a significant relationship between the internal locus of control and Mathematics achievement of high ability students.

The finding agreed with **Davis and Lee (2016)** who found that students with a strong internal locus of control were more likely to engage in effective study habits, leading to improved performance in mathematics assessments. The finding is in line with **Miller et al. (2019)** who found that high ability students with an internal locus of control exhibited greater resilience and adaptability, which are vital for mastering complex mathematical concepts. The finding is in agreement with a study conducted by Smith et al. (2018) who found that students with an internal locus of control demonstrated higher mathematics performance, as they were more likely to engage in self-regulated learning strategies. This aligns with findings from Johnson and Lee (2020), who found that high-ability students with an internal locus of control were more resilient in the face of academic challenges, leading to better outcomes in mathematics. The finding is in line with Garcia and Rojas (2021) who found that an internal locus of control in students can enhance their motivation and engagement in mathematics, which is important for achieving high levels of performance. The finding is in agreement with the study conducted by Chen et al. (2022), Wang, Chen, and Liu (2022), Huang and Chen (2020), Patel et al. (2021), Zhang et al. (2017) found that those with an internal locus of control were more likely to set higher academic goals in mathematics, which in turn correlated with higher achievement levels.

The result of hypothesis two shows that there is a significant relationship between the external locus of control and Mathematics achievement of high ability students.. The finding agreed with Zhang, Wang, and Liu,(2017) who found that students with an external locus of control may struggle with mathematics, as they might believe that their performance is largely determined by luck or external conditions. The finding agreed with Zhang, Wang, and Liu (2018) who found that students who attributed their successes and failures to external factors showed lower motivation and achievement in mathematics. In agreement to this finding Miller and Smith (2016) found that students with a higher external locus of control tended to have lower mathematics achievement due to a reliance on external factors rather than personal effort. The finding is in line with Khan, Ali, and Patel(2020) who found that an external locus of control was negatively correlated with academic achievement, suggesting that students who felt less in control of their outcomes performed worse in mathematics. Patel and Kumar (2021) found that students with a strong external locus of control experienced higher levels of anxiety, which negatively impacted their performance in mathematics. The finding is in consonance with Liu, Zhang, and Wang (2017) who found that an external locus of control was associated with decreased intrinsic motivation, leading to poorer mathematics performance. The finding is in line with Raza and Khan (2021) found that a higher external locus of control was linked to lower resilience, negatively impacting mathematics performance. Huang, Chen, and Li (2023) found that students with a higher external locus of control were less resilient and had poorer academic outcomes in mathematics.

CONCLUSION

The relationship between internal and external locus of control and mathematics academic achievement among high ability students has been significantly explored in recent studies. Students with a strong internal locus of control tend to demonstrate higher levels of motivation, resilience, and academic performance in mathematics. They attribute their successes to their own efforts and abilities, leading to enhanced achievement in this subject area. Conversely, students with a pronounced external locus of control often perform poorly in mathematics.

They are more likely to attribute their academic outcomes to external factors, such as luck or the influence of others, which can diminish their motivation and performance. The finding of the study revealed that internal locus of control and external locus of control individually relate to academic achievement of high ability students.

RECOMMENDATIONS

Based on the finding of the study. The following recommendation were made;

1. Educational institutions should integrate programs that promote an internal locus of control among high ability students. This should include training in goal-setting, self-reflection, and self-regulation strategies to help students recognize the impact of their efforts on their academic outcomes.
2. Educators should be trained to identify and nurture traits associated with an internal locus of control. This includes providing constructive feedback that emphasizes effort and personal responsibility rather than attributing success to external factors.
3. Schools should offer counseling services that help students develop a stronger internal locus of control. Counselors should work with students to reframe their thinking about challenges and failures, encouraging them to view these as opportunities for growth rather than as insurmountable obstacles.

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