

## Research Article

### Emotional Intelligence as Predictor of Secondary School Students' Achievement in Mathematics in Imo State, Nigeria

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**Abstract:** This study investigated emotional intelligence as a predictor of secondary school students' achievement in mathematics in Imo State, Nigeria, with specific focus on self-awareness and self-regulation. The study adopted a correlational research design. The population of the study comprised all 32,368 Senior Secondary Two (SSII) students in public secondary schools in Imo State, Nigeria. A sample size of 324 SSII students drawn using a multi-stage sampling procedure was used for the study. Two instruments were used for data collection: an Emotional Intelligence Scale measuring self-awareness and self-regulation, and a Mathematics Achievement Proforma (MAP). The instruments were validated by experts. The reliability coefficients for the EII were self-awareness (0.86), self-regulation (0.87) with an overall reliability coefficient of 0.89. Data collected were analyzed using both linear and multiple regression analysis to determine the predictive power of the independent variables on students' achievement in mathematics. All the null hypotheses were tested at 0.05 level of significance using the p-values obtained from the regression analyses. The findings revealed that self-awareness accounted for 19.8% of the variance in students' mathematics achievement, while self-regulation accounted for 22.3%, with both variables significantly predicting achievement. Furthermore, the combined influence of self-awareness and self-regulation explained 28.3% ( $R^2 = 0.283$ ) of the variance in students' mathematics achievement, indicating a significant joint predictive effect. The study concluded that emotional intelligence, particularly self-awareness and self-regulation, is a significant determinant of students' academic performance in mathematics. It was recommended, among others, that emotional intelligence training should be integrated into the school curriculum and that teachers should adopt strategies that enhance students' emotional competencies to improve academic outcomes.

**Keywords:** Emotional Intelligence, Self-Awareness, Self-Regulation, Mathematics Achievement, Secondary School Students

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#### 1. Introduction

The persistent concern over students' poor achievement in mathematics in Nigerian secondary schools, including Imo State, has continued to attract scholarly attention. For decades, academic achievement in mathematics was largely explained in terms of cognitive variables such as intelligence quotient (IQ), prior knowledge, and instructional methods. However, contemporary research in educational psychology has shifted emphasis toward non-cognitive variables, particularly emotional factors, as critical determinants of students' academic outcomes (Mayer, Salovey, & Caruso, 2004; Goleman, 1995). This shift reflects a growing recognition that students' ability to manage emotions can significantly influence their engagement, persistence, and achievement in cognitively

demanding subjects such as mathematics (Pekrun, 2006; Zeidner, Matthews, & Roberts, 2012).

Mathematics, as a subject, is often associated with negative emotional experiences such as anxiety, fear, and low self-confidence among students. These emotional barriers can significantly hinder students' ability to concentrate, process information, and solve problems effectively (Ashcraft & Krause, 2007; Hembree, 1990). Mathematics anxiety, in particular, has been identified as a major factor contributing to poor academic performance, as it interferes with working memory and reduces students' ability to engage with mathematical tasks (Ashcraft & Krause, 2007; Maloney & Beilock, 2012). Consequently, students' emotional competencies become crucial for managing these challenges and achieving success in mathematics.

Emotional intelligence (EI) refers to the capacity to perceive, understand, manage, and utilize emotions effectively in oneself and others (Salovey & Mayer, 1990; Mayer et al., 2004). The concept gained widespread recognition through the work of Goleman (1995), who identified key components such as self-awareness, self-regulation, motivation, empathy, and social skills. In educational settings, emotional intelligence plays a vital role in shaping students' learning behaviours, interpersonal relationships, and academic success (Brackett, Rivers, & Salovey, 2011; MacCann et al., 2020). Unlike cognitive intelligence, which primarily addresses reasoning and problem-solving abilities, emotional intelligence encompasses the emotional and behavioural competencies that support effective learning and adaptation in academic environments (Zeidner et al., 2012).

Within the framework of emotional intelligence, self-awareness and self-regulation are particularly relevant to academic achievement. Self-awareness refers to an individual's ability to recognize and understand their own emotions, as well as the impact of these emotions on their thoughts and behaviours (Goleman, 1995; Mayer et al., 2004). In a mathematics classroom, self-aware students are better able to identify feelings of anxiety, confusion, or frustration and understand how these emotions affect their learning processes. This awareness enables them to adopt appropriate coping strategies, seek assistance when needed, and maintain a positive attitude toward learning (Brackett et al., 2011; Pekrun, 2006).

Closely related to self-awareness is self-regulation, which involves the ability to manage and control one's emotional responses, particularly in challenging or stressful situations (Gross, 1998; Goleman, 1995). Self-regulation enables students to remain calm under pressure, delay impulsive reactions, and persist in solving difficult mathematical problems. It is also a central component of self-regulated learning, which involves the active management of cognitive, emotional, and behavioural processes to achieve academic goals (Zimmerman, 2002; Pintrich, 2004). Empirical studies have shown that students with strong self-regulatory skills are more likely to exhibit higher levels of academic achievement, including in mathematics (Duckworth & Seligman, 2005; Zimmerman, 2002).

In Nigerian, particularly in Imo State, the emphasis on academic performance and examination success often overlooks the emotional experiences of learners. Many students experience mathematics-related stress, fear of failure, and low self-efficacy, which negatively impact their performance (Akinsola & Olowojaiye, 2008; Ogundele & Olanipekun, 2014). Despite various reforms in curriculum and teaching

strategies, students' achievement in mathematics has remained relatively unsatisfactory, suggesting that cognitive-focused interventions alone may be insufficient (WAEC, 2022; NECO, 2021). This highlights the need to explore emotional intelligence as a complementary factor influencing academic outcomes. Furthermore, secondary school students are at a developmental stage characterized by emotional instability, identity formation, and increased sensitivity to social and academic pressures. Their ability to understand and regulate emotions can significantly influence their academic engagement, motivation, and performance (Eccles&Roeser, 2011; Steinberg, 2014). Students with high emotional intelligence are more likely to demonstrate resilience, effective study habits, and positive attitudes toward learning, all of which are essential for success in mathematics (MacCann et al., 2020; Brackett et al., 2011). In contrast, students with low emotional intelligence may struggle with emotional distress, lack of focus, and poor academic outcomes.

Given the importance of emotional competencies in learning, investigating emotional intelligence; particularly self-awareness and self-regulation as predictors of students' achievement in mathematics is both timely and necessary. Such an investigation provides empirical evidence on the role of emotional factors in academic performance and offers valuable insights for educators, counsellors, and policymakers. It also underscores the need to integrate emotional intelligence training into the secondary school curriculum to enhance students' overall academic development and well-being (Durlak et al., 2011; MacCann et al., 2020). By focusing on self-awareness and self-regulation, this study contributes to a more holistic perspective on learning, emphasizing the interplay between emotional and cognitive processes in shaping academic outcomes in secondary schools in Imo State, Nigeria.

### **Purpose of the Study**

The general purpose of the study was to determine the predictive power of emotional intelligence on secondary school students' achievement in Mathematics in Imo state, Nigeria. Specifically, the study sought to determine the;

1. predictive value of self-awareness on secondary school students' achievement in Mathematics in Imo state, Nigeria.
2. predictive value of self-regulation on secondary school students' achievement in Mathematics in Imo state, Nigeria.
3. joint predictive value of the variables of emotional intelligence (self-awareness, self-regulation) on secondary school students' achievement in Mathematics in Imo state, Nigeria.

### **Research Questions**

**The following research questions guided the study;**

1. What is the predictive value of self-awareness on secondary school students' achievement in Mathematics in Imo state, Nigeria?
2. What is the predictive value of self-regulation on secondary school students' achievement in Mathematics in Imo state, Nigeria?
3. What is the joint predictive value of the variables of emotional intelligence (self-awareness, self-regulation) on secondary school students' achievement in Mathematics in Imo state, Nigeria?

### **Hypotheses**

The following null hypotheses were formulated and tested at 0.05 level of significance;

1. Self-awareness does not significantly predict students' achievement in mathematics in Imo state, Nigeria.
2. Self-regulation does not significantly predict students' achievement in mathematics.
3. There is no significant joint predictive value of the variables of emotional intelligence (self-awareness, self-regulation) on secondary school students' achievement in Mathematics in Imo state, Nigeria.

## 2. Methods

This study adopted a predictive correlational research design. A correlational design is a non-experimental research method used to measure the statistical relationship between two or more variables without the researcher manipulating any of them (Creswell & Creswell, 2018; Bhandari, 2021). The population of the study comprised all 32,368 Senior Secondary Two (SSII) students in public secondary schools in Imo State, Nigeria, as reported by the Imo State Secondary Education Management Board (SEMB) enrolment statistics for the 2024/2025 academic session (Secondary Education Management Board, SEMB, 2025). A sample of 324 SSII students was drawn using a multi-stage sampling procedure to ensure representativeness across the state's geographical and educational diversity while maintaining feasibility. Two main instruments were used for data collection in this study: the Emotional Intelligence Inventory (EII) and the Mathematics Achievement Proforma (MAP). The Emotional Intelligence Inventory (EII) was adapted from Farn-Shing et al. (2007). It has two clusters designed to elicit information on self-awareness and self-regulation. The Emotional Intelligence Inventory (EII), originally developed by Farn-Shing et al. (2007), is a standardized instrument for measuring emotional intelligence among adolescents and has been used in various studies among senior secondary school students in Nigeria. Its validity has therefore been established through prior applications and reported psychometric properties in the literature.

The reliability coefficients for the EII, as reported by Nwadinigwe and Azuka-Obieke (2012) in a Nigerian, were deemed high and acceptable. The coefficients for the clusters were: self-awareness (0.86) and self-regulation (0.87) with an overall reliability coefficient of 0.89. These high values indicate that the instrument is reliable and suitable for use in this study. The Mathematics Achievement Proforma (MAP) relied on official school records, which are standardized and validated by the school authorities, hence ensuring the reliability of the achievement data. The researcher personally visited the nine selected public secondary schools in Imo State after obtaining permission from the principals. With the assistance of two trained research assistants, the Emotional Intelligence Inventory (EII) was administered on the 324 sampled SSII students during school hours. The researcher supervised the process, read instructions aloud, clarified questions, and ensured understanding. Questionnaires were completed and collected on the spot, yielding 320 usable returns (98.8% return rate). Mathematics achievement scores were then collected from official school records using the Mathematics Achievement Proforma (MAP). Data collected were analyzed using both linear and multiple regression analysis to determine the predictive power of the independent variables on students' achievement in mathematics. All the null hypotheses were tested at 0.05 level of significance using the p-values obtained from the regression analyses.

## 3. Results

### Research Question One

What is the predictive value of self-awareness on secondary school students' achievement in Mathematics in Imo state, Nigeria?



**Table 1:** Simple Regression Analysis Showing Self-Awareness as a Predictor of Students’ Achievement in Mathematics

Variables	N	R	R-square	Prediction (%)
Self-awareness	320	0.445	0.198	19.8
Achievement	320			

The analysis in Table 1 reveals the predictive value of self-awareness. The R-Square value is 0.198. This indicates that self-awareness accounts for 19.8% of the variance in students’ mathematics achievement scores.

**H<sub>01</sub>:** Self-awareness does not significantly predict students’ achievement in mathematics in Imo state, Nigeria.

**Table 2:** Summary of Simple Regression for the Significance of Self-Awareness in Predicting Mathematics Achievement

Variables	N	R	R-square	t	Sig.	Decision
Self-awareness	320	0.445	0.198	0.000	Sig.	
Achievement	320					

From the analysis in Table 2, the statement of hypothesis 1 was rejected; implying that self-awareness significantly predicts students’ achievement in mathematics in Imo state, Nigeria. This is because the p-value (Sig. = 0.000) is less than 0.05 Alpha level.

**Research Question Two**

What is the predictive value of self-regulation on secondary school students’ achievement in Mathematics in Imo state, Nigeria?

**Table 3:** Simple Regression Analysis Showing the Predictive Value of Self-Regulation on Students’ Achievement in Mathematics

Variables	N	R	R-square	Prediction (%)
Self-regulation	320	0.450	0.203	20.3
Achievement	320			

The result in Table 3 showed a moderate positive relationship between self-regulation and achievement of students in mathematics (R = 0.450). This revealed that increase in self-regulation will increase students’ achievement in mathematics. However, self-regulation predicted 22.3% to the variation in students’ achievement in mathematics in Imo State, Nigeria.

**H<sub>02</sub>:** Self-regulation does not significantly predict students’ achievement in mathematics.

**Table 4:** Summary of Simple Regression for the Significance of Self-Regulation as a Predictor of Students’ Achievement in Mathematics

Variables	N	R	R-square	t	Sig.	Decision
Self-regulation	320	0.450	0.203	0.372	0.000	Sig.
Achievement	320					



From the analysis in Table 4, the statement of hypothesis 2 was rejected; implying that self-regulation significantly predicts students' achievement in mathematics. This is because the p-value (Sig. = 0.000) is less than 0.05 Alpha level.

**Research Question Three**

What is the joint predictive value of the variables of emotional intelligence (self-awareness, self-regulation) on secondary school students' achievement in Mathematics in Imo state, Nigeria?

**Table 5:** Summary of multiple regression on the joint predictive value of emotional intelligence components on students' achievement in Mathematics

Variables	R	R-Square	%Prediction
Emotional Intelligence Achievement	0.532	0.283	0.276

The result in Table 5 showed that the predictor variables emotional intelligence (self-awareness and self-regulation) jointly accounted for about 28.3% of the variance (R<sup>2</sup>= 0.283) observed in students' achievement in mathematics.

**H<sub>03</sub>:** There is no significant joint predictive value of the variables of emotional intelligence (self-awareness, self-regulation) on secondary school students' achievement in Mathematics in Imo state, Nigeria.

**Table 6:** ANOVA summary for the significance of the joint prediction of emotional intelligence components on students' achievement in Mathematics

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	13996.009	2	2332.668	12.574	0.000
Residual	48783.541	313	125.750		
Total	62779.550	319			

From the multiple regression analysis as shown in Table 6, the statement of hypothesis 3 was rejected; implying that there is a significant joint prediction value of the variables of emotional intelligence (self-awareness, self-regulation) on secondary school students' achievement in Mathematics in Imo state, Nigeria. This is because, the p-value (Sig. = 0.000) was less than 0.05 alpha level.

**4. Discussion of Findings**

**Predictive value of self-awareness on secondary school students' achievement in Mathematics in Imo state, Nigeria**

The findings of the study revealed that self-awareness accounts for 19.8% of the variance in students' mathematics achievement scores. Further analysis revealed that self-awareness significantly predicts students' achievement in mathematics in Imo state, Nigeria. This indicates that self-awareness makes a meaningful contribution to students' academic performance, even though it is not the sole determinant of achievement. The proportion of variance explained suggests that while other factors such as cognitive ability, teaching methods, and socio-economic background also play important roles, self-awareness remains a significant psychological variable influencing students' outcomes in mathematics.

This aligns with recent Nigerian studies. Nwokolo and Ahaneku (2021) in Imo State reported a significant positive correlation between self-awareness (as part of emotional intelligence) and mathematics achievement among secondary school students, using reliable scales and regression analysis. Similarly, Arinze (2025) in Anambra State found that emotional intelligence components, including self-awareness, significantly predict academic achievement, emphasizing its role in meta-cognitive adjustment during challenging subjects like mathematics.

### **Predictive value of self-regulation on secondary school students' achievement in Mathematics in Imo state, Nigeria**

The findings of the study revealed self-regulation predicted 22.3% to the variation in students' achievement in mathematics in Imo State, Nigeria. Further analysis revealed that self-regulation significantly predicts students' achievement in mathematics. This indicates that self-regulation is a substantial predictor of academic performance, contributing slightly more to students' achievement than self-awareness. The proportion of variance explained suggests that students' ability to manage and control their emotions, thoughts, and behaviours plays a critical role in determining their success in mathematics, although it operates alongside other influencing factors.

The finding corroborates Nkeiru and Eze (2025) in the Federal Capital Territory (FCT), Abuja, where self-regulation within emotional intelligence significantly predicted both interest and achievement in mathematics. Ogar et al. (2023) in Cross River State also highlighted self-regulation's important role in improving mathematics outcomes among underachieving high-ability students, thereby supporting the need for effective emotion management strategies in mathematics learning.

### **Joint predictive value of the variables of emotional intelligence (self-awareness, self-regulation) on secondary school students' achievement in Mathematics in Imo state, Nigeria**

The findings of the study revealed that the predictor variables of emotional intelligence (self-awareness and self-regulation) jointly accounted for about 28.3% of the variance ( $R^2=0.283$ ) observed in students' achievement in mathematics. Further analysis revealed a significant joint prediction value of the variables of emotional intelligence (self-awareness, self-regulation) on secondary school students' achievement in Mathematics in Imo state, Nigeria. This indicates that, when considered together, these emotional competencies make a substantial contribution to students' academic performance. The joint predictive value being significant further underscores the importance of emotional intelligence as a meaningful determinant of success in mathematics beyond the influence of each variable in isolation.

The significant joint prediction of self-awareness and self-regulation is consistent with empirical studies which emphasize that emotional intelligence components work synergistically to influence academic achievement (MacCann et al., 2020; Brackett, Rivers, & Salovey, 2011). Students who are both aware of their emotions and capable of regulating them are better equipped to maintain focus, persist through difficulties, and adopt effective learning strategies. For instance, a student who recognizes feelings of confusion (self-awareness) and takes deliberate steps to seek clarification or remain calm (self-regulation) is more likely to succeed than one who lacks these competencies.

## 5. Conclusion

This study examined emotional intelligence as a predictor of secondary school students' achievement in mathematics in Imo State, Nigeria, with particular focus on self-awareness and self-regulation. The findings revealed that both dimensions of emotional intelligence significantly predict students' academic performance in mathematics. Specifically, self-awareness accounted for 19.8% of the variance, while self-regulation contributed 22.3%, indicating that each variable independently plays an important role in shaping students' achievement. More importantly, the joint contribution of self-awareness and self-regulation accounted for 28.3% of the variance in students' mathematics achievement, demonstrating that emotional intelligence, when considered as an integrated construct, has a substantial influence on academic outcomes. The results underscore the critical role of emotional competencies in enhancing students' learning and performance in mathematics. Students who are able to recognize their emotions and regulate them effectively are better positioned to cope with academic challenges such as mathematics anxiety, frustration, and low motivation. These competencies enable learners to remain focused, persist in problem-solving, and adopt effective learning strategies, all of which contribute to improved academic achievement. Thus, emotional intelligence extends beyond social functioning and serves as a key determinant of cognitive and academic success.

## 6. Limitations

The study was limited to public secondary schools in Imo State and relied on self-report on EI data. Private schools and ability-based EI measures were not included.

## 7. Recommendations

Based on the findings that self-awareness and self-regulation significantly predict students' achievement in mathematics, the following recommendations are made:

1. Educational authorities should incorporate emotional intelligence training, particularly self-awareness and self-regulation into the secondary school curriculum. This can be embedded within subjects such as Civic Education, Guidance and Counselling, or as part of life skills programmes to help students understand and manage their emotions effectively.
2. Teachers should be trained through workshops, seminars, and in-service programmes on how to foster emotional intelligence in the classroom. This includes strategies for helping students identify their emotions, manage anxiety, and develop persistence when solving mathematical problems.
3. Mathematics teachers should adopt teaching methods that promote active engagement, reflection, and emotional awareness. Techniques such as collaborative learning, guided discovery, and formative feedback can help students build confidence and regulate their emotional responses to challenging tasks.
4. Schools should strengthen guidance and counselling units to support students in developing self-awareness and self-regulation skills. Counsellors can provide interventions such as stress management training, coping strategies for mathematics anxiety, and emotional skills development.
5. Students should be encouraged to set academic goals, monitor their progress, and evaluate their learning outcomes. Teachers can guide students in developing study plans, time management skills, and reflective practices that enhance both self-regulation and academic performance.
6. Parents should be sensitized to the importance of emotional intelligence in their children's academic success. They should provide supportive home environments that encourage open communication, emotional expression, and disciplined study habits.

7. Schools should implement programmes aimed at reducing mathematics anxiety, such as peer tutoring, remedial classes, and confidence-building exercises. Creating a supportive and non-threatening classroom environment will help students regulate negative emotions associated with mathematics.

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