INTERCONTINENTAL JOURNAL OF EDUCATION, SCIENCE AND TECHNOLOGY
ISSN 2659 - 1085, VOL 9. NO. 1 JULY, 2025. USA.

SCHOOL FACILITIES AND PUPILS' ACADEMIC PERFORMANCE IN MATHEMATICS IN PUBLIC PRIMARY SCHOOLS IN RIVERS EAST SENATORIAL DISTRICT, RIVERS STATE

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ABSTRACT

The study determined the relationships between school facilities and the academic performance of pupils in mathematics in pubic primary schools in Rivers East Senatorial District of Rivers State. Four research questions and four hypotheses guided the study. The study employed the correlational research design. The population of the study was 3570 respondents, out of which 714 respondents were sampled using simple random sampling technique. The researcher designed questionnaire and pupils' performance test in mathematics were used for data collection. Data was analyzed using Pearson Product Moment Correlation Coefficient. The findings revealed that there was a significant relationship between school buildings and the academic performance of pupils in mathematics in public primary school in Rivers East Senatorial District of Rivers State; there was a significant relationship between classroom furniture and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District; School libraries does significantly relate to the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State; there is a significant relationship between playground (space) and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State. Based on the findings of the study, recommendations were made which include that classroom settings in the public primary schools should be adequate and age appropriate to enable the pupils participate effectively and maximally during classroom mathematics instructions. There is also the need for the school authorities to ensure that play spaces and libraries are provided to help facilitate the development of the physical, cognitive, personality skills and reading culture in mathematics by primary school pupils.

Keywords: School facilities, Primary school Pupils, Academic performance and Mathematics

INTRODUCTION

Mathematics is the science of reasoning and computations. It is the science or study of numbers, quantities or shapes. Mathematics enables individuals to make, the invisible to be visible, thereby solving problems that would be impossible and otherwise (Lambdin, 2009). The mathematical demands on pupils' increases as they progress through school, take up their adult lives at home and in the workplace (Lambdin, 2009).Therefore, in order to function in a mathematically literate way in the future, pupils must have a strong foundation in mathematics. In this perspective, a strong foundation involves much more than the rote application of procedural knowledge, but rather, pupils should be able to understand, make sense of, and apply mathematics as well as make connections between

concepts and see patterns throughout in mathematics.

Persons use ideas of mathematics in their daily activities though they may not be aware of it. The mathematical knowledge is stored in people's memories and activities and are expressed in stories, puzzles, riddles, folklore and games (Grenier 1998). The mathematical knowledge that people have outside the formal school system can be made use of in the teaching and learning of school mathematics.

Kazima (2013) acknowledged that children tend to view mathematics as a "cut-and-dried, obscure subject that arose full-blown from the minds of the white men in the past". It is therefore viewed that, many students find mathematics irrelevant, develop fears and anxiety about the subject and want to drop it as soon as possible. This general lack of confidence normally indicates that people were taught mathematics in the wrong way yet mathematical issues cannot be separated from real life activities and experiences.

Learning is a complex activity that puts students' motivation and physical condition to test. It has been a long-held assumption that curriculum and teaching have an impact on learning. However, it is becoming more apparent that the physical condition of our schools can influence pupils' achievement in mathematics.

The teaching of mathematics is often formalized into intellectual units that have no relationship to the child's daily experiences and interests. Several scholars acknowledged that classroom activities are too exclusively abstract, remote and essentially unconnected from the children's experiences and purposes that might make them relevant and meaningful. The ultimate result is general disinterest in mathematics (Rosa and Orey, 2011). Mathematics can become enjoyable to the pupils when the appropriate school facilities that will facilitate the teaching and learning of mathematics are effectively put in place and utilized.

School facilities are the material resources provided for staff and students to optimize their productivity in teaching and learning processes. The realization that the transfer of knowledge does not only take place in the four walls of the classroom from teacher to pupils but rather that, learning takes place through discovery, exploration, interaction with the internal and external environment has necessitated the creative and innovative development of teaching and learning facilities that reflect these changes (Asiabaka, 2008).

School facilities are engines of growth in learning which support the teacher and the learner for effective and efficient teaching and learning for the attainment of goals and objectives of education. Tahir (2003) refers to school plant and facilities as physical and spatial enablers and enhancers of teaching and learning.

The importance of school facilities in the development of effective educational system, particularly at the primary school level cannot be over emphasized. The realization of the goals and objectives of education require the provision, maximum utilization and appropriate management of the school facilities. This point is aptly stated in the National Policy on Education that: "Education and training facilities shall continue to be expanded, to afford response to societal needs and made progressively accessible to the individual as a far more diversified and flexible choice"(FRN 2004). School facilities are the space interpretation and physical expression of the school curriculum (FRN 2004).

The primary school, which is the educational institution where children receive foundational education, needs school plant and facilities which consist of all types of buildings for academic and non-academic activities, equipment for academic and non-academic activities, areas for sports and games, landscape, farms and gardens, including trees, roads and paths. Other facilities needed includes, furniture and toilet facilities, lightings, acoustics, storage facilities and parking lots, security, means of

transportation, cleaning materials, food services, and special facilities for special needs. Their appearance and maintenance influences most parents and convince them to make judgment about the quality and effectiveness as to what goes on in the school. It is believed that, without such facilities, the empty buildings, no matter how attractive they are cannot be effectively used for educational purposes (Ogunsajo, 2010). Mark, (2002) lamented that high level of pupils' academic performance may not be guaranteed where instructional space such as class rooms, libraries, technical workshops and laboratories are structurally defective.

School facilities that are deteriorated and inadequate may result in reduced learning time, indifferent pupil, inability to provide specialized curriculum, low staff morale, lack of technology proficiency, safety hazards, lack of teachers interest, and a reduced ability to meet special needs (21st Century School Fund, 2002). It is a common experience to see some schools today, where the environments are by far from being conducive for learning, where classroom spaces are inadequate and compacted, especially in public primary schools. In some cases, learning takes place under trees. Some schools are generally in a poor state of repair. Teachers' effectiveness and pupils' learning are limited by inadequate learning materials. Poor working conditions and insufficient facilities have inevitably eroded motivation and satisfaction as well as demoralized teachers. Therefore, the educational system today must prepare the child for an all-round development in mathematics.

Objectives of the study

The general objective of this study was to examine the relationship between school facilities and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State. The specific objectives are to:

i. examine the relationship between school buildings and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.
ii. determine the relationship between classroom furniture and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.
iii. examine how school libraries relate to the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.
iv. determine the relationship between playground (space) and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

Research questions

The research questions that guided this study were:

i. How does school buildings relate to the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State?
ii. What is the relationship between classroom furniture and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State?
iii. How does school libraries relate to the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State?
iv. What is the relationship between playground (space) and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State?

Research hypotheses

The null hypotheses formulated to guide this study were:

i. There is no significant relationship between school buildings and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.
ii. There is no significant relationship between classroom furniture and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.
iii. School libraries does not significantly relate to the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.
iv. There is no significant relationship between playground (space) and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

RESEARCH METHODOLOGY

Research design

The study adopted the correlational research design. This design was considered appropriate for the study since the variables in the study (School facilities and Pupils' academic performance) were examined to determine their relationships.

Area of the study

Rivers East Senatorial District is one of the Senatorial Districts in Rivers State. The senatorial District has a projected population of 2,670,903 according to census data released in 2006.It covers the following Local Government Areas: Emohua (LGAs):Etche, Ikwerre, Obio/Akpor, Ogu/Bolo, Okrika, Omuma and Port Harcourt. These Senatorial district are bound on the South by the Atlantic Ocean; to the North by Imo State; to the East by Rivers South East Senatorial District and to the West by Rivers West Senatorial District. It is the home to many indigenous ethnic groups: Ikwerre, Okrika, Etche, and others. The inland part of the senatorial district consists of tropical rainforest; towards the coast the typical Niger Delta environment, which features many mangrove swamps.

The Senatorial District has a total of 359 public primary schools and 105 secondary schools. The secondary schools are more in the Local Government Area headquarter towns and in Port Harcourt. The tertiary institutions in this area include: the University of Port Harcourt, Choba, Port Harcourt; established by the federal government in 1975; the Rivers State University, founded in 1980 by the Rivers State government; the College of Health Science and Technology, Port Harcourt, established by the Rivers State Government; the Rivers State University of Education (now known as Ignatius Ajuru University) with campuses at Rumuolumeni, Rumukalagbo and Ndele and the School of Nursing and Midwifery at Rumueme and D/line, and the Elechi Amadi polytechnic Port Harcourt.

Population of the study

The population of the study comprised of three thousand and seventy (3,570) basic five pupils in the three hundred and fifty-nine(359) Public primary schools in the Rivers East Senatorial District of Rivers State (Rivers state Universal Basic Education Board,2021/2022 Academic Year).

Sample and Sampling Techniques

Seven hundred and fourteen (714) basic five pupils formed the sample for the study which was 20% of the entire population. The stratified random sampling technique was used to select the 359 public primary schools on the basis of urban and rural Local Government Areas, consisting of eight (8) Local Government Area: Port Harcourt, Obio/Akpor, Ikwerre, Etche, Omuma, Okrika, Ogu/Bolo and Emohua Local Government Areas. The number of primary schools in the urban areas was 235 and

the number of primary schools in the rural area was 124 teachers. The list of the public primary schools was collected from the Universal Basic Education (UBE) board. The systematic random sampling technique was used to select a school at every 10th school. In all, 36 public primary schools in both urban and rural areas were selected for the study.

Instrumentation

The instruments that were used for data collection in the study were the researcher designed questionnaire titled "School Facilities and Pupils Academic Performance Questionnaire (SFPAPQ)" and Pupils' performance test in mathematics. The SFPAPQ is divided into two sections, A and B. Section A comprises of the Bio-data of the respondents while section B comprises of a16 item developed questions based on the Four (4) research questions with a four-point rating scale of Strongly Agree (SA)=4,Agree(A)=3,Disagree (D)=2 and Strongly Disagree (SD)=1 for positive items, while the negative items were scored in the reverse. The pupils' mathematics performance test had 10-item of multiple choice test.

Validity of the Instrument

The instruments were validated by two experts in the Department of Early Childhood and Primary Education Studies, Faculty of Education, Ignatius Ajuru University of Education. This was necessary to ascertain their language level, appropriateness of items and the face validity of the instrument. Thereafter, the instruments were revised according to the experts' comments.

Reliability of the Instrument

The reliability of the instrument was determined through a pilot study which was conducted using 20 primary school pupils in two private primary schools in the Rivers South-East Senatorial District that were not part of the study. The test-retest method was used were the researcher administered the instrument to the respondents and then after two weeks to re-administered the instrument. The results obtained were correlated using the Pearson's Product Moment Correlation Coefficient formulae. The reliability index of the instrument was 0.76.With this reliability index, the instrument was considered reliable for the study.

Administration of the instrument

The administration of the instrument was carried out with the help of teachers in the various classrooms of the selected schools. They were given some brief orientation on how to effectively carry out the exercise. The cooperation from the respondents enabled the administration and collection of the copies of the questionnaire and the performance test of the respondents within the stipulated time for the field study. All retrieved copies of the instruments were used for data analysis.

Method of data analysis

The data collected was analyzed using Pearson product moment correlation coefficient to answer the research questionnaire and test the null hypotheses at .05 level of significance.

PRESENTATION OF RESULTS

Research Question one: How does school buildings relate to the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State?

Table 1: Summary of Relationship Test between school building and academic performance

Variables	∑X ∑Y	∑X² ∑Y²	∑XY	r_{cal}
School buildings	1993	5977	9475	0.42
Pupils' academic performance	3414	16470		

The results in Table 1 shows the summary of the Pearson Product Moment Correlation (PPMC) of the relationship between school buildings and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State. The result of the analysis shows an r-value of 0.42. This indicates that school building has a positive relationship to the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

Research Question two: What is the relationship between classroom furniture and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State?

Table 2: Summary of Relationship Test between classroom furniture and academic performance

Variables	∑X ∑Y	∑X² ∑Y²	∑XY	r_{cal}
Classroom furniture	1710	4290	8077	0.77
Pupils' academic performance	3380	16276		

The results in Table 2 shows the summary of the Pearson Product Moment Correlation (PPMC) of the relationship between classroom furniture and the academic performance of pupils in mathematics. The result of the analysis shows an r-valueof 0.77, indicating a positive relationship between classroom furniture and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

Research Question three: How does school libraries relate to the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State?

Table 3: Summary of Relationship Test between classroom school libraries and academic performance

Variables	∑X ∑Y	∑X² ∑Y²	∑XY	r_{cal}
School libraries	1718	4306	5703	0.65
Pupils' academic performance	2431	8567		

The result in Table 3 shows the summary of the Pearson Product Moment Correlation (PPMC) of the relationship between libraries and the academic performance of pupils in mathematics. The result of the analysis shows an r-value of 0.65. This indicates that school libraries has a positive relationship to

the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

Research Question four: What is the relationship between playground (space) and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State?

Table4: Summary of Relationship Test between playground (space) and academic performance

Variables	$\sum X$ $\sum Y$	$\sum X^2$ $\sum Y^2$	$\sum XY$	r_{cal}
Playground (space)	1669	4061	7332	0.39
Pupils' academic performance	3123	13827		

The results in Table 4 indicates that the correlation index (r) is 0.39 indicating a moderate relationship between playground and academic performance of pupils in mathematics. Thus, playground (space) has a moderate relationship to the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

Testing of null hypotheses

Ho_1: There is no significant relationship between school buildings and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

Table *5*: Summary of PPMC Significant Relationship Test between school buildings and academic performance

Variables	$\sum X$ $\sum Y$	$\sum X^2$ $\sum Y^2$	$\sum XY$	r_{cal}	Df	r_{crit}	Decision
School buildings	1993	5977	9475	0.42	712	0.196	Reject Null Hypothesis
Pupils' academic performance	3414	16470					

Significant @.05 alpha level

The result in Table 5 shows that at 0.05 level of significance and witha df of 712, the calculated value of r (0.42) is greater than the table value of r (0.196), therefore, the null hypothesis is rejected. Meaning that there is a significant relationship between school buildings and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

Ho_2: There is no significant relationship between classroom furniture and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

Table 6: Summary of PPMC Significant Relationship Test between classroom furniture and academic performance

Variables	∑X ∑Y	∑X² ∑Y²	∑XY	r_{cal}	Df	r_{crit}	Decision
Classroom furniture	1710	4290	8077	0.77	712	0.196	Reject Null Hypothesis
Pupils' academic performance	3380	16276					

Significant @.05 alpha level

The result in Table 6 shows that with a df 712 and at 0.05 level of significance, the critical table of r (0.196) is less than the calculated value of r (0.77), therefore, the null hypothesis is rejected. Thus, there is a significant relationship between classroom furniture and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

Ho_3: School libraries does not significantly relate to the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

Table 7: Summary of PPMC Significant Relationship Test between school libraries and academic performance

Variables	∑X ∑Y	∑X² ∑Y²	∑XY	r_{cal}	Df	r_{crit}	Decision
School libraries	1718	4306	5703	0.65	712	0.196	Reject Null Hypothesis
Pupils academic performance	2431	8567					

The results in Table 7 indicates that at 0.05 level of significance and with a df of 712,the calculated r value (0.65) is greater than the table value ofr (0.196), leading to the rejection of the null hypothesis. Therefore, School libraries does significantly relate to the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

Ho_4: There is no significant relationship between playground (space)and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

Table 8: Summary of PPMC Significant Relationship Test between playground and academic performance

Variables	∑X ∑Y	∑X² ∑Y²	∑XY	r_{cal}	Df	r_{crit}	Decision
Playground (space)	1669	4061	7332	0.39	712	0.196	Reject Null Hypothesis
Pupils' academic performance	3123	13827					

The result in Table 8 indicates that at 0.05 level of significance and with a df of 712,the calculated r value (0.39) is greater than the critical value of r (0.196), this leads to the rejection of the null hypothesis. Therefore, there is a significant relationship between playground (space) and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

Discussion of findings

Relationship between school buildings and academic performance

The result in Table 5 shows that at 714 degree of freedom and .05 alpha level, the critical r value is less than the calculated r value, therefore the null hypothesis was rejected. Thus, there is a significant relationship between school buildings and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

The findings of the study is in agreement with the findings of Adebule and Adeusi (2017) who in their studies reported that, school size and school building facilities utilization has impacted positively on the performance of secondary school students in Ekiti State. Their study established a strong and positive relationship between school size and school building facilities utilization in relation to students' academic performance. The findings of the study also agree with the findings of Zainuddin and Subri (2017) who reported that students from schools with enough school building facilities in good condition performed better during learning process and in their examinations. Thus, the study concludes that school building facilities may improve students' academic achievement.

Relationship between classroom furniture and academic performance

The results in Table 6 reveal that the r_{cal} is greater than the $r_{crit,}$ this leads to the rejection of the null hypothesis. Thus, there is a significant relationship between classroom furniture and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

The findings of the study supports the findings of Kazuzuru (2019) who found out that there is a significant and positive relationship between a students' performance and classroom furniture as well as the number of qualified (graduate) teachers in a school. The finding also agrees with the findings of Nsaet al. (2013), who examined the effects of classroom furniture and students' performance and found out that, there exists a significant influence of the classroom furniture and the academic performance of students.

Relationship between school library and academic performance

The result in Table 7 revealed that at 714 degree of freedom and.05 alpha level, the critical r value was less than the calculated r value which means that the null hypothesis is rejected. This, implies that, school libraries does significantly relate to the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

This finding is in agreement with the findings of Dukper et al. (2018) who found that there is a positive significant difference in the academic achievement of students in schools with libraries and those without libraries. Also, the finding is in agreement with the views of Philias and Wanjobi (2012) who revealed that lack of library facilities for teaching and learning negatively affect the academic achievement of pupils in schools.

Relationship between playground and academic performance

The result in Table 8 revealed that at 714 degree of freedom and .05 alpha level, the critical r value is less than the calculated r value. Since the r_{cal} is greater than the $r_{crit,}$ the null hypothesis is rejected. Thus, there is a significant relationship between playground (space) and the academic performance of pupils in mathematics in public primary schools in Rivers East Senatorial District of Rivers State.

This finding supports the views of Busato et al. (2000) who opined that pupils' characteristics of acquiring new knowledge and achieving success in learning depend on the intellectual development of the children and the overall structure of the personality of the child as they play using the play-ground. Again, the findings of the study agree with the views of Alukoand Imasuen (2020) who stated that playground promotes learning, thereby promoting academic performance

CONCLUSION AND RECOMMENDATIONS

School facilities play important role in the learning and academic performance of pupils in primary schools. School facilities have both positive and negative impacts on the academic performance of the pupils. The study deduced that dilapidated structure or school buildings and classroom furniture can have negative influence on the pupils' academic performance, while adequate or modern school buildings and classroom furniture/facilities help to enhance and improve the pupils' academic performance. Based on the findings of the study the following recommendations were made:

1. The government should ensure that classroom settings in the public primary schools are adequate and age appropriate to enable the pupils participate effectively in the classroom instruction.
2. There is the need by the school authorities to ensure that play spaces are provided in the primary schools to help facilitate the development of the physical, cognitive and personality skills of primary school pupils.
3. Libraries should be provided and made functional in the primary schools to encourage the development of the reading culture of pupils.
4. School buildings and play spaces that are in connection with the developing pace of education and instructional activities should be provided in the primary schools to aid effective learning.

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