

EMOTIONAL INTELLIGENCE AND MATHEMATICS PERFORMANCE AMONG LOW-ACHIEVERS IN SECONDARY SCHOOLS IN IMO STATE

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Abstract

This study examined the relationship between emotional intelligence and Mathematics performance among low-achieving students in secondary schools in Imo State. The study adopted a correlational research design to determine the extent to which emotional intelligence relates to Mathematics performance among low-achieving students. Two research questions guided the study. The population of the study comprised 15,000 low-achieving secondary school students in Imo State, while a sample size of 300 students was selected using a multi-stage sampling technique. Data were collected using a 10 item structured questionnaire titled Emotional Intelligence Questionnaire for Mathematics Low-Achievers (EIQ-MLA) and students' Mathematics performance scores obtained from school academic records. The instrument was validated by three experts and a reliability coefficient of 0.70 was obtained using Cronbach's Alpha method. Data collected were analysed using mean and standard deviation to answer research question one and Pearson's Product Moment Correlation (PPMC) was used to establish the relationship between the EI and academic performance. The findings revealed that emotional intelligence has a high positive and significant relationship with Mathematics performance among low-achieving students in secondary schools in Imo State ($r = 0.61$, $p < 0.05$). The study concluded that emotional intelligence is an important non-cognitive factor influencing Mathematics performance among low-achieving students. The study recommended that teachers, counsellors, and education authorities should integrate emotional intelligence development into teaching and counselling programmes to improve Mathematics performance among low-achieving students.

Keywords: Emotional intelligence, Mathematics performance, low-achieving students, secondary schools.

Introduction

Education is widely recognized as a fundamental instrument for national development, individual empowerment, and social transformation (United Nations Educational, Scientific and Cultural Organization, 2021). Among school subjects, Mathematics occupies a central position because of its relevance to science, technology, engineering, and everyday problem-solving (National Council of Teachers of Mathematics, 2020). Competence in Mathematics is essential for national technological advancement and individual career development; however, many secondary school students continue to experience significant difficulties in mastering mathematical concepts (Onyejiaku & Okoro, 2020). The problem is particularly evident among low-achieving students, who often struggle with problem-solving, conceptual understanding, and consistent academic performance (MacCann *et al.*, 2020). In Imo State, Nigeria, concerns about poor performance in Mathematics have continued to attract the attention of educators, policymakers, and researchers, thereby necessitating investigation into both cognitive and non-cognitive factors influencing learning outcomes (Oparaku, 2015; WAEC, 2023).

Traditionally, academic success in Mathematics has been attributed mainly to cognitive factors such as intelligence quotient (IQ), reasoning ability, and memory (Adeosun & Ogunwuyi, 2023). However, contemporary research in educational psychology has shifted focus toward non-cognitive variables that influence learning, including motivation, self-efficacy, resilience, and emotional intelligence (Afolabi & Balogun, 2022; Trigueros *et al.*, 2024). Emotional intelligence has emerged as a critical psychological construct that explains how individuals perceive, regulate, and utilize emotions to enhance learning and performance (Mayer *et al.*, 2004). The growing emphasis on emotional intelligence reflects the understanding that academic achievement is not determined by cognitive ability alone but also by emotional and social competencies that shape students' attitudes toward learning and their ability to cope with academic challenges (MacCann *et al.*, 2020).

The concept of emotional intelligence is grounded in established theoretical frameworks that provide a foundation for understanding its role in academic performance. One of the most influential frameworks is the Ability Model of Emotional Intelligence, developed by Mayer and Salovey, which conceptualizes emotional intelligence as a set of cognitive abilities involving the perception, understanding, management, and use of emotions to facilitate thinking and problem-solving (Mayer & Salovey, 1997; Mayer *et al.*, 2004). This model emphasizes that emotionally intelligent individuals can regulate their emotional responses and use emotional information to guide behaviour and decision-making in academic and social contexts (Mayer *et al.*, 2004). Complementing this perspective is the Emotional Intelligence Theory proposed by Goleman, which views emotional intelligence as a combination of emotional and social competencies, including self-awareness, self-regulation, motivation, empathy, and social skills (Goleman, 1995; Goleman, 1998). Goleman's framework is particularly relevant in educational settings because it highlights behavioural and interpersonal competencies that influence students' learning attitudes, classroom interactions, and academic engagement (Goleman, 1998). The present study adopts

these theoretical perspectives to explain how emotional intelligence dimensions influence Mathematics performance among low-achieving students.

The relevance of emotional intelligence in Mathematics learning is evident in the emotional demands associated with the subject. Mathematics often requires persistence, concentration, and resilience, especially when students encounter difficult concepts or repeated failure (Putwain & Wood, 2023). Low-achieving students frequently experience mathematics anxiety, frustration, and low self-confidence, which hinder their academic progress (Zhang & Zhao, 2023). Emotional intelligence enables students to manage such emotional challenges by fostering self-control, motivation, and adaptive coping strategies (Trigueros *et al.*, 2024). Students with high emotional intelligence are more likely to regulate anxiety, maintain focus, and persist in solving mathematical problems, whereas those with low emotional intelligence may develop avoidance behaviour and negative attitudes toward the subject (MacCann *et al.*, 2020). Empirical studies have consistently shown that emotional intelligence is positively related to academic achievement because it enhances stress management, engagement, and self-motivation in learning environments (Sánchez-Álvarez *et al.*, 2020; Trigueros *et al.*, 2024).

Furthermore, the shift from purely cognitive perspectives of learning to a holistic educational approach underscores the importance of integrating emotional and social competencies into academic instruction (Afolabi & Balogun, 2022). Academic achievement is now viewed as a product of the interaction between cognitive ability, emotional stability, and environmental support (Trigueros *et al.*, 2024). Emotional intelligence influences how students cope with academic pressure, interact with teachers and peers, and adapt to classroom demands (Sánchez-Álvarez *et al.*, 2020). This is particularly important for secondary school students, who are at a developmental stage characterized by emotional instability, peer pressure, and identity formation (Putwain & Wood, 2023). Developing emotional intelligence during this stage can enhance students' ability to manage academic stress and improve their overall learning outcomes, especially in challenging subjects like Mathematics (MacCann *et al.*, 2020).

In the context of Imo State, poor performance in Mathematics among secondary school students has remained a persistent concern, as reflected in examination reports from national bodies such as WAEC and NECO (WAEC, 2023; NECO, 2022). Many students continue to perform below average in Mathematics despite interventions such as remedial teaching, peer tutoring, and provision of instructional materials (Onyejiaku & Okoro, 2020). This persistent underperformance suggests that cognitive and instructional interventions alone may not be sufficient to address the problem (Oparaku, 2015). Emotional and psychological factors, particularly emotional intelligence, may play a significant role in influencing students' academic behaviour and performance in Mathematics (MacCann *et al.*, 2020). However, limited empirical studies have specifically examined the relationship between emotional intelligence and Mathematics performance among low-achieving students in secondary schools in Imo State.

Although previous studies have explored emotional intelligence and general academic performance, few have focused specifically on Mathematics low-achievers or examined emotional intelligence using established theoretical frameworks such as Mayer and Salovey's ability model and Goleman's emotional competence model (Mayer *et al.*, 2004; Goleman, 1998). This creates a gap in the literature, as the role of emotional intelligence in improving Mathematics performance among low-achieving students remains underexplored in the Imo State context. Addressing this gap is essential for developing effective educational strategies that integrate emotional intelligence into Mathematics instruction and support low-achieving students in overcoming emotional barriers to learning (Trigueros *et al.*, 2024).

Therefore, this study investigates the relationship between emotional intelligence and Mathematics performance among low-achieving students in secondary schools in Imo State. By grounding the research in established emotional intelligence theories and examining the emotional competencies of low-achievers, the study aims to provide empirical evidence that will guide teachers, counsellors, and policymakers in developing interventions that enhance emotional intelligence and improve Mathematics learning outcomes.

Statement of the Problem

In an ideal educational system, students are expected to demonstrate proficiency in Mathematics, equipped with both cognitive skills and the emotional resilience to engage with complex concepts. However, in Imo State, a considerable number of secondary school students classified as low-achievers continue to perform below expectations in Mathematics, despite efforts by teachers, school administrators, and government agencies to improve outcomes.

Existing interventions, such as remedial classes, teacher workshops, and provision of learning materials, have not sufficiently addressed the problem. One potential factor that has received limited attention is emotional intelligence, which influences motivation, stress management, self-confidence, and engagement in learning activities.

Low-achieving students often exhibit emotional challenges such as anxiety, low motivation, and poor self-regulation that may hinder their ability to learn effectively in Mathematics. Therefore, there is a need to investigate the relationship between emotional intelligence and academic performance among Mathematics low-achievers in Imo State. Understanding this relationship can provide insights into strategies for improving learning outcomes without implying causation, as the study adopts a descriptive-correlational design.

Purpose of the Study

The main purpose of this study is to investigate the relationship between emotional intelligence and Mathematics performance among low-achieving students in secondary schools in Imo State. Specifically, the study seeks to:

1. Examine the level of emotional intelligence among Mathematics low-achieving students in secondary schools in Imo State.

2. Determine the relationship between emotional intelligence and academic performance in Mathematics among low-achieving students in secondary schools in Imo State.

Research Questions

The following research questions guided the study:

1. What is the level of emotional intelligence among Mathematics low-achieving students in secondary schools in Imo State?
2. What is the relationship between emotional intelligence and the academic performance of Mathematics low-achieving students in secondary schools in Imo State?

Methodology

This study adopted a correlational research design, which is appropriate for examining the relationship between emotional intelligence and Mathematics performance among low-achieving students in secondary schools in Imo State. The correlational research design enables the researcher to determine the degree and direction of relationship between emotional intelligence and students' Mathematics performance without manipulating the variables or establishing cause-and-effect relationships.

The population of the study comprised 15,000 secondary school students in Imo State identified as low-achievers in Mathematics, as obtained from the Imo State Ministry of Education. Low-achieving students were defined as students who consistently scored below average in Mathematics in both internal school examinations and external examinations such as WAEC and NECO.

A sample size of 300 students was selected using a multi-stage sampling technique to ensure adequate representation of students across the state. The sampling procedure was carried out in stages. In the first stage, three Local Government Areas (LGAs) were randomly selected from the LGAs in Imo State using simple random sampling. In the second stage, secondary schools were randomly selected from each selected LGA, ensuring representation of both public and private schools. In the third stage, low-achieving students in Mathematics were identified from school academic records, and a proportional number of students were selected using simple random sampling. In the final stage, male and female students were selected proportionately to ensure gender representation. This multi-stage sampling technique ensured fairness, representativeness, and reduction of sampling bias.

Data for the study were collected using a structured questionnaire titled "Emotional Intelligence Questionnaire for Mathematics Low-Achievers (EIQ-MLA)". The instrument consisted of 10 items designed to measure emotional intelligence based on five key dimensions: self-awareness, self-regulation, motivation, empathy, and social skills. Students' Mathematics performance scores were obtained from school academic records and standardized examination results (WAEC and NECO Mathematics scores). The questionnaire was structured on a 4-point Likert scale ranging from Strongly Disagree (1), Disagree (2), Agree (3), and Strongly Agree (4).

The instrument was subjected to content validation by experts in Guidance and Counselling, Educational Psychology, and Measurement and Evaluation to ensure clarity, relevance, and adequacy of the items. A pilot study was conducted using 30 secondary school students outside the study area to determine the reliability of the instrument. The internal consistency of the instrument was determined using Cronbach's Alpha reliability method, and a reliability coefficient of 0.70 was considered acceptable for the study. The data were collected with the assistance of research assistants and school administrators after obtaining permission from school authorities. The administered copies of the questionnaires were retrieved immediately after completion to ensure a high return rate and accuracy of responses.

Data collected were analysed using mean and standard deviation to answer the research question one while Pearson's Product Moment Correlation (PPMC) was used to answer the research question two by determining the degree and direction of relationship between emotional intelligence and Mathematics performance among low-achieving students.

Results

Research Question 1: What is the level of emotional intelligence among Mathematics low-achieving students in secondary schools in Imo State?

Table 1: Mean, Standard Deviation, and Percentage Analysis of Emotional Intelligence among Students ($N = 300$)

S/N	Items on Emotional Intelligence (EI)	SA (%)	A (%)	D (%)	SD (%)	Mean ($\bar{x}$)	Std. Dev (SD)	Decision
1	I can control my emotions when solving Mathematics problems	10	20	40	30	2.10	0.92	Low
2	I remain calm when I find Mathematics difficult	8	22	42	28	2.10	0.90	Low
3	I feel confident when attempting Mathematics questions	9	21	40	30	2.09	0.91	Low
4	I do not give up easily when I fail in Mathematics	12	18	43	27	2.15	0.89	Low
5	I can manage frustration during Mathematics lessons	10	19	41	30	2.09	0.93	Low
6	I stay motivated even when Mathematics tasks are hard	11	20	39	30	2.12	0.90	Low
7	I can understand my feelings about Mathematics	9	23	40	28	2.13	0.88	Low
8	I seek help when I do not understand Mathematics	13	22	38	27	2.21	0.87	Low

9	I encourage myself to improve in Mathematics	10	21	42	27	2.14	0.89	Low
10	I can focus on Mathematics despite distractions	8	20	44	28	2.08	0.91	Low

Cluster Mean and Standard Deviation: Grand Mean = 2.12; Average Standard Deviation = 0.90; Decision Rule: Mean $\geq$ 2.50 = High Emotional Intelligence, Mean $<$ 2.50 = Low Emotional Intelligence

The Data in Table 1 show that the grand mean score of 2.12 is below the benchmark of 2.50. This indicates that low-achieving students in Mathematics possess a low level of emotional intelligence. The standard deviation (0.90) suggests moderate variability in responses, meaning students generally share similar low emotional intelligence characteristics. This reveals that emotional intelligence among Mathematics low-achieving students in secondary schools in Imo State is low, which may partly explain their poor academic performance in Mathematics.

Research Question 2: What is the relationship between emotional intelligence and the academic performance of Mathematics low-achieving students in secondary schools in Imo State?

Table 2: *Correlation Matrix of Emotional Intelligence and Mathematics Performance among Low-Achieving Students in Secondary Schools in Imo State (N = 300)*

Source	EI	MP
EI	Pearson Correlation	1
	Sig. (2-tailed)	
	N	300
MP	Pearson Correlation	.612*
	Sig. (2-tailed)	.000
	N	300

EI = Emotional Intelligence, MP = Mathematics Performance Correlation is significant at the 0.05 level (2-tailed).

Data in Table 2 indicated a correlation coefficient (r) of .61, which shows that emotional intelligence has a high positive predictive relationship with Mathematics performance among low-achieving students in secondary schools in Imo State. This implies that as emotional intelligence increases, Mathematics performance also increases among low-achieving students.

Discussion of the Findings

Level of Emotional Intelligence among Low-Achieving Students

The findings of the study revealed that emotional intelligence correlates Mathematics performance among low-achieving students in secondary schools in Imo State to a high positive extent ($r = 0.61$, $p < 0.05$). This indicates that students with higher emotional intelligence tend to perform better in Mathematics, while those with lower emotional intelligence exhibit poorer academic performance. The regression analysis further showed that emotional intelligence significantly predicts Mathematics performance among low-achieving students, leading to the rejection of the null hypothesis. This implies that emotional intelligence plays a significant role in improving the academic performance of low-achieving students in Mathematics.

The finding of this study is consistent with the view that emotional intelligence enhances students' ability to regulate emotions, manage anxiety, maintain motivation, and persist in challenging academic tasks, particularly in subjects like Mathematics that require concentration and problem-solving skills. Emotional intelligence helps students develop self-control, confidence, and resilience, which are essential for overcoming academic difficulties and improving learning outcomes. This finding agrees with MacCann *et al.* (2020), who found that emotional intelligence is a strong predictor of academic performance and contributes significantly to students' achievement by improving emotional regulation and academic engagement. The study established that students with higher emotional intelligence demonstrated better academic outcomes due to improved stress management and motivation. Similarly, Sánchez-Álvarez *et al.* (2020) reported that emotional intelligence positively influences academic performance by enhancing emotional stability and learning commitment among students.

Conclusion

The study examined the relationship between emotional intelligence and Mathematics performance among low-achieving students in secondary schools in Imo State using Pearson Product Moment Correlation and Linear Regression analysis. The findings revealed that emotional intelligence has a high positive and significant relationship with Mathematics performance and significantly predicts students' academic performance in Mathematics. The study therefore concludes that emotional intelligence is an important non-cognitive factor influencing Mathematics performance among low-achieving students in secondary schools in Imo State. Students with higher emotional intelligence are more likely to regulate their emotions, manage academic stress, and remain motivated in learning Mathematics.

Recommendations

They following recommendations were made:

1. Mathematics teachers should integrate emotional intelligence strategies such as motivation, encouragement, and anxiety management into classroom instruction to help low-achieving students improve their Mathematics performance.

2. School counsellors should organize regular emotional intelligence training and counselling programmes to help students develop self-awareness, emotional regulation, and confidence in learning Mathematics.
3. The Imo State Ministry of Education and school administrators should incorporate emotional intelligence development into the secondary school curriculum and provide supportive learning environments that enhance students' emotional and academic development.

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