

TEACHING FACILITIES AND STUDENTS' ACADEMIC PERFORMANCE IN MATHEMATICS IN SENIOR SECONDARY SCHOOLS IN SAGBAMA LOCAL GOVERNMENT AREA OF BAYELSA STATE, NIGERIA.

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Abstract

The study examined the relationship between teaching facilities and students' academic performance in mathematics in senior secondary schools in Sagbama Local Government Area of Bayelsa State, Nigeria. A correlational survey design was adopted, guided by two research questions and two hypotheses. The population comprised 3,400 senior secondary school 2 (SS2) students across all public secondary schools in the area, from which a sample of 393 students was selected using a simple random sampling technique. Data collection was executed using two instruments: a self-designed structured Teaching Facilities Questionnaire (TFQ) and a Mathematics Achievement Test (MAT), which demonstrated a high reliability coefficient of 0.87 via the test-retest method. Data were analyzed using the Pearson Product Moment Correlation coefficient at the 0.05 level of significance. The findings revealed a strong, statistically significant positive relationship between classroom furniture and students' academic performance in mathematics ($r = 0.784$, $p = 0.002 < 0.05$). Similarly, a strong, statistically significant positive relationship was established between instructional resources and students' mathematics academic performance ($r = 0.871$, $p = 0.003 < 0.05$). Based on these outcomes, it was concluded that the availability and quality of physical learning facilities are critical drivers of mathematics achievement. The study recommended that stakeholders aggressively prioritize the provision of ergonomic classroom furniture to enhance student comfort, and that mathematics educators be continuously encouraged to utilize varied instructional materials to demystify abstract mathematical concepts.

Keywords: Teaching Facilities, Classroom Furniture, Instructional Resources, Mathematics Performance, Secondary Schools.

Introduction

Education is widely recognized as a vital instrument for national development, as it provides individuals with the knowledge, skills and attitudes, required for personal growth and societal progress (Fafunwa, 1974; Obanya, 2004). However, the effective delivery of education depends largely on the availability of adequate teaching and learning facilities, which form the backbone of instructional process (Ajayi, 2007). For Balderstens (2021) and Comb (2019), the growth of education initially progressed at a gradual pace but later expanded rapidly. This expansion has generated an enormous demand, not only for access to education in general but also for adequate school facilities in particular. The consequences of this rising demand are evident in many developing nations, including Nigeria where issues such as overcrowded classrooms, shortage of furniture, poorly equipped laboratories remain persistent (Adeyemi & Adu, 2010; Owoeye & Yara 2011). As Akinsolu (2010) observed educational facilities are essential to effective teaching and learning, and their inadequacy contributes significantly to students poor performance.

Mathematics is the foundation of science and technology, multifaceted that no discipline escapes its applications and usefulness. Mathematics is the mirror of civilization and in all the centuries of pains taking calculations and fundamental discipline for persons who would be truly literate in the areas of science and technology including other related areas (Okeke, 2015). Mathematics continues to play significant role in the growth and development of societies. Indeed mathematics is a fundamental tool in realizing the nations science and technology aspiration of the young ones. Mathematics is also seen as the study of relationships among quantities, magnitudes and properties, including the logical operation by which unknown quantities, magnitudes and properties may be deduced (Joubert, 2015).

The knowledge of mathematics is very relevant in the success of people's activities in their daily living. Mathematics Education has the power to enable man solve daily problems experienced in the societies. It can also enhanced, the capacity of human being intellectually and economically, right from the pre-colonial days of human existence to these technological days, mathematics has played vital roles in the technological and economic development of many societies and countries of the world (Smith, 2020). In exploring the multifaceted roles of mathematics and science.

It becomes evident that proficiency in these disciplines is essential, also it is very important for a country to produce young learners who are good in mathematics aimed at equipping learners to be functional in endeavors. It also prepared the students in transmitting from secondary to tertiary institutions. Mathematics also prepare students in their choice of careers in engineering, sciences and medically related courses. For this to be achieved, the schools need to be provided with enough school facilities.

Therefore, school facilities are basic need in the school which improved the academic standard of students. They are responsive to the changing programmes of educational delivery and provide a physical environment that is comfortable, safe, secure, accessible, well illuminated, well ventilated and aesthetically pleasing. The school facilities consist of furnishing materials, equipment and consumables, information and communication technology. It is imperative for the development of a particular society.

The facilities for teaching mathematics is regarded as mathematics laboratory. Mathematics laboratory is a place where students can learn and explore various mathematical concepts and verify different activities and materials (Igbokwe, 2022). The use of mathematics laboratory helps to integrate theory and practical work in teaching and learning of mathematics. It is a room containing relevant tools in teaching and learning mathematics in a practical manner. The mathematics laboratory provides the students with experiences that he needs in order to acquire the principles and generalization in mathematics (Dhuche, 2021). This may involve performing an experiment viewing a film, playing a game, discussing, building models, solving problems, drawing a design, making a graph, presenting a mathematical skill, completing a test, providing a theorem practically and so on. The advantages of using mathematics laboratory includes the display of mathematical information, venue for experimentation through practical work, pool of storage of mathematical materials for easy areas removing abstractness and increasing effective teaching and learning. Based on the advantages of mathematics laboratory, it is expected that teaching and learning of mathematics with mathematics laboratory may help to reduce the abstract nature of the subject and motivates the students to learn (Ogunkunle, 2023).

Classroom furniture significantly impact teaching and learning, influencing students comfort, engagements and physical health. Good furniture are designed to fit students and anthropometric characteristic can reduces musculoskeletal disorders and improve focus. Good furniture is also support students centered learning and promote various pedagogical approaches. Children spend as long as nine hours on their desk every day and also 83% of them sit on their desks and chairs that are not suitable for their body height. Instructional resources are also essential and significant tools needed for teaching, learning of school subjects to promote teaching efficiency and improves students' performance. They make learning more interesting, practical, realistic and appealing. They also enable both teacher and students participate actively and effectively in lesson session. They gave room for acquisition of self-confidence and self-actualization. Ibeneme (2018) defined instructional resources as those facilities used for practical demonstration in class situation by students and teacher they are also devices that assist the teacher to present a lesson to the learners in a logical manner.

However, observations in many public secondary schools in Sagbama Local Government Area of Bayelsa State reveal inadequate teaching facilities characterized by insufficient classroom furniture, poor classroom conditions, and inadequate instructional resources. These deficiencies may negatively affect students' learning experiences and consequently their academic performance in Mathematics. It therefore becomes necessary to investigate the extent to which teaching facilities relate to students' academic achievement in the subject.

The study was undertaken to examine the relationship between teaching facilities and students' academic performance in Mathematics among senior secondary school students in Sagbama Local Government Area of Bayelsa State. Specifically, the study focused on classroom furniture and instructional resources as dimensions of teaching facilities. To guide the investigation, two research questions were raised concerning the relationships between classroom furniture and Mathematics performance, and between instructional resources and Mathematics performance. Correspondingly, two null hypotheses were formulated to determine whether significant relationships exist between these variables.

The study was anchored on Epstein's Theory of Overlapping Spheres of Influence and the Constructivist Theory of Piaget and Vygotsky. According to Epstein's Theory of Overlapping Spheres of Influence, effective learning occurs when these stakeholders collaborate to create supportive educational environments. Epstein identified major forms of involvement, including parenting, communication, learning support, decision-making, and community collaboration. The theory suggests that collaboration among schools, families, and communities can improve the provision and utilization of educational facilities, thereby enhancing students' academic performance. The Constructivism Theory explains learning as an active process in which students construct knowledge through interaction with their environment, experiences, and social activities. Piaget emphasized cognitive development through exploration and discovery, while Vygotsky stressed the importance of social interaction and guided learning in knowledge construction. Availability of facilities such as instructional materials, mathematics laboratories, ICT tools, and conducive classrooms can promote students' engagement, participation, and understanding of mathematical concepts. These theories emphasize the importance of supportive learning environments and adequate educational resources in promoting effective learning and academic success. Related literature reviewed highlighted the significance of Mathematics education, the role of teaching facilities in enhancing instructional effectiveness, and the influence of classroom furniture and instructional resources on students' academic outcomes. Empirical evidence from previous studies revealed that classroom furniture and instructional resources significantly influence students' academic performance. For instance, Eton (2021) found that classroom furniture positively affected pupils' performance, while Kyari (2023) reported that inadequate instructional materials contributed to poor academic achievement among students. These findings suggest that the provision of adequate teaching facilities is essential for improving learning outcomes and academic success.

Against this background, the present study sought to determine the relationship between teaching facilities and students' academic performance in Mathematics in senior secondary schools in Sagbama Local Government Area of Bayelsa State, Nigeria.

Statement of the Problem

One of the most used tool in the effective teaching, learning and achievement of students in mathematics is school facilities. However, the achievement of student in mathematics in Sagbama Local Government Area is below expectation. Some public schools exist in a vacuum with virtually no facilities to promote effective teaching and learning process, some classrooms full of pothole's and children scarcely find space to sit or move about, lack of ceiling, some buildings have sagging roofs on them, which constitute health hazards to the students and teachers. This has made teachers not to perform effectively and the students' academic performance has also been negatively affected and the tone of the school has been on its lowest ebb.

Efforts to achieve behavioral objectives has been near futility. Could this be the case of low academic performance of students in mathematics in Sagbama Local Government Area of Bayelsa State? Hence, the study will assessed school facilities with respect students' academic performance in mathematics in senior secondary schools in Sagbama Local Government Area of Bayelsa State.

Methodology

The study adopted correlational survey design. This is because it is a non-experimental study and the variables have already occurred and cannot be manipulated by the researcher. Fleetwood (2024) stated that correlational research design is a type of non-experimental research method in which a researcher measures two variables and understands and assesses the statistical relationship between them with no influence from any extraneous variable. The population of the study consists 3,400 senior secondary school 2 (SS2) students in all public secondary schools in Sagbama Local Government Area, of Bayelsa State. Simple random sampling technique was used to draw a sample size of 393 senior secondary school 2 (SS2) students from the population. The instrument for data collection was a self-designed questionnaire titled: "Mathematics Achievement Test (MAT) and structured Teaching Facilities Questionnaire (TFQ)". Face and content validity were used in this study. Experts in measurement and evaluation examined the items on the instrument and confirmed that they were adequate and suitable for the study. To determine the reliability of the instrument, a test-retest method was employed, the data obtained were analyzed using the Pearson Product Moment Correlation, which yielded a

reliability coefficient of 0.87, indicating that the instrument was reliable for the study. Data used in this study were collected through the administration of the questionnaire to senior secondary school students in Sagbama Local Government Area of Bayelsa State. Pearson Product Moment Correlation was used to answer the research questions and test the hypotheses at 0.05 level of significance.

Results

Research Question One: What is the relationship between classroom furniture and students' academic performance in mathematics in senior secondary schools in Sagbama Local Government Area of Bayelsa State?

Hypothesis One: There is no significant relationship between classroom furniture and students' academic performance in mathematics in senior secondary schools in Sagbama Local Government Area of Bayelsa State.

Table 1: Pearson Product Correlation Coefficient Table Showing the Relationship Between Classroom Furniture and Students' Academic Performance in Mathematics in senior secondary schools in Sagbama Local Government Area of Bayelsa State

		Classroom Furniture	Academic Performance
Classroom Furniture	Pearson product moment	1	0.784**
	Correlation		
	Significant 2-tailed		0.002
	N	393	393
Academic Performance	Pearson Correlation	0.784**	1
	Sig. (2-tailed)	0.002	
	N	393	393

** Correlation is significant at the 0.05 level (2-tailed).

Table 1 shows the Pearson Product Moment correlation result for the relationship between classroom furniture and students' academic performance in mathematics in senior secondary schools in Sagbama Local Government Area of Bayelsa State. The correlation analysis between Mathematics Achievement Score and classroom furniture Score reveals a strong relationship, with a Pearson Product Moment correlation coefficient of $r = 0.784$. This indicates that classroom furniture has a strong association with students' Mathematics achievement. Furthermore, the

significance level ($p = 0.002$) is less than the standard threshold of 0.05, meaning the correlation is statistically significant.

Research Question Two: What is the relationship between instructional resources and students' academic performance in mathematics in senior secondary schools in Sagbama Local Government Area of Bayelsa State?

Hypothesis Two: There is no significant relationship between instructional resource and student academic performance in mathematics in senior secondary schools in Sagbama Local Government Area of Bayelsa State.

Table 2: Pearson Product Correlation Coefficient Table Showing the Relationship Between Instructional Resource and Student Academic Performance in Mathematics in senior secondary schools in Sagbama Local Government Area of Bayelsa State

		Instructional Resource	Academic Performance
Instructional Resource	Pearson product moment	1	0.871**
	Correlation		
	Significant 2-tailed		0.003
Academic Performance	N	393	393
	Pearson Correlation	0.871**	1
	Sig. (2-tailed)	0.003	
		N	393

** Correlation is significant at the 0.05 level (2-tailed).

Table 2 shows the Pearson Product Moment correlation result for the relationship between instructional resources and students' academic performance in mathematics in senior secondary schools in Sagbama Local Government Area of Bayelsa State. The correlation analysis between Mathematics Achievement Score and Instructional Resources Score reveals a strong positive relationship, with a Pearson Product Moment correlation coefficient of $r = 0.871$. This indicates that instructional

resources has a strong association with students' Mathematics achievement. Furthermore, the significance level ($p = 0.003$) is less than the standard threshold of 0.05, meaning the correlation is statistically significant.

Discussion of Findings

The findings presented in table 1 show a high positive relationship between classroom furniture and students' academic performance in Mathematics among senior secondary school students in Sagbama Local Government Area of Bayelsa State. This aligns with the findings of Eton (2021), who found that there is great influence of class furniture on pre-school performance in social habits, there is also significant influence of social culture on pre-school performance in social habit. These findings highlight the need for schools to provide adequate and sufficient classroom furniture in other enhance students' learning processes which could also improve academic outcomes in Mathematics.

The findings presented in table 2 show a significant a high positive correlation between instructional resources and students' Mathematics performance, the finding revealed significant high positive relationship. This indicates that students that are exposed to and uses instructional resources in class tend to perform better in Mathematics. The statistically significant result underscores the importance of provision of adequate and sufficient instructional materials in schools to enhance academic performance. This finding is in aligned with the findings of Kyari (2023), which study the impact of instructional materials on students' academic performance in social studies in junior secondary schools in Gashua Educational Zone, Bade Local Government Area of Oyo state. The findings revealed that the schools do not have enough instructional materials to meet the needs of both teachers and students and this led to low academic performance. This result shows a strong relationship between instructional resources and students' academic performance.

Conclusion

The findings of this study indicate that teaching facilities plays a crucial role in students' academic performance in Mathematics in senior secondary schools in Sagbama Local Government Area of Bayelsa State. Classroom furniture and instructional materials exhibited high positive statistically significant relationships

with mathematics achievement, suggesting that students may benefit more from the provision and adequate classroom furniture and instructional materials. These results highlight the need for holistic approaches in the provisions of teaching facilities and not just the once captured in these research work in order to improve students' academic success in Mathematics.

Recommendations

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

1. Provision of adequate and sufficient sitting and other classroom facilities should be encourage in schools, so that the students can seat comfortable while teaching and learning activity is on, for this will reduce distraction among students.
2. Mathematics teachers' in school should be encourage to use instructional materials while teaching any topics in mathematics, for this will enhance class participation and made the teaching concrete.

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