



## **Influence of Teachers ' Self-Efficacy on Secondary School Students ' Achievement in Mathematics in Bayelsa State, Nigeria**

Chinelo Blessing ORIBHABOR

Author: [chiblessing42004@yahoo.co.uk](mailto:chiblessing42004@yahoo.co.uk); [chinelo.oribhabor@uat.edu.ng](mailto:chinelo.oribhabor@uat.edu.ng)

OrcID: 0000-0002-7318-1477

Phone Number: +234 08034982069

Department of Guidance and Counselling, Faculty of Arts and Education,  
University of Africa, Toru-Orua, Bayelsa State, Nigeria.

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### **Abstract**

*This research examined the impact of teacher self-efficacy on the performance of Bayelsa State secondary school students in Mathematics. Teacher self-efficacy refers to a teacher's confidence in their ability to plan and implement teaching tasks successfully. Teacher self-efficacy is a key factor in improving instruction and student performance. Mathematics, being a challenging subject, requires not only content knowledge but also strong pedagogical skills and self-confidence in teachers to facilitate student achievement. A descriptive correlational design was employed, involving 20 Mathematics teachers and 500 students from SS2 and SS3 who were randomly selected from state public secondary schools. The Teacher Self-Efficacy Scale (TSES) and the standardized Mathematics Achievement Test (MAT) were administered to gather data. The findings revealed a statistically significant positive relationship between teacher self-efficacy and student performance in Mathematics ( $r = 0.83, p < 0.01$ ), implying that higher teacher self-efficacy results in improved student performance. The study highlighted the necessity of investing in teacher development programs to increase instructional efficacy and quality. It recommends that policymakers and school administrators in Bayelsa State emphasize continuous professional growth, mentoring, and classroom support frameworks to strengthen teacher self-efficacy to enhance students' achievement in Mathematics.*

**Keywords:** Teachers, Self-efficacy, Secondary School, Mathematics, Students

## Introduction

Mathematics is an essential discipline in the Nigerian secondary school curriculum and is vital for fostering scientific and technological knowledge. It is crucial for developing logical reasoning, problem-solving abilities, and quantitative thinking-skills essential for achievement in multiple academic fields and real-life situations (Obielodan & Adelokun, 2021). Although it is important, students' performance in Mathematics in Nigerian secondary schools has continually fallen short of expectations, as demonstrated by patterns in the West African Senior School Certificate Examination (WAEC) over the last ten years (WAEC Chief Examiner's Report, 2022). Ugwuegbulam et al. (2021), who reported that over 60% of students at the senior secondary school level in Southeastern Nigeria scored below the pass mark in standardized Mathematics examinations. Numerous factors have been linked to the ongoing underperformance in Mathematics, including insufficient teaching materials, negative student attitudes, and ineffective teaching methods. Nonetheless, new studies underscore the significance of teacher self-efficacy as a vital but often overlooked factor affecting Mathematics success (Adebayo & Ayodele, 2021).

Teacher self-efficacy is the confidence a teacher has in their ability to plan and implement teaching practices that result in effective student learning (Bandura, 1997). It includes assurance in classroom management, teaching methods, and student engagement -all of which are especially important when instructing a challenging subject such as Mathematics. Teacher self-efficacy specifically denotes a teacher's confidence in their capability to effectively organize and implement the tasks necessary to influence student learning, manage the classroom, and achieve instructional outcomes (Ma, 2022). It is not just an indication of skill but a belief that one can efficiently carry out teaching tasks in specific situations. Bandura (1997) states that beliefs in self-efficacy influence individuals' emotions, thoughts, self-motivation, and actions. For educators, these convictions affect the energy they invest in teaching, their ability to endure challenges, their receptivity to innovative teaching methods, and their determination when student progress is gradual.

Self-efficacy is highly influential in the learning of mathematics, where abstraction, student anxiety, and their sense of difficulty hinder learning. Confident teachers are more likely to experiment with novel teaching methods, differentiate instruction, and persist with struggling students (Aina & Olanipekun, 2020). Moreover, self-efficacious teachers are likely to create a more supportive classroom climate, which is essential for stimulating mathematics involvement and attainment (Zee & Koomen, 2016). Teacher self-efficacy in mathematics has been associated with increased persistence, resilience,

and the use of student-centered instructional approaches (Tschannen-Moran & Hoy, 2001). High teacher self-confidence stimulates increased student aspirations, the application of various teaching strategies, and positive criticism—habits that are beneficial to student motivation and academic achievement (Klassen et al., 2011). Low teacher self-efficacy, however, leads to teaching anxiety, lack of effort, and excessive dependence on direct or ineffective strategies that do not accommodate diverse learners.

Amaechi-Udogu and Iwezor (2025) investigated the correlation between teachers' self-efficacy and the mathematics attainment of secondary school students in Obio/Akpor Local Government Area (LGA), Rivers State, Nigeria. The correlational research design was employed, and data were collected from 300 students and 50 teachers in 10 secondary schools. The Teacher Self-Efficacy Scale (TSES) and a standardized Mathematics Achievement Test (MAT) served as the tools. Data were analyzed using Pearson correlation and multiple regression analysis. The results showed positive significant correlations between mathematics achievement and teacher self-efficacy. In a quantitative study among 120 mathematics teachers and 600 senior secondary school students in Southwestern Nigeria, Adebayo and Ayodele (2021) investigated the correlation between teacher self-efficacy and students' mathematics performance. Using the Teacher Sense of Efficacy Scale (TSES) and students' mathematics test results, the study found a statistically significant positive correlation ( $r = 0.48$ ,  $p < 0.01$ ) between teachers' self-efficacy and students' achievement. Teachers with high self-efficacy were also found to be more likely to use student-centered teaching strategies and reported higher persistence in supporting struggling learners. Results indicated that over 65% of participants reported moderate self-efficacy levels, exhibiting strengths in instructional strategies but weaknesses in classroom management and student motivation.

Zee and Koomen (2016) conducted a meta-analysis of four decades of teacher self-efficacy studies, examining 165 research projects across various educational environments. The analysis revealed that greater teacher self-efficacy was frequently linked to enhanced classroom dynamics and improved student performance, particularly in disciplines such as mathematics and science. The researchers noted that teacher efficacy influenced student achievement both directly and indirectly, functioning through improved classroom management, strengthened student-teacher relationships, and more tailored instruction. Yusuf (2022) conducted research with 80 mathematics teachers from 15 secondary schools in Kano State to assess their self-efficacy levels. The research utilized a 9-point Likert variant of the

TSES and found that mathematics educators indicated a strong degree of self-efficacy in instructional strategies ( $M = 7.2$ ) while demonstrating lower degrees in student engagement ( $M = 5.9$ ) and classroom management ( $M = 6.3$ ). The results demonstrated that although teachers had a strong grasp of the content, they felt uncertain about inspiring low-achieving students, particularly in crowded and rural classrooms. Aina and Olanipekun (2020) investigated how teacher experience and self-efficacy influenced students' mathematics achievement in a study conducted in Kwara State, Nigeria. A survey was administered with 75 mathematics teachers and 450 students. The results indicated that teacher self-efficacy played a key mediating role between teaching experience and student performance. Teachers with greater experience and high self-efficacy had a more significant impact on students' understanding of mathematics compared to their less confident counterparts. Klassen and Tze (2014) performed a meta-analysis examining the connection between teacher self-efficacy and student outcomes across various countries and educational systems. Their research indicated that teacher self-efficacy is a significant predictor of teaching effectiveness, which subsequently affects student achievement, particularly in subjects that require high cognitive demands, such as mathematics. The authors also found that mathematics educators typically reported higher instructional self-efficacy than those teaching language or social studies, especially in nations with organized mathematics curricula.

Past research within the Nigerian context has predominantly focused on general teaching effectiveness or student-related variables, with little empirical attention given to teachers' psychological and professional beliefs as causal predictors of learning. This study seeks to fill this gap by examining to what extent teacher self-efficacy influences secondary school students' performance in mathematics within Bayelsa State. The findings of this study are expected to enhance the body of knowledge in teacher effectiveness, inform teacher education and professional development policy, and provide best practice advice to school leaders and policymakers interested in improving mathematics education in Nigeria.

## **Research Questions**

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

1. What is the level of Mathematics teachers' self-efficacy in the selected secondary schools in Bayelsa State?
2. What is the level of students' achievement in Mathematics in Bayelsa State?

3. What is the relationship between teachers' self-efficacy and students' Mathematics achievement in the selected secondary schools in Bayelsa State?

### **Hypothesis**

The following hypothesis was tested at 0.05 significant level:

There is no significant relationship between teacher self-efficacy and students' Mathematics achievement.

### **Methodology**

This study employed a descriptive correlational design. The design was considered appropriate as it allows for the exploration of the nature and extent of the association between two or more variables—in this instance, teachers' self-efficacy and students' mathematics academic achievement—without manipulating any of the variables (Creswell & Creswell, 2018). The population of the study consisted of all mathematics teachers and Senior Secondary School (SSS 2 and SSS 3) students in all public secondary schools in Bayelsa State, Nigeria. The Bayelsa State Ministry of Education (2023) stated that there were approximately 1,100 mathematics teachers and over 30,000 senior secondary school students in the eight Local Government Areas (LGAs) of the state. A multistage sampling technique was utilized to select the sample for the study. Four of the eight LGAs in Bayelsa State were randomly selected in the first instance. Subsequently, five public secondary schools were randomly selected from each of the chosen LGAs through a simple random sampling technique, yielding 20 schools. A single mathematics teacher and 25 students (SS2 or SS3) from each school were randomly selected, resulting in an overall sample size of 20 mathematics teachers and 500 students. The sample size was deemed sufficient for feasible statistical analysis, with adequate representation under geographic and school-type diversity. The Teacher Self-Efficacy Scale (TSES) and Mathematics Achievement Test (MAT) were used as the data collection tools. The Teacher Self-Efficacy Scale (TSES) was adapted from Tschannen-Moran & Hoy (2001), a 15-item Likert-type scale measuring instructional strategies, classroom management, and student engagement. The tool's response format (5-point Likert Scale) is as follows: 1 = Not at all confident, 2 = Slightly confident, 3 = Moderately confident, 4 = Very confident, and 5 = Extremely confident. The mean response ratings are interpreted as follows: 1.00 to 2.90 = low self-efficacy, 3.00 to 3.90 = moderate self-efficacy and greater than 4.00 = high self-efficacy. Cronbach's alpha technique was used to estimate the reliability of the Teacher Self-Efficacy Scale, achieving a reliability coefficient of 0.87. The Mathematics Achievement Test (MAT) is a 30-

item standardized assessment composed of past WAEC examination questions with a Cronbach reliability index of 0.82. Data were collected through administered questionnaires and test scores. Mean and standard deviation were utilized to address the research questions, while Pearson's Product-Moment Correlation Coefficient was used to determine the correlation between student mathematics achievement and teacher self-efficacy. Analysis was conducted using SPSS version 26.0, and statistical significance was set at  $p < 0.05$ .

## Results

**Research Question One:** What is the level of Mathematics teachers' self-efficacy in the selected secondary schools in Bayelsa State?

**Table 1: Level of Mathematics Teachers' Self Efficacy**

S/N	Items	Mean	Standard Deviation
<b>Efficacy in Instructional Strategies</b>			
1	How well can you use a variety of assessment strategies?	3.61	0.78
2	How well can you provide alternative explanations when students are confused?	3.86	0.59
3	How well can you adjust your lessons to the proper level for individual students?	3.78	0.74
4	How well can you implement effective teaching strategies in Mathematics?	3.81	0.70
5	How well can you facilitate student understanding of complex mathematical concepts?	3.42	0.87
<b>Efficacy in Classroom Management</b>			
6	How well can you control disruptive behavior in the classroom?	2.80	0.99
7	How well can you establish routines to keep activities running smoothly?	3.46	0.85
8	How well can you ensure a safe learning environment for students?	3.72	0.91
9	How well can you keep students on task during lessons?	3.41	0.87
10	How well can you manage time effectively in your lessons?	3.62	0.85
<b>Efficacy in Student Engagement</b>			
11	How well can you motivate students who show low interest in Mathematics?	3.16	1.02
12	How effectively does the teacher help students value learning Mathematics?	3.54	0.84

13	How well can you get students to believe they can do well in Mathematics?	3.74	0.73
14	How well can you promote student participation in your lessons?	3.73	0.67
15	How well can you address the learning needs of disadvantaged or struggling learners?	3.21	0.95
<b>Grand Mean</b>		<b>3.52</b>	<b>0.82</b>

Descriptive statistics indicated that the average self-efficacy score for Mathematics teachers was 3.52 (SD = 0.82) on a 5-point scale, reflecting a moderate level of self-efficacy

**Research Question Two:** What is the level of students' achievement in Mathematics in Bayelsa State?

**Table 2: Mean Score of the Students' Achievement in Mathematics in Bayelsa State**

Variable	Mean	Standard Deviation
Achievement in Mathematics	44.5	7.32

The average score of students on the MAT was 44.5 (SD = 7.32), indicating a moderate achievement level, with potential for enhancement.

**Research Question Three:** What is the relationship between teachers' self-efficacy and students' Mathematics achievement in the selected secondary schools in Bayelsa State?

**Table 3: Relationship between Teachers' Self-Efficacy and Mathematics Achievement**

Variable	N	Mean	SD	r
Teacher Self-Efficacy	20	3.52	0.82	0.83
Mathematics Achievement	500	44.5	7.34	

Table 3 shows the relationship between teachers' self-efficacy and students' Mathematics achievement in the selected secondary schools in Bayelsa State. The table 3 shows that the relationship coefficient is 0.83, which is high and positive. Therefore, the relationship between teachers' self-efficacy and students' Mathematics achievement in the selected secondary schools in Bayelsa State is high and positive.

**Hypothesis One:** There is no significant relationship between teacher self-efficacy and students' Mathematics achievement.

**Table 4: Significant Relationship between Teachers' Self-Efficacy and Mathematics Achievement**

Variable	Mean	SD	r	p-value
Teacher Self-Efficacy	3.52	0.82	0.83	0.001
Mathematics Achievement	44.5	7.34		

$\alpha = 0.05$

The result in Table 4 reveals the relationship between teachers' self-efficacy and students' Mathematics achievement in the selected secondary schools in Bayelsa State. The Pearson product-moment correlation coefficient obtained was  $r = 0.83$  with a corresponding p-value of 0.001, which is less than the 0.05 level of significance. This indicates that there is a high, positive, and statistically significant relationship between teachers' self-efficacy and students' achievement in Mathematics. In other words, higher levels of teachers' self-efficacy are associated with improved Mathematics performance among students. The implication is that teachers who are more confident in their instructional abilities, classroom management, and engagement strategies are better able to enhance their students' learning outcomes in Mathematics. This finding underscores the critical role of teacher beliefs and confidence in fostering academic success in core subjects such as Mathematics.

### Discussion of Findings

The findings from research question one revealed that the overall level of teachers' self-efficacy among secondary school teachers, including Mathematics teachers, was moderate in the schools covered by this sampling. It reflects that most teachers are confident in their ability to manage classes, use instructional methods, and engage learners effectively. These results align with previous research that cites teacher self-efficacy as a determining factor in effective instruction and student academic achievement (Tschannen-Moran & Hoy, 2001; Klassen & Tze, 2014). In brief, the study also showed that classroom management self-efficacy was moderate among the respondents. Although most teachers were comfortable managing day-to-day class disruptions and being assertive in upholding rules, others hesitated when dealing with chronic behavioral issues or handling large class sizes—especially in urban schools with crowded classrooms. This is consistent with the Yusuf (2022) report, which indicated that environmental constraints, including a lack of infrastructure and disciplinary challenges among students, affect teachers' confidence in classroom management. Effective class

management is critical to a productive learning environment, and when teachers feel unable to manage their classrooms, this can lead to teacher burnout, stress, and disaffection (Zee & Koomen, 2016). Reinforcing teacher training in managing behavior and emotional control is, therefore, essential to boost self-efficacy in these domains.

The findings from the research question two showed that the level of attainment of students in Mathematics among secondary school students in the schools under study was generally moderate. This pattern corresponds with widespread concerns about deteriorating performance in Mathematics at the secondary school level in Nigeria, and the majority of developing countries (Uwadiae, 2023). Mathematics test score analysis in the study indicated that a large number of students scored below average. This suggests that most students struggle with the procedural and conceptual aspects of Mathematics, which hinders their performance in the subject. This finding aligns with Ugwuegbulam et al. (2021), who reported that over 60% of students at the senior secondary school level in Southeastern Nigeria scored below the pass mark in standardized Mathematics examinations. WAEC Chief Examiners' Reports (2022) have also consistently indicated poor mastery of elementary mathematical concepts by the students, inadequate computational skills, and failure to contextualize for real-life applications.

The findings of this study indicate a positive and significant relationship between teacher self-efficacy and students' performance in Mathematics. This suggests that students taught by teachers with high self-efficacy perform better in Mathematics than students taught by teachers with low self-efficacy. This result supports the theoretical assertion of Bandura's Social Cognitive Theory (1997), which posits that individuals' beliefs about their abilities influence their behavior and performance. For instruction, this means that self-efficacious teachers will more frequently select highly effective instructional practices, persist even when challenges arise, and generate positive influences on their students' learning processes. Correlation analysis showed that teachers who scored high on the Teacher Sense of Efficacy Scale (TSES) had students who also scored high on the Mathematics Achievement Test (MAT). This aligns with previous studies, such as Klassen and Tze (2014), and Zee and Koomen (2016), which established the foundation of teacher self-efficacy effects on students' academic achievement through enhanced classroom practices, effective class management, and increased student motivation.

## Conclusion

This study investigated the influence of teachers' self-efficacy on secondary school students' performance in Mathematics in Bayelsa State, Nigeria. Implications were that teachers' self-efficacy had a strong and positive relationship with students' performance in Mathematics. Specifically, teachers who had high confidence in their ability to teach, manage classrooms, and encourage students were more effective in enhancing academic attainment among their students. The study substantiates the theoretical argument that self-efficacy, according to Bandura's Social Cognitive Theory, is a powerful psychological construct that determines teacher behavior, teaching effectiveness, and ultimately, student performance. Teachers with high self-efficacy will utilize better teaching methods, demonstrate persistence in the face of challenges in the classroom, and motivate students to achieve their best academic performance.

## Recommendations

Based on the findings, the study recommends the following:

1. The educational authorities must organize subject-specific regular professional development programmes in pedagogical content knowledge, student-centered instructional methods, classroom management, and student motivation. Specifically, these programs must address teachers' self-efficacy in instructional methods, classroom management, and student engagement.
2. Remedial Mathematics classes must be implemented for low-achieving students, and peer-tutoring programs can be utilized to facilitate collaborative learning among students. Such interventions have been shown to enhance achievement, especially if they are targeted and extended.
3. Teacher education programs must include formal modules aimed at building self-efficacy in pre-service Mathematics teachers. This can be accomplished by offering simulated classroom experiences, peer teaching, feedback, and mentoring.
4. Mentorship schemes should be launched to assist less experienced educators in gaining confidence and competencies.

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