

# Perception of Classroom Environment and Academic Achievement in Mathematics among Primary School Pupils in Calabar Metropolis, Cross River State

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## Abstract

*The study investigated the perceived correlation between classroom environment and academic attainment of primary school pupils in mathematics in Calabar Metropolis. An ex-post facto approach was used to guide the research methodology. The research adopted a stratified random sampling technique and a total of 144 pupils were chosen at a random from the larger population of 5594 primary six pupils in Calabar Metropolis. Data for the study were gathered using a questionnaire entitled "Perception of Classroom Environment Questionnaire" (PCEQ) and "Mathematics Achievement Test" (MAT). Specialists from the Educational Test and Measurement Department of the University of Calabar, validated the PCEQ while the content of the MAT was validated by specialists in Mathematics Department of the same university. The PCEQ's reliability was assessed using Cronbach's Alpha method, with reliability coefficients ranging from 0.73 to 0.85 for the subscales, while Kuder – Richardson K-R-20 method was used for the MAT with a coefficient of 0.72. The data gathered was subjected to descriptive statistical analysis, and the relationships were examined using Pearson Product Moment Correlation (PPMC) at 0.05 significance level. The result of the analysis showed that classroom facilities and instructional facilities had a significant relationship with academic achievement in Mathematics among primary school pupils in Calabar Metropolis. It is concluded that classroom environment is a key determinant of academic achievement of elementary school pupils in Mathematics in Calabar metropolitan area of Cross River State, Nigeria. It was recommended among others that pupils, policymakers, head teachers, teachers, parents, and researchers should pay adequate attention to classroom environment as an important factor for improved academic achievement in Mathematics.*

**Keywords:** Classroom environment, Academic achievement, Classroom facilities, Instructional Facilities.

## Introduction

Education is a systematic training that leads to knowledge, skills, and character enrichment. It is also the systematic way by which the latent abilities of individuals are designed so that they may be useful to themselves and society (Doharey, Verma, Verma & Yadav 2023).

Primary education, which is the centre of this study, is known to be a major bedrock for the social-economic and political growth of any nation (Etor, Ekanem & Sule, 2024). It aims at learning at an elementary level of complexity with little expertise (International Standard Classification of Education ISCED, 2011). Progression of many people's skills and knowledge through coaching is part of the requirements for national advancement and this begins at the primary level for many nations, including Nigeria. Therefore, any threat to the quality of education at this level cannot be disregarded.

For many Nigerians, primary education starts at around age five, where the pupil will spend six years

after which the pupil will obtain a certificate of primary school completion(Federal Republic of Nigeria FRN, 2013). The Subjects taught at this elementary stage in Nigeria include: English, Mathematics, Agricultural Science, Social Studies, Civic Education and any one of Hausa, Yoruba, Igbo. To qualify for admission into any Nigerian Federal, State, or private secondary school, the pupil must take a common entrance examination (Ige, 2024).

Mathematics is an important subject and in the acknowledgement of this, the Federal Government of Nigeria has mandated mathematics to all students in elementary and high schools. The importance of mathematics in understanding the philosophies and structures of science, technological progress, nation development and the interplay of association existing among disciplines is very critical and cannot be overemphasized. However, the rate at which students fail this subject is very alarming.

There is a general attitude of many to Mathematics either at primary, secondary or even at tertiary level, which often result to mass failure in the subject. The underlying problem to this attitude most times is been investigated at post primary school level neglecting the foundation of the pupils. There is a saying that if the foundation be destroyed what can the righteous do. The reason I supposed is that, most of the pupils at primary school only needed to pass their common entrance, which is an aggregate of scores in Mathematics, English and General Paper. Once they get a score above the cut off mark, straightway they gained admission to Secondary School. Since the pass mark is a function of the aggregate scores of the three subjects, their performance in each subject is often not considered important. However, the result of the common entrance examination of pupils in Calabar Metropolis from 2017 to 2019 has shown that majority of these pupils failed Mathematics though did well in English and General Paper. This work is looking into this omission, which has been unnoticed for so long.

#### Primary six pupils' performance in Mathematics

Schools	Examination Year	Total number of Candidates that enrolled.	Candidates that scored above 50 in Mathematics	Above 50 (%)
School A	2017	78	25	32.1
	2019	60	16	26.7
School B	2017	106	29	27.3
	2019	87	9	10.3
School C	2017	67	1	1.5
	2018	77	22	28.6
	2019	99	58	58.6
School D	2017	114	3	2.6
School E	2017	33	12	36.4
School F	2017	54	18	33.3
School G	2019	115	50	43.5

Source: - Cross-River State Ministry of Education.

Generally, in order to resolve the long-standing challenge of Mathematics underachievement among students, Federal Government of Nigeria through the Mathematical Association of Nigeria (MAN) launched a program tagged 'War Against Poor Achievement in Mathematics' (WAPAM), which was a project to enhance mathematics instruction in schools. The project also catered for how to teach the subject as well as how to deliver it to pupils in order to boost their interest and performance. However, with WAPAM, MAN could not resolve the issues of Mathematics achievement deficits among students in Nigeria post-primary institutions. Thereafter, the

National Mathematical Centre (NMC) in Abuja initiated a Mathematics Intervention Program through the Director of the Centre. The Science Teachers Association of Nigeria (STAN) also made attempts to address the issues surrounding science, technology and mathematics in Nigeria through various workshops, projects and programmes. Yet, the sad situation persists.

The learning environment which includes classroom facilities, instructional materials, are vital in the cultivation of intellectual, emotional, and physical abilities that aid academic achievement in Mathematics. Comfortable classroom enhances teachers' effectiveness as well as provide opportunity for pupils ask questions, engage more fully in the calculation process and get more personalised attention. The attitudes of students to Mathematics at primary and secondary schools' level have been discovered to be greatly influenced by what they encounter in classrooms (Onah, 2017). The application of instructional materials in instructing mathematics has the capacity of making the subject less abstract and application oriented.

Classroom is a place where teaching and learning takes place. A typical classroom has structural and symbolic facilities. The structural facilities are the lighting, noise, air quality, temperature in the classroom while the symbolic facilities are the objects like desk, chairs, whiteboard etc. found in the classroom as well as the wall decorations. These facilities have been found to have impact not only on teachers and students but also on the teaching-learning process (Cheryan, Ziegler, Plaut & Meltzoff, 2014).

Empirical studies have shown that classroom facility affects how well students do in Mathematics. In a research investigation to find out the effect of classroom facilities, which are classroom painting, lightings, air quality, seat, seat arrangement, chalkboard, on the academic achievement of students in mathematics, Shamaki (2015) selected randomly 337 SS 2 students drawn from a target population of 1682 students in Potiskum of Yobe State. The collected data were subjected to t-test and descriptive statistical analysis. His findings revealed that dull classroom paintings and lightings have negative effects on the students' academic performance in mathematics, mathematics lesson becomes boring due to little ventilation, bad seat arrangement makes mathematics uninteresting, and that the students sitting at the back are affected by the class chalkboard since they cannot clearly see the writings on it. The result actually demonstrated that, at 0.05 significance level, the variation in average performance between pupils who were taught in a boring classroom and those who were educated in an ideal one was clear.

Studies have also shown that classroom facilities affect students' performance in other subjects besides Mathematics. In a study by Wali, Abulfathi and Mustapha (2019), they examined classroom environment's impact on students' academic achievement in English language, and in correlation to the difference in performance by gender. Survey and Correlation research methodologies were employed for the study. Sample for the investigation was 401 students representing 20% of the study's total population, which were randomly selected from among the 2003 SS3 students in the chosen schools and 183 teachers. Self-developed questionnaires and proforma were used for the collection of data for this study. The data collected were analyzed using descriptive statistics of Mean and Standard Deviation and Multiple Regression. Their findings revealed that the classroom environment strongly impacts the academic performance of students in the English Language. They conclude that when the school enables an optimum environment, both students and teachers tend to be highly inspired toward teaching and learning.

Instructional materials are a diverse array of equipment deployed by educators to enhance teaching-learning process and to stimulate self-activity by the pupils. We have several types of instructional materials that can be used in learning, it is divided into three major categories based on their sensory appeal, which are audio, visual, and audio-visual (Akpan, Okpara, Okoli & State, 2017). According to Ede, Oleabhiere and Modebelu (2016) instructional materials assist educators in facilitating meaningful learning experiences for students. The quality of education a learner received is usually a function of availability, quality, and access to or the lack of physical structure (instructional facility inclusive) and the entire environment in which learning takes place.

Instructional materials are a very important tool in the teaching-learning process of all subjects (Lyimo & Too, 2017). To discover how instructional materials affect the performance of students in Economics, a study was carried out by Oleabhiere and Ede (2016) using the control and experimental groups. In the study, which looked into the effect of instructional materials on senior secondary students' performance in Economics, a quasi-experimental design was adopted. Sixty students sampled for the study were obtained through a simple random sampling, thirty of the sixty students were assigned to the treatment group, and the remaining thirty were allocated to the non-treatment group. It was discovered that after the application of treatment (instructional

material), the treatment group outperformed the non-treatment group. Since the difference in means in the achievement was statistically significant, it meant that the utilization of instructional tools helped the learners to perform better in economics.

Awoyale, Alagbe, Olorunmaiye, & Adewara (2024) in examining the influence of effective usage of Instructional materials on the academic performance of pupils in Mathematics had in total 130 students and 134 teachers as their sample. A descriptive and a quasi-experimental design were adopted for the study. Results from the study demonstrated a high potency of the instructional tools in increasing pupils' achievement in Mathematics.

The findings of Ogundeji, Farayola and Adetunji (2024) in their research on the impacts of educational resources on the academic achievement of college students in Biology in Lagos State corroborate with the findings in the above reviewed studies. The investigation, which also employed a quasi-experimental design, had all the S.S.S 2 students from 2 private schools as its population, out of which 100 were sampled. Analysis of the data was done using t-test. Their report showed a significant difference in the academic attainment of the learners taught with educational resources and those taught without educational resources. The researcher concluded that the learners exposed to educational resources had exceptional performance scores compared with those taught without any material.

Many more researchers have stated some more important functions of instructional tools in facilitating student learning experience alongside their studies. Educational resources help to optimise learning experience (Onyia, 2013). It also assists in the formation of skills, values, abilities, and knowledge by learners in the learning process. (Saglam, 2011). Akpan, Okpara, Okoli and State (2017) submitted that instructional tools enhance learning and aid faster assimilation. Another role of instructional material is that it initiates self-confidence, self-realization, and acts as a drive for students. (Saad, 2017). Other roles are that it gives room to educators and learners for prompt engagement in the learning process, enhances learning objectives and students' interest, conserves time, and also optimises the retention of memory in students (Awolaju, 2016). However, the importance of educational resources in enhancing academic achievement in a school environment cannot be over-emphasized.

A close interaction with pupils in most Nigerian government primary schools shows that these children are barely learning. Many of these pupils cannot read, let alone solve simple arithmetic, which is evidenced in their common entrance results.

However, the Nigerian Government in an attempt to close the gap to improve the performance of primary school pupils had made several efforts by ensuring that quality supervisors are sent periodically to schools for routine checks and inspection, they have organized several seminars, workshops for teachers, they increased their consistency in the payment of teachers' salaries, yet, there seems to be insignificant progress in the students' performance especially with respect to Mathematics. The question that borders the researchers is: could the pupils' low achievement in mathematics be due to their classroom environment?

### **Purpose of the Study**

The primary goal of this research was to determine the perceived relationship between classroom environment and pupils' mathematics success in Calabar Metropolis. The study will focus on the following key objectives to:

- i. investigate the perceived relationship between classroom facilities and academic success in Mathematics among primary school pupils in Calabar Metropolis.
- ii. determine the perceived relationship between instructional facilities and academic success in Mathematics among primary school pupils in Calabar Metropolis.

### **Hypotheses**

The following hypotheses guided the study.

- i. There is no significant relationship perceived between classroom facilities and academic success of primary school pupils in mathematics in Calabar Metropolis
- ii. There is no significant relationship perceived between instructional facilities and academic success of primary school pupils in mathematics in Calabar Metropolis.

### **Methodology**

The study was conducted using an ex-post facto research methodology, which is a research design where



inquiries begin after the fact has happened without involvement from the researcher. Ex-post facto research design fits the research since the quality that already exists (the classroom environment) is compared to the dependent variable (academic performance).

The population study is 5594 primary six pupils in the 46 public primary schools in Calabar Metropolis. The sample school used for the investigation was 12 out of the 46 government elementary schools in Calabar Metropolis selected by hat and draw method. The researcher proportionally sampled the pupils using fifty percent of the pupils in each school, giving an overall of 144 pupils as the sample.

Stratified random technique, which was deployed in this study, is a method that gives each member an equal opportunity for selection, it is a chance event. This technique was employed to enable effective representation of the population, which has equal likelihood of being selected. The researcher wrote the names of all the government elementary schools in Calabar Metropolis on different pieces of paper, each piece was rolled into a paper ball and put in a container to blindly draw the required number of primary schools, which was twelve, that is six for Calabar Municipal and six for Calabar South.

The study's data were gathered using the two instruments (PCEQ and MAT). The researcher conducted a visit to the selected schools and informed the school authority of the intention behind the study. After the formal introduction, the instrument was administered to the pupils with the help of the teachers in the various schools. The pupils were informed on the need to give honest responses to the instruments and that the data gathered will be used exclusively for research purposes. All the instruments distributed were collected after the exercise as the researcher thanked the pupils for their cooperation and the teachers for their assistance.

The data gathered were analysed by Pearson Product Moment Correlation analysis.

## Results

**TABLE 1**  
Descriptive statistics of research variables (N=144)T

SN	Variables	Mean	SD
1.	Classroom facilities	14.08	3.27
2.	Instructional facilities	13.98	3.20
3.	Achievement test in Mathematics	8.30	2.99

Table 1 shows the descriptive statistics (means and standard deviations) that are calculated for the two variables of interest and the achievement test scores. The result indicated that classroom facilities produced a mean value of 14.08, and a standard deviation SD of 3.27, while instructional facilities gave a mean score of 13.98 with SD 3.20. The result finally indicated that the mean of the pupils' performance in Mathematics is 8.30 with SD 2.99.

**TABLE 2**  
Perceived relationship between classroom facilities and academic success of primary school pupils in Mathematics using Pearson Product Moment Correlation Analysis (N=144)

Variables	$\bar{X}$	SD	r-ratio	p-level
Perceived classroom facilities (X)	14.08	3.27	.206*	.013
Academic performance in Mathematics (Y)	8.30	2.99		

\*Significant at .05 alpha level. df=142.

**TABLE 3**

Perceived relationship between instructional facilities and academic success of primary school pupils in Mathematics using Pearson Product Moment Correlation Analysis(N=144)

Variables	$\bar{X}$	SD	r-ratio	p-level
Perception of instructional facilities (X)	13.98	3.20	.221*	.008
Academic performance in Mathematics (Y)	8.30	2.99		

\*Significant at .05 alpha level. df=142.

### Result interpretation

Hypothesis one indicated no significant relationship between perceived classroom facilities and academic success in Mathematics among primary school pupils in Calabar Metropolis. To examine the hypothesis, a correlational analysis using PPMC was carried out on the perceived classroom facilities and Mathematics academic achievement. The analysis result is shown in Table 2.

Table 2 showed that Pupils' perceptions of classroom facilities yielded a mean score of 14.08 (SD = 3.27), while their Mathematics academic achievement had a mean score of 8.30 (SD = 2.99). The result which also revealed that the calculated r-ratio is .206 and p-value is .013 at 142 degrees of freedom is significant in as much as the obtained p-value is less than .05. Thus, the null hypothesis is not accepted. With the obtained value of .206, it means that there is a significant positive relationship between perceived classroom facilities and academic achievement in Mathematics.

The second hypothesis stated that, perception of instructional facilities do not significantly relate with academic success in mathematics among primary school pupils of Calabar Metropolis. To investigate this hypothesis, a correlational analysis deploying PPMC was performed on perception of instructional facilities and Mathematics academic achievement. The result of the analysis is shown on Table 3.

As presented by Table 3, the result indicates that pupils' perceptions of instructional facilities yielded a mean score of 13.98 (SD = 3.20), whereas their Mathematics academic achievement had a mean score of 8.30 (SD = 2.99). Additionally, the study found that the calculated r-ratio of .221 with a p-value of .008 at 142 degrees of freedom is statistically significant since the p-value is less than 0.05. Hence, the null hypothesis that perception of instructional facilities do not significantly relate with academic success in mathematics among primary school pupils in Calabar Metropolis is rejected. With the obtained value of .221, it means that the correlation between perception of instructional facilities and academic achievement in Mathematics is significant.

### Discussion of Findings

It was observed that the classroom facilities of some of the schools visited was nothing to write home about, talking in terms of desks, chairs and white board for the pupils and of course the outcome is what is seen in their performance. According to Asiyai (2014), she reported that motivation and learning for students is strongly dependent on the classroom environment of the student. Whatever, the condition of the classroom environment, this serves as a motivation for these pupils and when the classroom environment is not conducive, it has a high tendency of distracting learning. Mathematics is such a subject that requires high concentration on the part of the pupils and even the teacher, so anything that can serve as a distraction will definitely affect learning.

This research findings corroborates with the research carried out by Shamaki (2015) that investigated the influence some classroom facilities had on students' academic attainment in mathematics. His findings reveals that chalkboard affect students' performance especially those sitting at the back because they cannot see the writings on the chalkboard clearly, as such the student cannot comprehend what is being taught. The findings of

the study also concurred with Wali, Abulfathi and Mustapha, (2019), who assessed the effect of classroom environment on students' academic success in English language, discovered a positive relationship between the variables. They concluded that optimal environment inspires and motivates both learners and teachers. However, the findings of this study does not conform with the findings of Ibrahim, Umar and Clement (2017) who studied the impact of school facilities on secondary school students' performance in Bauchi State. Their findings revealed that school facilities does not have impact on students' achievement.

The use of Instructional materials by teachers creates a collaborative learning environment, leading to a more interactive and engaging classroom experience. This research finding was consistent with the opinions of Awoyale, Alagbe, Olorunmaiye, and Adewara (2024) who described the effectiveness of instructional tools which help pupils to develop strategy pattern in solving fraction problem in Mathematics. In addition, the findings of this study align with the report of Ogundeji, Farayola and Adetunji (2024) who found that students exposed to instructional materials outperformed their peers who received instruction without materials. According to the outcomes of the study on the impacts of educational materials on the academic achievement of secondary school students in Biology in Lagos State, the authors strongly suggested that teachers of Biology should seek out engaging instructional materials that stimulate students' senses, arouse their interest, foster participation, and enhance academic performance.

Additionally, the findings in this study establish the fact that instructional facilities help students to remember the lessons they have learnt. This corroborates the findings of Effiong and Igiri (2015) who researched on the impact of Instructional tools in the teaching and learning of Biology concluded that instructional materials bring learning to life, which in turn enhances good assimilation of the subject matter and ultimately promotes the retention of the subject matter learnt.

## Conclusion

The study investigated perceived relationship between classroom environment and intellectual achievement of elementary school pupils in Mathematics in Calabar Metropolis. The study used variables such as instructional resources and classroom facilities. As indicated by the analysis of the data collected, the outcome of the study was that classroom environment plays a significant role in the academic achievement of primary school pupils in Mathematics in Calabar Metropolis.

## Suggestions

Based on the research findings, the following are suggested.

1. A well ventilated classroom with clear white boards should be made available in classrooms.
2. Mathematics teachers should make good use of instructional material that will help the pupils understand the concept of the mathematics topic being taught.
3. Mathematics teachers should create a more engaging and supportive classroom setting that motivates students and builds up their confidence in Mathematics
4. Government should also ensure that standard classroom facilities and instructional materials are in regular supply to schools.

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