

Influence of School Context on Students' Achievement in Mathematics in Delta State

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Abstract: *The study evaluated how school context affects Delta State students' mathematics achievement. The study uses ex-post facto and correlational survey designs. 39,904 Delta State public senior secondary SSII students were studied. Stratified sampling was used to choose 589 Delta State public secondary school students for the study. School Context Questionnaire (SCQ) was employed for data gathering. SCQ had 25 items and a column for student mathematics examination scores. SCQ was face verified by three professionals and had a Cronbach alpha reliability coefficient of 0.76. The past mathematics examination scores of students who completed the questionnaire were collected. The questionnaire and students' mathematics scores were collected on the spot and analysed using Pearson's Product Moment Correlation statistics. Results showed that school setting (climate, physical environment, instructional practices, availability and use of facilities, and leadership) positively correlates with mathematics achievement. Thus, educational context favourably affects mathematics students' achievement. The study's results led to appropriate suggestions.*

Keywords: School context, school climate, physical environment, school leadership, mathematics achievement

Introduction

Mathematicians study shape, amount, and arrangement. Mathematics promotes logical thinking and mental discipline. Mathematics helps students understand science, social studies, music, and art. Mathematics improves logic, critical thinking, creativity, abstract or spatial thinking, problem-solving, and communication. Physics, engineering, medicine, biology, finance, business, computer science, and industry require mathematics (Ijeh, 2012). Economists study economic competition, bargaining, mechanism design, auctions, voting theory, experimental economics, political economy, and behavioural economics to improve national and international economies using mathematical game theory. It can help analyse scenarios with limited resources, several decision possibilities, varied outcomes, and the possibility of collaboration or rivalry amongst players.

In humanitarian and other behavioural studies, mathematics is used for problem evaluation and development of predictive models for human behaviours. Thus, the importance of mathematics could be said to be all encompassing. It is because of its all reaching importance both in academic and our daily lives as individuals, that most curriculums around the world include mathematics as a compulsory subject even from the earliest learning like pre-school and kindergarten (Ijeh, 2014). The importance of mathematics notwithstanding, students' achievement in the subject in Delta State and Nigeria at large have not improved significantly. Although, a lot of studies especially with regards to instructional pedagogies have been conducted to determine better ways of teaching the subject, students' achievement is often greeted with appalling remarks. WAEC Chief Examiner Reports over the years show poor performance.

38.68%, 52.97%, and 59.22% of WASSCE students passed mathematics at the credit level in 2015, 2016, and 2017. The WAEC Chief Examiner reported 786,016 applicants, or 49.98%, passed Mathematics in 2018. 64.18 percent, or 1,020,519 students, passed mathematics with a credit grade or above in 2019. 24,491 applicants, or 39.82 percent, passed mathematics in 2020. 1,274,784 candidates (81.7%) earned credits in 2021. Mathematics achievement fluctuates due to many causes. Ijeh (2022) attributes student math performance to various variables, including staff shortages, learner attitudes, mathophobia, lack of teaching and learning tools, and inexperienced teachers. Another common factor adduced by many researchers include the teaching method adopted by mathematics teachers. Researchers have seldomly considered the influence of school context such as school culture and climate, school demographics, physical environment, curriculum and instructional practices, resources and support services, and governance and leadership on students' achievement in mathematics. Thus, this study evaluated how school context affects mathematics achievement in Delta State.

School context refers to the environment and circumstances in which a student, teacher, or staff member operates within a school setting. It includes factors such as the physical setting of the school, its cultural and social environment, the policies and practices of the school, the quality and availability of resources, and the academic and personal backgrounds of the students and staff. Understanding school context is important in creating effective teaching and learning environments, implementing successful initiatives and programs, and supporting the academic and personal needs of students and staff. Education affects students' social, emotional, and ethical growth (Usaini, Abubakar & Bichi, 2015). Supportive schools reduce drug use, violence, and other bad conduct. Supportive schools encourage students' sense of community, belonging, and connectedness, according to study. These expressions are used interchangeably to describe students' close, respectful relationships with peers and school staff. Thus, school communities promote academic success. Teachers' caring and active interaction of students stimulates students (Eric, 2015).

The academic success of pupils is impacted by the location of schools. Due to uneven resource distribution, subpar school facilities, a shortage of qualified teachers willing to work in remote villages, poor roads, poor communication, and the casual attitude some communities have towards education, there is a significant achievement gap between rural and urban secondary schools. Rural

schools have few certified teachers. They don't want to live in rural locations without social amenities. Urban schools are their preference. Due to their limited exposure and experience, rural students may lack a sense of competition and rivalry as a result of the intensive preparation for public exams that urban students receive (Owoeye & Philius, 2011).

Student achievement may be significantly impacted by the educational environment. How well pupils succeed academically depends on a variety of factors, including the learning environment at school, the calibre of the instruction, the accessibility of resources, and the relationships between students and teachers. Students can be inspired to work harder and achieve their goals by a supportive school environment. Schools that foster a sense of community and belonging can make students feel valued and increase their engagement in learning. Effective teachers who provide clear instruction, feedback, and support can have a significant impact on student achievement. Teachers who personalize their instruction to meet the needs of individual students can improve their learning outcomes. Schools that have adequate resources such as textbooks, technology, and other instructional materials, are better positioned to support student learning and achievement. A sense of trust and respect that is fostered by good connections between students and teachers can increase student motivation and engagement. In conclusion, student achievement may be significantly impacted by the educational environment. Students can realise their full potential in schools that offer a favourable learning environment, excellent instruction, sufficient resources, and supportive connections. This study examines the influence of school context on students' academic achievement in mathematics in Delta State given this backdrop.

Statement of the Problem

From my perspective, students' mathematics performance in external examinations like WAEC and NECO has been consistently poor. Senior high school students in Delta State have struggled with it. Many students find the subject vague and apathetic, which may have contributed to Delta State's declining achievement. Parents and major stakeholders are concerned about this. Success or failure at this level influences one's chances of entrance to higher universities.

Mathematics teachers' inadequate methods are primarily to blame for this poor achievement. School environments have rarely been studied in relation to mathematics achievement. School context is the environment in which students, teachers, and staff work. The school's physical setting, cultural and social atmosphere, rules and practises, quality and availability of resources, and students' and staff's academic and personal backgrounds are all considered. Understanding school context is crucial to building effective teaching and learning settings, implementing successful projects and programmes, and supporting students and staff's academic and personal needs. Pleasant learning environments, effective education, adequate resources, and pleasant connections can help students reach their potential. The study's question is: how does school context affect mathematics achievement?

Purpose of the Study

The purpose of the study was to determine the influence of school context on students' achievement in mathematics. The indices used to measure school context in this study are: (i) school climate, (ii) physical environment, (iii) instructional practices, (iv) availability and utilization of facilities and (v) school leadership. Thus, the specific purpose of the study was to determine:

1. the relationship between school climate and students' achievement in mathematics;
2. the relationship between physical environment and students' achievement in mathematics;
3. the relationship between instructional practices and students' achievement in mathematics;
4. the relationship between availability and utilization of facilities and students' achievement in mathematics;
5. the relationship between school leadership and students' achievement in mathematics.

Hypotheses

Five hypotheses guided this study:

1. There is no significant relationship between school climate and students' achievement in mathematics.
2. There is no significant relationship between physical environment and students' achievement in mathematics.
3. There is no significant relationship between instructional practices and students' achievement in mathematics.
4. There is no significant relationship between availability and utilization of facilities and students' achievement in mathematics.
5. There is no significant relationship between school leadership and students' achievement in mathematics.

Significance of the Study

This study may be of benefit to students, teachers, parents, school administrators, and prospective researchers in the following ways. The outcome of this study may provide information that will enhance students understanding of how school context affects their academic achievement in mathematics. It may also enhance students understanding of how their involvement in teaching and learning process through utilization of instructional resources and good instructional practices can affect their academic achievement in mathematics.

This study may improve teacher productivity and effectiveness. Instructional materials allow teachers to compress and visualise knowledge for their students. Since they inspire students to study more, these materials give teachers engaging ways to share information. Good learning environments also inspire curiosity and interest. Thus, a teacher who uses proper instructional resources will help students become more creative, spontaneous, and enthusiastic.

The information provided by this study may enable parents to provide adequate instructional resources to schools in their locality in order to support learning. It may equally help parents in the provision of appropriate learning resources to their children at home. The finding of this study may provide useful information on how school climate and leadership affect their children's academic achievement in mathematics. This information will guide parents on the choice of school to admit their children.

To school administrators, information provided by this study may help them appreciate the need to assess the characteristics of the secondary school's physical environment, school climate, availability and utilization of facilities among other to ensure that quality education is given to students. This may encourage regular classroom supervision to ascertain teachers' knowledge of subject matter, utilisation instructional resources and classroom management. This will to some extent contribute to effective teaching and learning at the secondary school level of education.

Prospective researchers are not left out. The findings of this study may serve as source of literature to prospective researchers carrying out a similar or related studies. This will guide them in discerning the gap for their studies. The finding of the study may also aid future researchers in selecting appropriate methodology and statistics tools.

Methodology

The study uses correlational survey and ex-post facto design. Nworgu (2015) says this design tries to determine the relationship between two or more variables. This design was adopted because it helps one to establish the relationship between variables of study. This study sought to establish the relationship among school context (school climate, physical environment, instructional practices, availability and utilization facilities and school leadership) and students' achievement scores in mathematics. Ex-post facto design was used on the basis that students past result in mathematics were correlated with the independent variables. A breakdown of the design is shown in Table 1:

Table 1

Design Matrix

Independent Variables (School Context)	Dependent Variable
School climate	Chemistry Achievement
Physical environment	
Instructional practices	
Availability and utilization of facilities	
School leadership	

The study included 39,904 SSII students in Delta State public senior secondary schools. 589 Delta State public secondary school students were stratified sampled for the study. Data was collected using SCQ. SCQ had 25 items and a mathematics score column. The instrument's reliability was determined by Cronbach Alpha. SCQ was administered to 45 students in a school outside the sampled schools. The respondents' responses were evaluated and analysed using SPSS. Analysis yielded a 0.76 reliability coefficient. The sampled students answered the questionnaire. The questionnaire was collected from responders instantly. The questionnaire and students' mathematics scores were collected and analysed using Pearson's Product Moment Correlation statistics.

Results

- There is no significant relationship between school climate and students' achievement in mathematics.

Table 2

Correlation of School Climate and Achievement

Variables	N	Mean	SD	r-cal.	Sig. (2-tailed)	Decision
School climate	589	65.21	13.67	0.495	0.000	Ho ₁ is significant
Achievement	589	57.89	11.30			

P<0.05

School atmosphere affects mathematics achievement, $r = 0.495$, $P(0.000) < 0.05$, as seen in Table 13. Thus, rejecting the null hypothesis. Therefore, school atmosphere correlate mathematics achievement significantly.

- There is no significant relationship between physical environment and students' achievement in mathematics.

Table 3

Correlation of Physical Environment and Achievement

Variables	N	Mean	SD	r-cal	Sig. (2-tailed)	Decision
Physical environment	589	59.74	11.24	0.683	0.000	Ho ₂ is significant
Achievement	589	57.89	11.30			

Table 3 shows that there is a significant relationship between physical environment and students' achievement in mathematics, $r = 0.683$, $P(0.000) < 0.05$. Thus, the null hypothesis is rejected. Therefore, there is a significant relationship between school physical environment and students' achievement in mathematics.

- There is no significant relationship between instructional practices and students' achievement in mathematics;

Table 4

Correlation of Instructional Practices and Achievement

Variables	N	Mean	SD	r-cal	Sig. (2-tailed)	Decision
Instructional practices	589	59.18	12.31	0.740	0.000	Ho ₃ is significant
Achievement	589	57.89	11.30			

P<0.05

Table 4 shows that there is a significant relationship between instructional practices and achievement in mathematics, $r = 0.740$, $P(0.000) < 0.05$. Thus, the null hypothesis is rejected. Therefore, there is a significant relationship between instructional practices and students' achievement in Mathematics.

- There is no significant relationship between availability and utilization of facilities and students' achievement in mathematics.

Table 5

Correlation of Availability/Utilization of Facilities and Achievement

Variables	N	Mean	SD	r-cal	Sig. (2-tailed)	Decision
Availability/utilization of facilities	589	63.67	12.63	0.350	0.000	Ho ₄ is significant
Achievement	589	57.89	11.30			

P<0.05

Table 5 shows that there is a significant relationship between availability and utilization of facilities and students' achievement in mathematics, $r = 0.350$, $P(0.000) < 0.05$. Thus, the null hypothesis is rejected. Therefore, there is a significant relationship between availability and utilization of facilities and students' achievement in mathematics.

- There is no significant relationship between school leadership and students' achievement in mathematics.

Table 6

Correlation of School Leadership and Achievement

Variables	N	Mean	SD	r-cal	Sig. (2-tailed)	Decision
School leadership	589	59.12	10.96	0.356	0.000	Ho ₅ is significant
Achievement	589	57.89	11.30			

P<0.05

Table 6 shows that there is a significant relationship between school leadership and students' achievement in mathematics, $r = 0.356$, $P(0.000) < 0.05$. Thus, the null hypothesis is rejected. Therefore, there is a significant relationship between school leadership and students' achievement in mathematics.

Discussion

The study found that school climate affects mathematics performance. This means that schools with excellent climates will improve student achievement. The evidence shows that a favourable school climate with modern equipment like computers, internet, labs, and libraries makes learning easier and faster. Learning is aided by knowledgeable instructors, a healthy learning environment, positive teacher-student contact, and a positive school-parent relationship. These benefits boost academic achievement. Thus, school climate is crucial to academic success. Students do better in schools with good climates and sophisticated educational facilities. Usaini, Abubakar, and Bichi (2015) discovered that students from schools with adequate resources, qualified teachers, and a positive learning environment outperform students from schools with fewer of these elements.

The study discovered that the physical environment of the school has an impact on mathematics achievement. This shows that a favourable environment aids pupils studying mathematics. A good learning environment boosts mathematics performance. The learning environment strongly affects student achievement (Fraser, 2012). This is consistent with the findings of Zaid, Ismail, Majid, Othman, and Salleh (2019), who discovered that physical learning environments had a favourable and significant impact on student achievement.

The study also found that instructional practises affect mathematics achievement. Teaching quality improves mathematics achievement. Clear instruction, feedback, and assistance can boost student progress. Personalised instruction can also boost student learning. Bibon (2022) and Ijeh (2013) discovered a positive correlation between science achievement and instructors' instructional practises.

The study also found a correlation between facility availability and mathematics achievement. This may be because school facilities help teachers explain mathematics to students. Most teachers explain topics without supporting resources in schools without amenities. Akparobore (2018) and Emerhiona, Ijeh, and Ajaja (2022) also found that school instructional materials affect chemistry students' academic achievement. Akparobore (2018) added that students learn critical skills when teaching facilities are available and utilised properly.

Finally, the study found that school leadership affects mathematics achievement. Effective school leadership improves student learning. Effective school leadership boosts student achievement, according to research. Tedla and Kilango (2022) discovered that schools with effective leadership had students who did much better on standardised examinations than schools with ineffective leadership.

Conclusion

Based on the findings of this study, the following indices for measuring school context; school climate, physical environment, instructional practices, availability and utilization of facilities, and school leadership positively correlate students' achievement in mathematics. It was therefore, concluded that school context positively influences students' achievement in mathematics in Delta State.

Recommendations

Based on this study's findings and conclusion:

1. School administrators should establish a relevant learning environment.
2. Teachers should understand and accept their students' diverse home environments.
3. To make learning more real and concrete in secondary schools, the government should provide enough instructional materials and infrastructure.
4. Teachers should effectively utilize available instructional materials in classroom learning.

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