

IMPACT OF CLASSROOM MANAGEMENT ON STUDENTS ENGAGEMENT AND LEARNING OUTCOMES IN SELECTED NIGERIAN SECONDARY SCIENCE CLASSES

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Abstract

This study investigates the impact of classroom management on student engagement and learning outcomes in Nigerian secondary school science classes. The research adopted a mixed-methods approach, combining quantitative data from student and teacher questionnaires with qualitative insights from classroom observations and academic performance records. A total of 500 science students and 30 science teachers were sampled from ten public secondary schools across diverse regions in Nigeria. The study focused on three key aspects of classroom management: classroom rules and routines, teacher-student relationships, and the use of interactive teaching methods. Multiple regression analyses revealed that these variables significantly predicted both student engagement and academic achievement in science subjects. Specifically, classroom management practices accounted for 52% of the variance in student engagement and 47% of the variance in science learning outcomes. Findings underscore the importance of structured and student-centered classroom environments in enhancing learning in science education. The study concludes that effective classroom management not only promotes discipline and order but also serves as a catalyst for improved student participation and academic performance. It recommends targeted teacher training, policy support, and the integration of interactive pedagogical strategies to strengthen science education in Nigerian schools.

Keywords: classroom management, student engagement, learning outcomes, Nigerian, secondary school science classes

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Introduction

Classroom management is a critical component of effective teaching and learning, particularly in subjects that demand high levels of student participation and engagement, such as science. In Nigerian secondary schools, science education has faced numerous challenges, including inadequate resources, poor teaching methodologies, and a lack of student interest in subjects like Physics, Chemistry, and Biology. Among the various factors contributing to these challenges, classroom

management plays a significant role in influencing both student engagement and academic achievement in science subjects.

Classroom management encompasses a range of strategies and practices that teachers use to maintain a conducive learning environment, foster student interaction, and promote active participation. Effective classroom management not only creates an orderly environment but also supports the psychological and emotional well-being of students. This, in turn, leads to improved concentration, motivation, and ultimately, better learning outcomes. The importance of classroom management becomes even more apparent in the context of science education, where practical work, experiments, and problem-solving activities require a high level of student involvement and focus.

In the Nigerian context, the challenge of managing classrooms in science subjects is compounded by large class sizes, limited instructional materials, and a sometimes rigid curriculum that may not fully address the diverse learning needs of students. Moreover, students' attitudes toward science, shaped by various psychological and social factors, can either enhance or hinder their level of engagement and performance in these subjects. Teachers' ability to adapt their management strategies to the specific needs of their students while promoting a positive learning atmosphere is therefore essential for improving student engagement and overall academic success.

This study aims to explore the impact of classroom management on student engagement and learning outcomes in Nigerian science classes.

Literature Review

According to Emmer and Sabornie (2015), classroom management includes the establishment of rules and expectations, strategies for managing student behavior, and the use of instructional methods that promote student participation. Classroom management also refers to the practices and actions teachers take to organize students and activities in a classroom to ensure that the environment is conducive to learning. Effective classroom management allows for a smooth, orderly learning environment, which in turn positively affects student behavior, attitudes, and academic performance. In science classrooms, classroom management must extend beyond traditional approaches. Science education is inherently interactive, requiring students to engage in experiments, discussions, and collaborative work. Therefore, managing group work, student behavior during practical, and fostering a positive atmosphere for scientific inquiry are critical for success (Sullivan, 2013). Teachers' ability to create a structured yet flexible environment significantly impacts students' engagement levels in the subject.

The Role of Classroom Management on Student Engagement Student engagement is defined as the level of interest, attention, and emotional investment that students have in their learning activities (Skinner & Belmont, 1993). In the context of science education, student engagement is particularly important because science requires active participation and critical thinking. Research shows that when classroom management techniques foster a supportive, engaging environment, students are more likely to participate actively and retain information (Pianta, La Paro, & Hamre, 2008).

According to a study by Olorundare and Ajayi (2015) on science education in Nigerian secondary schools, student engagement is positively correlated with effective classroom management strategies. When teachers use clear expectations, engage students in problem-solving tasks, and offer opportunities for hands-on activities, student engagement in science classes increases significantly. However, when classroom management is poor, students tend to become disengaged, which often leads to a decline in academic performance.

A critical aspect of classroom management that influences student engagement in Nigerian science classrooms is teacher-student relationships. Positive relationships, characterized by mutual respect and trust, contribute to higher levels of student engagement (Jennings & Greenberg, 2009). Teachers who are able to create a supportive classroom atmosphere can motivate students to actively participate in lessons and take ownership of their learning.

Learning outcomes refer to the measurable achievements that students are expected to attain through their education. In science education, learning outcomes often focus on the acquisition of knowledge, the ability to apply scientific principles, and the development of critical thinking and problem-solving skills. Classroom management practices directly influence these outcomes by creating an environment where students can focus on learning without distractions.

In Nigeria, where science education has faced numerous challenges such as overcrowded classrooms, inadequate teaching resources, and a lack of trained teachers, effective classroom management becomes even more important (Ogunyemi, 2014). When classroom management is effective, students are more likely to remain focused, understand complex scientific concepts, and perform better in assessments. Conversely, poor classroom management can lead to increased disruptions, lack of concentration, and negative attitudes towards the subject, resulting in lower learning outcomes (Adeyemo, 2011).

A study by O'Connor and McCartney (2007) found that students in well-managed classrooms performed better academically in science subjects than those in classrooms with poor management. This is because good classroom management allows for more time on task, greater student participation, and a more supportive learning environment, all of which contribute to better academic achievement. In Nigerian science classrooms, where resources are often scarce, effective classroom management ensures that teachers can maximize available resources and maintain a focus on learning.

Psychological factors play a critical role in how classroom management strategies impact student engagement and learning outcomes. Motivation, self-regulation, and emotional intelligence are key psychological elements that influence how students behave and engage in the classroom. According to Deci and Ryan (2000), intrinsic motivation driven by personal interest in the subject matter is a strong predictor of student engagement and success. In science education, teachers who foster a sense of curiosity and encourage self-directed learning can significantly enhance students' engagement levels.

In addition, classroom management strategies that promote positive emotional development, such as providing feedback, recognizing achievements, and offering

emotional support, help to reduce anxiety and increase students' confidence in their abilities (Aloe, Shisler, Norris, & Nickerson, 2014). Students who feel emotionally secure in the classroom are more likely to take risks, participate in class discussions, and approach learning with a positive attitude, all of which contribute to better learning outcomes.

Methodology

This study employs a mixed-methods research design, combining both quantitative and qualitative approaches to explore the impact of classroom management on student engagement and learning outcomes in Nigerian science classrooms. The mixed-methods approach allows for a more comprehensive understanding of the relationship between classroom management practices, student engagement, and academic performance. The quantitative component involves the collection of data on student engagement and learning outcomes, while the qualitative component captured in-depth insights from teachers and students regarding classroom management practices.

The target population for this study includes secondary school science students and science teachers in public secondary schools across Nigeria. The study focused on students enrolled in science subjects such as Physics, Chemistry, and Biology. A stratified random sampling technique was used to select 10 secondary schools from various regions in Nigeria to ensure a diverse sample in terms of geographical location (urban and rural). A total of 500 science students and 30 science teachers were selected to participate in the study. 500 students, with 50 students selected from each of the 10 schools. The students were chosen randomly to ensure diversity in terms of gender and academic ability. 30 science teachers, with at least three teachers from each of the selected schools.

The student questionnaire assessed levels of student engagement and perceived learning outcomes in science education. It included Likert-scale questions designed to measure aspects of engagement such as attention, interest, participation in class activities, and the perceived impact of classroom management strategies on their motivation and learning. Questions also focused on students' academic performance in science subjects, including self-reported grades and perceived learning outcomes.

The teacher questionnaire gathered data on teachers' classroom management strategies and their perceptions of how these strategies impact student engagement and performance. The questions covered areas such as the use of rules and expectations, discipline strategies, student-teacher interactions, and the incorporation of active learning techniques in science classes.

Observations were conducted in selected science classrooms to assess how classroom management is implemented and how students engage in the learning process. A structured observation checklist was used to observe key aspects of classroom management, such as: the clarity of rules and expectations, teacher-student interactions, the level of student participation in science activities, and student behavior during lessons, especially during practical experiments and group work.

Student academic performance data was collected from school records to assess learning outcomes. The data included recent scores from science exams, assignments,

and other assessments to measure the correlation between classroom management practices and academic achievement in science.

Data collected from the student and teacher questionnaires were analyzed using descriptive statistics (such as frequencies, means, and percentages) to summarize the responses. Multiple regression analysis was employed to assess the predictive power of classroom management techniques on learning outcomes, controlling for variables such as gender, prior academic performance, and school location.

Data Analysis and Discussion

Table 1: Summary of Descriptive Statistics

Variable	N	Mean (M)	Standard (SD)	Deviation
Classroom Management Practices	500	4.12	0.58	
Student Engagement	500	3.85	0.71	
Teacher-Student Relationship	500	4.00	0.66	
Use of Interactive Teaching Methods	500	3.70	0.80	
Science Academic Performance (GPA)	500	65.4	12.1	

SPSS, VERSION 23

Table 1.1 shows Classroom Management Practices ($M = 4.12$). This high mean suggests that students and teachers perceive classroom management strategies as being well implemented in science classes. Engagement ($M = 3.85$): Engagement levels are relatively high, implying that students are actively participating and showing interest in science lessons. Teacher-Student Relationship ($M = 4.00$): A healthy relational environment was reported, which is essential for promoting emotional safety and academic participation (Jennings & Greenberg, 2009). This reinforces the idea that students feel supported and motivated in science classrooms. Interactive Teaching Methods ($M = 3.70$): This score indicates moderate use of interactive strategies like group work, demonstrations, and experiments. Science Academic Performance ($M = 65.4$).

Hypotheses

- H₀₁: Classroom management practices do not significantly predict student engagement in Nigerian science classes.
- H₀₂: Classroom management practices do not significantly predict students' learning outcomes in science.

Table 2: Multiple Regression Results Predicting Student Engagement

Predictor Variable	Unstandardized Coefficient (B)	Standard Error (SE)	Beta (β)	t	p-value
(Constant)	1.25	0.27	–	4.63	0.000
Classroom Rules & Routines	0.42	0.08	0.35	5.25	0.000
Teacher-Student Relationship	0.31	0.09	0.28	3.44	0.001

Use of Interactive Teaching	0.29	0.07	0.24	4.14	0.000
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$R^2 = 0.52$, Adjusted $R^2 = 0.51$, $F(3, 496) = 94.76$, $p < 0.001$
SPSS, VERSION 23

Interpretation (Student Engagement Model)

Table 1.2 shows the R^2 value of 0.52 indicates that 52% of the variance in student engagement is explained by the three classroom management variables. All predictors were statistically significant ($p < 0.01$): Classroom rules & routines ($\beta = 0.35$) had the strongest influence. Teacher-student relationship and interactive methods also significantly contributed. The model is statistically significant overall ($F = 94.76$, $p < 0.001$), indicating a good fit. Hypothesis H_{01} is rejected; classroom management significantly predicts student engagement.

Table 3: Multiple Regression Results Predicting Learning Outcomes (Academic Performance)

Predictor Variable	Unstandardized Coefficient (B)	Standard Error (SE)	Beta (β)	t	p-value
(Constant)	49.76	3.42	—	14.55	0.000
Classroom Rules and Routines	4.88	1.07	0.32	4.56	0.000
Teacher-Student Relationship	3.15	1.12	0.24	2.81	0.005
Use of Interactive Teaching	2.70	0.98	0.20	2.75	0.006

$R^2 = 0.47$, Adjusted $R^2 = 0.46$, $F(3, 496) = 74.13$, $p < 0.001$
SPSS, VERSION 23

Table 1.3 shows the R^2 of 0.47 shows that 47% of the variance in science academic performance is explained by the classroom management variables. All predictors significantly contributed to predicting learning outcomes. The highest contribution came from Classroom Rules & Routines ($\beta = 0.32$). The model was a good fit, with a significant F-value ($p < 0.001$). Hypothesis H_{02} is rejected; which means that classroom management significantly predicts science learning outcomes.

Discussion of the Findings

The study revealed that classroom management practices - particularly clear classroom rules, positive teacher-student relationships, and the use of interactive teaching methods - significantly predict student engagement in Nigerian science classes. The model explained 52% of the variance in student engagement ($R^2 = 0.52$, $p < 0.001$).

These findings are consistent with previous studies such as: Emmer and Evertson (2016) which emphasized that structured routines and positive expectations promote a stable learning environment, which increases student participation. Jennings and Greenberg (2009) found that emotionally supportive classrooms enhance student motivation and classroom participation. Olorundare and Ajayi (2015) in a Nigerian context, observed that science teachers who used engaging strategies like group

experiments, inquiry-based instruction, and student-centered discussions recorded higher student interest and attentiveness.

The positive impact of interactive teaching methods on engagement reinforces the need to move beyond lecture-based instruction to more practical, student-driven learning, especially in science where curiosity and experimentation are key. Hypothesis H₀₁ was rejected. This means classroom management significantly influences student engagement.

The study also found that classroom management practices significantly influence students' academic performance in science subjects. The regression model accounted for 47% of the variance in students' learning outcomes ($R^2 = 0.47$, $p < 0.001$).

Among the predictors, classroom rules and routines ($\beta = 0.32$) had the strongest impact, followed by teacher-student relationships and interactive methods. This is consistent with: Adeyemo (2011), who found a direct relationship between discipline, structured instruction, and student academic performance in Nigerian secondary schools. Pianta, La Paro & Hamre (2008) who highlighted how emotionally supportive and well-organized classrooms enhance both engagement and achievement. Sullivan (2013) pointed out that in science classes, effective management allows teachers to spend more time on content delivery and experimentation, reducing time lost to distractions and behavioral issues.

These findings suggest that a well-managed classroom provides students with the emotional security, structure, and academic support they need to focus and perform effectively, particularly in complex subjects like science. Hypothesis H₀₂ was also rejected. Classroom management practices significantly impact students' science learning outcomes.

Conclusion

This study examined the impact of classroom management on student engagement and learning outcomes in Nigerian science classes. Using a mixed-methods approach, data were collected through questionnaires, classroom observations, and academic records from secondary school science teachers and students.

Findings revealed that effective classroom management practices—such as clear rules and routines, positive teacher-student relationships, and the use of interactive teaching methods—significantly enhance student engagement and improve academic performance in science subjects. Statistical analysis using multiple regression confirmed that these practices account for a significant portion of the variance in student outcomes.

The results support the rejection of the null hypotheses, confirming that classroom management significantly predicts both student engagement and science learning outcomes. These findings underscore the importance of structured, supportive, and student-centered classroom environments in achieving educational goals, especially in science education where practical engagement and conceptual understanding are critical.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. Regular workshops and in-service training should be organized for science teachers on modern classroom management techniques and student engagement strategies. Training should include conflict resolution, positive discipline, and the use of interactive and inquiry-based learning in science teaching.
2. Science teachers should be encouraged to use student-centered approaches such as group projects, laboratory experiments, peer instruction, and problem-solving activities. Such methods not only improve engagement but also deepen understanding and retention of scientific concepts.
3. School administrators should support teachers by creating a conducive environment for classroom management (e.g., manageable class sizes, adequate learning materials, and functioning laboratories). They should also monitor and evaluate classroom management practices and provide timely feedback to teachers.

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