

# Influence of School Environmental Variables on Students' Performance in Junior Secondary School Mathematics in Gwer-East Local Government Area of Benue State, Nigeria

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**Abstract:** - This study examined the influence of school environmental variables on students' performance in Junior Secondary School mathematics in Gwer-East Local Government Area of Benue State. The study adopted an expo-facto design. A sample of 120 Junior Secondary School II students from ten schools was drawn out of a population of 3,482 JSS II students from Gwer-East Local Government Area of Benue State, Nigeria. A validated 20-item Influence of Environmental Variables on Students Performance Questionnaire (IEVSPQ) was used to collect data. Mean and standard deviation were used to answer the four research questions raised for the study. The result revealed that nearness of school to noisy facilities has a negative influence on the performance of mathematics students in Junior Secondary Schools. Classroom size, library facilities and power supply influences the performance of mathematics students in Junior Secondary School to a high extent. It was recommended among others that school environmental variables should be taken into consideration in the siting and running of schools in order to enhance the students' performance in Junior Secondary School mathematics.

**Keywords:** School Environment, Mathematics Education, Gwer-East, Junior Secondary Mathematics, School Facilities

## I. INTRODUCTION

The evidence of science in human development is numerous. For instance, it is concerned with finding solutions to practical problems or finding simplified ways for doing things which might otherwise require a great deal of energy. According to Mulemwa (2002), the fast changing application of science and technology and the global reliance on its processes and products in all areas of human endeavour have made them valuable that any society or country without a good foundation on science and technology risks being alienated from the global village.

Several research reports indicate that students perform poorly in secondary school science subjects especially mathematics (Akinsola, Tella & Tella, 2007; Murugan & Rajoo, 2003; Shamki, 2005). The importance of mathematics to the individual and the nation cannot be overemphasized. The

development of a nation greatly depends on the level of mathematical knowledge. The G-7 nations of the world are proud of advancement because of the accruing benefits so far from science technology and mathematics. Mathematics plays a dominant in development of nations (Ademola, 2004). Mathematics is regarded as an important subject that is indispensable to the technological development of any nation. The high regard for mathematics may be because it has helped in the development of modern technology through the application of its principle in modern invention. The study of mathematics has been and will continue to be of tremendous importance to humanity for its ability to explain natural phenomena and everyday occurrences as well as its central role in the world's current technological development.

The importance attached to the learning of mathematics in schools tends to support the notion that technological progress of any nation depends to a large extent on mathematics and science education in that country (Shamaki, 2015). Despite the perceived importance of mathematics in scientific and technological development of nation, students' performance in the Nigerian institutions have not been encouraging (Tella, 2008; Akinsola, Tella & Tella 2007). Various examination reports have tried to identify factors which could have contributed to the observed poor performance in mathematics. The general consensus using the WAEC Chief Examiners Reports of 2013, 2014, 2015 and 2016 is that poor performance in mathematics is as a result of remarkable lack of well-organized human resources, teaching materials, facilities and environmental factors which influence teaching and learning of mathematics.

Ayodele (2012) attributed the poor performance of students in mathematics to the poor state in which it is taught in our schools. According to Shamaki (2015) mathematics learning has been a problem due to the large class size and much workload on the teachers couple with a poor learning environment. The school environment is the focus of the

education industry, on which success of teaching and learning depends.

Murugan and Rajoo (2013) viewed the school learning environment as the totality of the atmosphere within which the staff and students function. It is a dynamic and comprehensive picture of all those influences that mold physical, emotional, psychological and social life of the members of the school. With regards to this Uhrain (2016) maintained that the concept of school learning environment constitutes various strands which includes the school location, structure, organizations, interpersonal relationship, available materials, communication patterns, administrative and supervisory practices among others.

On his part, Tella (2008) maintained that the learning environment plays a vital role in determining how students perform or respond to circumstances and situations around them. This implies that no society is void of environmental influences.

The learning environment determines to a large extent how a student behaves and interacts, that is to say that the environment in which we find ourselves tend to mould our behaviour so as to meet the demands of life whether negatively or positively. Tella (2008) opined that the desire for both qualitative and quantitative education has multiplied the problem of providing an effective and conducive learning environment for teaching and learning in Nigeria. There is an increase in the number of students' enrolment in schools with little or no regard to improving the learning environment so as to better their performance.

Furthermore, Altinok and Kingdon (2012) view the school learning environment as the students' school surrounding and this may include physical environment as the students' school surrounding and this may include physical environment which points out to the physical structures such as terrains structural conditions, building, seating facilities and other basic infrastructures such as textbooks and laboratory equipment, also the social environment which on the other hand deals with the school population in terms of age, sex and other physical attributes. It also has to do with the background of the students and the method of teaching. The instructor who is the teacher also constitutes social environment. The interaction between the teachers and the students in the school system contribute to a large extent on the performance of the students. Frenzel, Pekrun and Goetz (2007) observed that the influence of environment on academic performance of secondary school students should be of a great concern to the government and private sector. Frenzel *et al.* stressed that the materials and conditions required for teaching and learning in the school environment should be conducive for learning.

Shamaki (2013) asserted that various social groups in the school environment tend to influence the performance of students in terms of thoughts, perceptual and motivational process of their members. Environmental forces play major roles in determining how effective teaching and learning flow,

how we react to our environment largely depends on how we perceive it. According to Shamaki (2015) the attitudes, values, perspectives and gender of the school teachers and students affect their perception, definition and interpretation of social situations in school learning environment, helping them to give meaning to their present experience in the school environment and the outside world.

Akabayashi and Makamura (2014) are of the opinion that, the desire for education has multiplied the problem at providing an effective and conducive environment for teaching and learning of mathematics. There is an increase in the number of students; enrolment in schools with little or no regards to improving the learning environment and also with no regards for some environmental variables such as cleanliness of the school environment, standard classrooms and class size, library/library facilities and other similar features, so as to better students' performance.

Uhrain (2016) said that performance entails a thing that somebody has done successfully especially using their own efforts and skills. Akinsola, Tella and Tella (2007) maintained that performance in the teaching and learning process has to do with attainment of set of objectives of instruction. For instance, if a learner accomplishes a task successfully and attains the specified goals for a particular learning experience, he/she is said to have achieved that task. Thus, the level of performance in senior secondary school students is determined through their performance in senior secondary certificate examination (SSCE). Available evidence on the level of performance of students in senior school certificate mathematics examination is quite disturbing. This is why the chief examiners reports available from the West African Examination Council (WAEC, 2013, 2014, 2015 and 2016) show that majority of the students underachieve in mathematics.

Cerny (2013) reported that electricity is the bed rock of both economic and technological development. Electricity supply is a necessity in any school setting be it urban or rural. Amandi (2015) said that many children in Nigeria go to schools that lack electricity. That means that classrooms must be conducted with projections, presentations, fans, air conditioning units, evening classes, computers or access to the internet. The lack of access to electricity reduces the teaching resources and classroom materials. Without electricity, both teachers and students cannot access online resources, such as videos and other multimedia sources, in their classroom as valuable methods for instruction and learning. As a result, teachers are unable to provide their students with the quality of education they deserve.

A school could be located in the urban or rural area. Rural schools are generally inferior to urban schools as schools in rural areas lack human and material resources needed for success at school. The location of school whether urban or rural affects a child's ability to study and perform at the level expected of him/her. Tella (2008) noted that different aspects

of school environment (rural or urban) influences students' performance. Akubue (2012) further stated that the individual students' academic behaviour is influenced not only by the motivating forces of his home, scholastic ability and academic values but also by the social pressure applied by the participants in the school setting.

Also differences in location imply differences in the existence of demographic and socio-economic parameters of the school. As stated by Ado & Kehinde (2008), because of urban involvement, students in urban schools perform better than those in rural schools. The reason includes the fact that rural students have limited access to reading materials, inadequate reading culture and insufficient graduate teachers in rural schools. Therefore, the location of the school has tremendous influence on students' academic performance.

The location of the student is related to performance in mathematics. This may be due to differential provision of infrastructure in urban and rural schools. The persistent poor performance of subjects in this subject leaves one in doubt that the effectiveness of the learning environment and location of school used by the mathematics teachers for teaching the subject. Shamaki (2015) attributed the poor performance of students in mathematics to the poor state in which science is taught in our schools. "Chalk and talk" method has been the most widely used teaching methods due to poor quality laboratory, large class size and much workload on the teachers couple with a poor learning environment. The absence of pleasant learning environment may constitute a hindrance to learning and performance in mathematics hence the need to investigate the influence of school environmental variables on students' performance in Junior Secondary School Mathematics, particularly in Gwer-East Local Government Area of Benue State, Nigeria.

## II. THEORETICAL FRAMEWORK

*Pavlov's Classical Conditioning Theory of Learning (Pavlov, 1927)*

Pavlov (1927) a Russian psychologist propounded the theory of conditioning as a psychological principle. In Pavlov's classical conditioning experiments, a hungry dog was placed in an elaborate apparatus which restricted the dog's movement. Pavlov holds that all responses are subject to stimulus in the environment. Classical conditioning thus, involves the association of two stimuli, one initially neutral in that it elicits no response called "conditional stimulus". In this case, the bell, a stimulus that consistently enhances a response called the unconditioned stimulus, in this case food.

Pavlov carried out this experiment using classical conditioning principle and finally discovered that a dog can be conditioned to respond to a particular situation in the environment. The importance of Pavlov's classical conditioning theory in the classroom and to this study cannot be overemphasized.

Pavlov's theory emphasizes the use of learning facilities in his experiment such as bell, food, cage and lever. Thus, a mathematics teacher who wants his/her students to learn effectively and efficiently would ensure that the school learning environment is conducive and well equipped with the relevant learning facilities. Students performance should be measured in schools with the necessary leaning facilities such as standard library, classroom size, electricity power supply and those without these facilities to determine their academic performances. Evidently, if given conducive conditions in the school environment, learning and performance could be made more meaningful.

*Skinner's Operant Conditioning Theory of Learning (Skinner, 1958)*

The famous "Skinner box" was used in connection with conditioning. The box contained a hungry cat, a lever and a device for producing a food pellet. The inside of the box was plain and empty except for the protruding lever with food pellets beneath it. The hungry cat is left alone in the box to move restlessly. The lever is attached to the pellets of food in such a way that each time the cat presses the lever, a food pellet drops, the cat eats and hunger is appeased. The pellet of food therefore, reinforces the pressing of the lever. The cat repeats the action whenever it is hungry. The pressing response is instrumental in producing the pellet of food which is the reinforcement.

The box, lever and device for producing a food pellet serve as conducive learning environment for the cat which when adequately used produce food as a reinforcement. Skinner has demonstrated the need for teachers, private organizations and the government to provide conducive learning environment for the students that will produce a reinforcement that is revealed in their academic performance.

Skinner (1958) looks upon learning as contingent upon conditions within the learner and conditions outside the learner which can be manipulated in the learning situations. Skinner has done some works to show that response obtained from a stimulus if reinforced can be a source of encouragement and when not reinforced can discourage certain behaviour. The basic principle underlying this theory is hinged on the fact that learning events are possible when the learner establishes a relationship between the stimulus and the responses practiced coupled with the environment. Therefore, the learning environment should stimulate the learner to evoke responses.

Denga (2002) recorded the view of Skinner which holds that operant conditioning leads the learner to learn mainly by producing changes in the environment. Essentially the learner has to operate in the environment in order to be rewarded or reinforced. In looking at the learning environment, Kolawole (2013) stated that learning is influenced by the nature of the environment. Kolawole (2013) maintained that an individual's intellectual functioning may be retarded by the lack of a nourishing environment. This means that the environmental

influences could determine whether or not a student achieves all his potentials.

### III. CONCEPTUAL FRAMEWORK

#### *The School Learning Environment*

This is generally defined as the school surrounding which may be physical, social or cultural. Adeoye (2011) explained that the school learning environment includes all the physical facilities in the school together with the administration atmosphere and the kind of leadership available. The school learning environment also includes the general sanitation, air quality, noise, light, temperature and climatic, classroom space, state of classroom building, ventilation and furnishings. And also cleanliness of the school environment, standard classrooms and class size, library/library facilities, laboratories and other similar features.

In Nigeria, most of our schools are poor in outlook and the environment inferior (Adeoye, 2011). These affect students' academic performance. It is then not surprising that there is a downward trend in the academic performance of mathematics students from year to year in Gwer-East Local Government Area of Benue State and Nigeria in general. Kolawole (2013), reiterated that the quality of teaching and learning in these schools are below standard. The school environments are not conducive to learning either as there are no toilet facilities, no good drinking water, and no health clinics. Kolawole noted that the mass destruction of trees that provide shade and beauty to our schools for energy purposes without replacement affects the environment and subsequently teaching and learning.

In most schools, noise, cleanliness of the school environment, standard classrooms and class size, library/library facilities and other similar features, of dangerous gases such as carbonmonoxide from factories and motor vehicles, heavy traffic etc, constitute health and environmental hazards to the learners.

#### *School Size and Classroom Size*

The issue of density and the physical scale of our building are important to the students' performance especially now that education experts call for a decrease in school and class size (Akinsola, Tella and Tella, 2007). Ademola (2004) in a study observes small schools in comparism with large schools (over 2000) offer students greater opportunities to participate in extra-curricular activities in school activities. In such small schools, students satisfaction, number of classes taken, and participation in school organization were all superior in small schools relative to large schools. A review of over twenty subsequent studies (Tosin, 2010) indicated that small schools (500) also have lower incidence of crime levels and less serious student misconduct.

Class size research, most notably the longitudinal research presented by Chen (2009) revealed that students in school with small class size (between 15 – 20) perform better than

students on large lasses (between 25-40). In addition, more and better quality student/teacher interactions is possible in a small class. Spatial density and crowding is reduced. In a study by Uhrain (2016), it was observed that a large class size can induce stress in learning thereby increasing aggressive behaviour and low academic performance.

#### *Building Condition, Building Life Cycle and Facility*

A well designed sustainable school building will certainly get us out of the starting blocks in a better footing (Makamura, 2014). School buildings deteriorate with age and since a building's age a factor in building deterioration, the condition of older buildings depends to a large extent on the adequacy of maintenance operations. A 2012 correlation study of building condition and student performance in the Washington D.C. schools found the educational building conditions were hampering students' performance and estimated that improved facilities could lead to a 5.5% to 11% improvement on standardize learning (Danielson, 2010).

School building and class size have mediating effects on a variety of variables known to have a link on students' performance. These according to Uhrain (2016) include student teacher interactions, classroom interruption and student participation in addition, the quality of the learning environment is known to affect teacher behaviour and teacher attitudes towards continuity to teach (Ado & Kehinde, 2008). The evidence is overwhelming that, school building and class size are of critical importance to the teaching and learning process.

#### *Energy and Electric Power Supply*

The European Commission Research on Energy, has shown that energy is very essential to the quality of man's everyday life. It is evident across the centuries that man is totally dependent and reliant on energy for work and personal life. In fact, the use of energy cuts across all sectors. The dependence on energy is even more visible in the 21<sup>st</sup> century with the heavy use of electrical every which is virtually applicable to all spheres of life ranging from home use, to entertainment, recreation, industries educational system. In the classroom, laboratories and even for educational field activities, electrical energy is used to power various appliances that are used for instruction, learning and research. Examples of instruments used in the educational sphere include projectors, computers, printers, scanners, air conditioners, fans, etc. Electricity is also necessary for communication in education and to access a wide source of information through the use of the internet. The use of energy for private use has a transferred effect on education.

Inadequate supply of electricity in Nigeria and Nigerian schools is a problem that has seemed to evade solutions by successive administration in the past fifty years and thus has had adverse effect on education (Amadi, 2015). The power supply is not constant and if it is barely enough to cater for the energy needs of the country and the educational sector



(Amadi, 2015). As an evidence to this, Nigerians have resorted to the use of fuel powered electricity generators to cater for their energy needs (Cerny, 2013), in order to compete favourably in term of productivity.

Ologundudu (2014) reported that electricity is the bedrock of economic and technological development. Therefore, it is an essential community in the educational sector. Omoleke (2011) maintained poor power supply in schools constitutes a major challenge to education as it discourages reading by students at nights thereby increasing poor performances in examination and promoting illiteracy among the populace. This is buttressed by Omoleke (2011), Babajide, Egenti and Komolafe (2016), all of which held that electricity promotes literacy because students can read and study when there is no natural light.

#### *Academic Performance*

Performance refers to the degree of achievement in a students' learning programme. Ugwuoke (2009) cited some influential factors to academic performance as intelligence, motivation, environment, personality, willing guidance of the teacher, teaching learning materials and teaching methods that are suitable. Adesina (2012) said that performance entails a thing that somebody has done successfully, especially using their own efforts and skills. Chen (2009) maintained that performance in the teaching and learning process has to do with attainment of set objectives of instruction. For instance, if a learner accomplishes a task successfully and attains the specified goals for particular learning experiences, he/she is said to have performed that task. This is the level of performance in senior secondary school is determined through their performances in senior secondary school certificate examination (SSCE).

A number of factors have been found to have contributed to the students' poor performance in mathematics in the senior school certificate examination (SSCE). Some of these factors according to Ayodele (2012) include teachers ineffectiveness in terms of context, coverage, teachers and students find it difficult to teach and learn, students interests and perception to mathematics, poor study habits, lack of quality resources materials, non-conducive learning environment and ineffective pedagogical methods used by the instructors.

Ayodele (2012) further stated that there is a positive correlation between performance and some basic facilities necessary for convenient study in any school environment, which whether urban or rural.

#### *Empirical Studies*

Anyebe (2009) conducted a study on comparison of the effect environment on urban and rural students' performance in science in Nasarawa state. The population comprised of eleven thousand five hundred and thirty one SSS III students out of which two hundred and forty were sampled for the study. The research questions and one hypothesis were formulated to guide the study. Using the expo-facto design,

the West African Senior School Certificate Examination (WASSCE) results for five years from five urban and five rural schools in Nasarawa state were used for the study. The instrument for data collection was an inventory on school environment and available facilities. Simple percentages were used to answer the research questions while chi-square statistics was used to test the hypothesis. Findings showed a significant difference in the academic performance of students in WASSCE results in urban and rural schools. The urban schools performed better than rural schools. The present research work differ from that of Anyebe (2009) considering that Anyebe (2009) focused only on location of schools. However, the present study considers classroom size, library facilities and the extent to which availability of power supply in the school influences the academic performance of students.

Adeoye (2011) investigated the school learning environment and its impact on the performance of students in Ibadan. Focusing on both physical and social environment of the school, the population comprised of twenty three thousand, one hundred and thirty two and one hundred and fifteen teachers. Twenty five teachers and seventy two students in five schools were sampled for the study. The design was a survey. Four research questions and four hypotheses guided the study. The survey research adopted a structured questionnaire for data collection. Simple percentages and chi square were used for data analysis. The result showed that, the presence of physical facilities in the school influence academic performance, teacher student relationship influence academic performance, teachers experience and qualification influence academic performance of students. The researcher investigated the effect of environment on the academic performance of students, focusing on both physical and social environment of the school but did not take note of important environmental variables like classroom size, electric power supply and inappropriate location of schools.

Makamura (2014) conducted a study on the impact of school environment in the learning of mathematics in secondary schools. The population comprised of six thousand, three hundred and six students and two hundred and three teachers. The design was causal-comparative. The sample for the study was made up of five schools from which seventy students and thirty teachers were selected. Two research questions guided the study and two research hypotheses were formulated and tested at 0.05 level of significance. Data collected were analysed using simple percentages and Pearson product moment correlation. The study revealed that the state of the learning environment affects the academic performance of students in secondary schools. The difference between the present research work and that of Makamura (2014) focused only on the impact of general school environment in the learning of mathematics. However, the current study considers school environment in terms of classroom size, inappropriate location and electric power supply.

The study by Adesina (2012) examined the effect of learning environment on students mathematics achievement and interest in a constructivist teaching in Nsukka. The design was a survey. The population comprised of eight thousand three hundred and seventeen students. A sample of four hundred mathematics students was selected. The instrument for data collection was a structured questionnaire. Data analysis was achieved using simple percentages and standard deviation. The results revealed that school learning environments such as library facilities, adequate classroom and health facilities enhances students' achievement. The gap which exists between the findings of Adesina (2012) and the current research is in the area of classroom size as well as adequate power supply in the school learning environment.

Salau (2011) investigated the significance home and school environmental factors associated with students' high achievement in mathematics in Ogun State using an expo-factor design, two questionnaires designed for the teacher and students were used in the study. The population comprised of six thousand, three hundred and four students and eighty four teachers. A Mathematics Achievement Test (MAT) and a questionnaire consisting of items on teacher factor, students' perception of mathematics, home environment and school were administered to a sample of 300 junior secondary students from ten randomly selected secondary schools in Ogun state. This sample consisted of one hundred and eighty boys and one hundred and twenty girls from five urban and five rural schools. Three research questions and three hypotheses guided the study. The teachers' questionnaire sought information such as qualification, experience, workload and attitudes to mathematics teaching. Results revealed that teachers attitude to mathematics teaching, education of father, regular homework, extra coaching lesson at home, occupation of father, teacher's qualification and adequacy of instructional materials when taken together could effectively predict mathematics achievement of students. Teachers experience, education and occupation of mother did not have any significant home and school environmental factors associated with students' high achievement in mathematics. The difference between the present research work and that of Salau (2011), is that, the current study focuses more on school environment, standard classroom size, library facilities, the location of the school as well as power supply in the school environment.

Ayodele (2012) studied sex and environment as likely factors in mathematics achievement, in Oyo state. The study was quasi experimental research design. A sample of three hundred mathematics SS II students was drawn from a population of seven thousand six hundred and twelve students. The instrument of the data collection was a mathematics achievement. Two research questions and two hypothesis were formulated and tested. Data was analysed using mean and standard deviation to answer research questions while analysis of covariance (ANCOVA) used to test the hypothesis at 0.05 level of significance. The findings revealed that male students achieved more than their female counterparts. Also, it

was revealed that environmental factors impact on students achievement in mathematics. The difference between this current research work and that of Ayodele (2012) is that Ayodele left out classroom size as well as location and electricity power supply. This makes the current research work valid for further investigation.

#### IV. RESEARCH QUESTIONS

The following research questions are raised to guide the study:

- i. To what extent does nearness of school to noisy facilities influence students' performance in mathematics in Junior Secondary School in Gwer-East Local Government Area of Benue State, Nigeria?
- ii. To what extent does classroom size influence students' performance in mathematics in Junior Secondary School in Gwer-East Local Government Area of Benue State, Nigeria?
- iii. To what extent do library facilities influence the performance of students in Junior Secondary School in Gwer-East Local Government Area of Benue State, Nigeria?
- iv. To what extent does power supply influence the performance of students in Junior Secondary School in Gwer-East Local Government Area of Benue State, Nigeria?

#### V. METHODOLOGY

This study adopted a simple survey design. This type of research design, according to Ali (2006) is chiefly concerned with finding, describing and interpreting data and information. Emaikwu (2014) pointed out that the design is useful for investigating a variety of educational problems. The justification for the use of this design emanates from the fact that only a representative, sample of the entire population would be studied and finding generalized to the entire population.

The study was carried out in Gwer-East local Government Area of Benue State, Nigeria. The choice of this area is based on the fact that less research work has been conducted in this area. The population for the study consists of 3482 Junior Secondary School two (JSS2) Mathematics students in all the 29 secondary schools located in Gwer-East local government area of Benue State, Nigeria.

The sample consisted of 120 JSS 2 mathematics students. The Sampling technique used is simple random sampling. Firstly, 10 schools were randomly selected from Gwer-East Local Government Area. Secondly, within each selected school, 12 JSS 2 students were randomly selected to answer the instrument.

The instrument for data collection is the Influence of Environmental Variables on Students Performance Questionnaire (IEVSPQ). IEVSPQ was developed by the

researcher. It consists of two sections. Section A demands demographic information about the respondents. Section B demands the view of students on influence of some environmental variables on students' performance in Mathematics. IEVSPQ consists of twenty items. They were answered using 4 point Likert – type scale of Very High (VH), High (H), Low (L), and Very Low (VL). The IEVSPQ is graded as VH=4, H=3, L= 2, VL=1.

To ensure content validity, the draft copy of the instrument was given to a specialist in measurement and evaluation. One specialist in Science Education and another in Mathematics Education also validated IEVSPQ. The specialists were expected to scrutinize and eliminate items that are not relevant, check the correctness appropriateness and clarity of language, and ensure that the items are relevant to answer the research questions. This procedure ensures that the instrument met the criteria for face and content validity.

The researcher travelled to each of the sampled schools and administered the instrument to the respondents by hand to ensure a high rate of return of instrument. The approach was that, permission will be sought from principals of the schools sampled for the study. The instrument was administered in the schools by the researcher.

Data collected through the instrument from the respondents were analysed using descriptive statistics. The research questions were analysed using of mean and standard deviation. Based on the IEVSPQ, the decision criteria is a benchmark mean of 2.50. This implies that a mean below 2.50 indicate low extent of influence while a mean of 2.50 and above indicates high extent of influence.

## VI. RESULTS AND DISCUSSION

The results for this study are presented according to the research questions.

### *Research Question One*

To what extent does nearness of school to noisy facilities influence students' performance in mathematics in Junior Secondary School in Gwer-East Local Government Area of Benue State, Nigeria?

Table 1: Mean and standard deviation rating on the extent to which nearness of school to noisy facilities influence students' performance

S/No	Item Description	Mean	SD	Remark
1	Nearness of school to noisy market places makes learning difficult	2.51	1.08	High extent
2	Nearness of school to noisy machines/factories/industries makes learning difficult	3.31	0.93	High extent
3	Nearness of school to noisy high way makes learning difficult	3.00	0.91	High extent
4	Nearness of school to noisy motor park makes learning difficult	3.15	0.93	High extent

5	Noise around the school can make me lose concentration/focus in learning mathematics	2.70	0.93	High extent
<b>Cluster mean</b>		<b>2.95</b>		<b>High extent</b>

The results obtained as shown in Table 1 revealed that nearness of school to noisy facilities has a negative influence on the performance of mathematics students in junior secondary school since all the mean score is above 2.50 which is an indication of the high extent level. The cluster mean is 2.95 which agrees that inappropriate location of the school influences the performance of students.

### *Research Question Two*

To what extent does classroom size influence students' performance in mathematics in Junior Secondary School in Gwer-East Local Government Area of Benue State, Nigeria?

Table 2: Mean and Standard Deviation rating on the extent to which classroom size influence students' performance in mathematics

S/No	Item Description	Mean	SD	Remark
1	When the classis over crowded, learning of mathematics becomes difficult	3.22	0.91	High extent
2	Heat generated in overpopulated class (more than 40 students) affect my learning of mathematics negatively	3.12	0.82	High extent
3	Generally, an overcrowded classroom is not comfortable for learning mathematics	3.26	0.95	High extent
4	Large number of students distract other students from learning mathematics	2.35	1.1	Low extent
5	Sometimes it is difficult to hear the mathematics teacher when the class is too large	2.78	0.94	High extent
<b>Cluster mean</b>		<b>2.95</b>		<b>High extent</b>

The result obtained as shown in Table 2 revealed that classroom size influences students' performance in junior secondary school mathematics since most of the score is above 2.50. The cluster mean is 2.95 which indicate that classroom size influences students' performance to a high extent.

### *Research Question Three*

To what extent do library facilities influence the performance of students in Junior Secondary School in Gwer-East Local Government Area of Benue State, Nigeria?

Table 3: Mean and standard deviation scores on the extent to which library facilities influence students' performance in mathematics

S/No	Item Description	Mean	SD	Remark
1	Library without mathematics tools discourage my learning of mathematics	2.86	1.02	High extent
2	Absence of desks, chairs and tables in our library affects my study of mathematics negatively	3.29	1.01	High extent
3	It is difficult to study mathematics in library that is not well ventilated	3.03	1.04	High extent
4	Schools that do not have libraries makes studying of mathematics difficult	1.76	0.78	Low extent
5	It is difficult to study mathematics in library that has no light	2.4	1.25	High extent
	<b>Cluster mean</b>	<b>2.79</b>		High extent

Table 3 shows that most of the means score is above 2.50. The cluster mean is 2.79, hence the respondents agree that library facilities influences mathematics students' performance to a high extent.

#### Research Question Four

To what extent does power supply influence the performance of students in Junior Secondary School in Gwer-East Local Government Area of Benue State, Nigeria?

Table 4: Mean and standard deviation scores on the extent to which power supply influences students' performance in mathematics

S/No	Item Description	Mean	SD	Remark
1	Without power supply the classroom is sometimes too dark for learning mathematics	2.35	1.06	High extent
2	Without power supply the classroom is sometimes too hot for learning mathematics	3.15	0.84	High extent
3	When the school do not have power supply, studying mathematics becomes difficult	2.12	1.1	Low extent
4	Absence of light at night discourage me from learning mathematics	2.73	0.96	High extent
5	Without power supply, computers cannot be used in learning mathematics	3.32	0.83	High extent
	<b>Cluster mean</b>	<b>2.73</b>		High extent

Table 4 show that power supply influences the performance of students in junior secondary school mathematics since most of the mean score is above 2.50. The cluster mean score is 2.73. Hence the respondents agree that inadequate power supply in the school influence the students' performance to a high extent.

The results revealed that nearness of school facilities to noisy environment negatively influences the performance of mathematics students in junior secondary school. This finding agrees with that of Ayolele (2012) who found that environmental variables influence students' performance in mathematics. The finding of this study could be attributed to the fact that noisy environments can cause a lot of distraction to effective learning of mathematics. It could also be attributed to the fact that noisy environment such as motor parks, factories, nearness to markets could hamper students effective learning of mathematics.

The second finding of the study revealed that classroom size influences students' performance in junior secondary school mathematics. This finding concurs with that of Adesina (2012) who maintained that standard classroom size enhances students' performance. The result cannot be far from the fact that a large classroom would be difficult to supervise effectively by a teacher. A large number of students in the classroom post an obstacle to effective learning of mathematics in the school.

The third finding of the study revealed that library facilities influence the performance of students in junior secondary school mathematics. This finding is in conformity with that of Makamura (2014) who said that library facilities are an essential part of any school organization. The researcher stressed that any school without adequate library facilities will certainly produce students who under perform. A standard library facility is one that should have adequate number of chairs, tables, shelves, books and other relevant mathematics equipment and library facilities.

Finally, the study revealed that power supply influences students' performance in junior secondary school mathematics. This finding is in agreement with that of Babajide, Egenti and Momolafe (2016) who also found that inadequate power supply and power irregularities hampers students' performance and general academic activities. A school environment where there is inadequate power supply, the students are bound to underperform. The incessant power supply and power fluctuation cannot guarantee adequate use of computers and other equipment and facilities that require adequate supply of electricity.

## VII. CONCLUSION

It is evident from the finding of the study that school environmental variables such as nearness to noisy environment, classroom size, library facilities and power supply influences students' performance in Junior Secondary School Mathematics to a high extent. This is because one cannot look at the child at school in isolation of the environmental variables. The school environmental variables bear in the child and this propels the child towards performing according to the desired goals in education.



## VIII. RECOMMENDATIONS

Based on the findings and the conclusion earlier reported, the following recommendations were made

- i. Stakeholders, including the Benue State Government, organized private sector, NGOs and parents should take into consideration, the appropriate location of the school. This is because inappropriate location such as nearness to market, motor parks, and other noisy environment hampers students performance in mathematics. The stakeholders should enforce the citing of schools away from noisy environments to enhance students performance
- ii. School environments should be made conducive for learning by maintaining standard classroom size. Large class sizes could provide a challenging environment for students learning.
- iii. The government, private individuals, stakeholders of ministry of education (both state and federal) should move closer with school principals in providing library facilities in schools. This is to have first hand information on the problems of teaching and learning of mathematics so as to provide necessary assistance.
- iv. The government and private proprietors should make provision for adequate power supply in schools. This is because modern and standard facilities like computers, projectors and laboratories cannot be operated without power supply.

## REFERENCES

- [1]. Ademola, I.M. (2004). The effect of school facilities on the achievement and attitude of students in Mathematics. *Journal of the World Council for Curriculum and Instruction*, 8(2), 147-154.
- [2]. Adeoye, O.K. (2011). The School Learning Environment and the Impact of the Performance of Students in Ibadan. *African Journal of Studies in Education*, 7(3) 13-22.
- [3]. Adesina, S. (2012). *The effect of learning environment on students mathematics achievement and interest in a constructivist teaching*. Unpublished M.Ed Thesis, University of Nigeria, Nsukka.
- [4]. Ado, S. & Kehinde, O. (2008). The impact of school environment on learning of sciences. Unpublished M.Ed. Thesis, University of Ibadan.
- [5]. Akinsola, O. Tella, S.O., & Tella, S.O. (2007). The effects of school size on students achievement and the interaction of small classes on school size on students achievement. *Educational Administration*, 3(2) 71-83.
- [6]. Akubue, A.U. (2012). Effect of school location on students achievement. *Journal of Educational Research*, 2 (1), 109-114.
- [7]. Altinok, E. Kingdon, L. (2012). Comparison of the effect of environment on urban and rural students achievement and interests in mathematics. *Ghana Journal of Scientific Literacy*, 3(1), 99-108.
- [8]. Amandi, H.N. (2015). Impact of power outages on developing countries: Evidence for rural households in Niger Delta, Nigeria. *Journal of Energy Technoloies and Policy*, 5(3), 17-23.
- [9]. Anyebe, I. (2009). Comparison of the Effect of Environment on Urban and Rural Students Performance in Science in Nasarawa State.
- [10]. Ayodele, A. (2012). Sex and environment as likely factors in mathematics achievement. *International Journal of Education Research* 5 (3), 27-35.
- [11]. Babajide, V. Egenti, M.N., & Komolafe, A.T. (2016). The Influence of Power Irregularities on Academic Activities in Nigeria Universities. *The Pre-Science Teacher Opinion. Education and Science Journal of Policy Review and Curriculum Development*, 6(1), 1-10.
- [12]. Cerny, M. (2013). *Economic and Social Costs of Power Outages: The Case of Pakistan*. Chalse University in Prague.
- [13]. Cerny, M. (2013). Economic and social costs of power outages: The case of Pakistan. Pakistan: Charles University Press.
- [14]. Danielson, K. (2010). Impact of School Learning Facilities on Students' Performance in Schools. *American Journal of Education* 3(2), 103-114.
- [15]. Denga, D.I. (2002). *Educational and Social Psychology for Schools and Other Social Organizations*. Calabar: CAPS Publishers.
- [16]. Durojaye, Y. (2011). *A Comparative Study of Library Facilities versus Students Performance in Rural and Urban Schools in Kaduna State*. Unpublished PGDE Thesis, Ahmadu Bello University, Zaria.
- [17]. Federal Republic of Nigeria, FRN (2014). *National Policy on Education*. Revised 5<sup>th</sup> edition. Lagos: NERDC Press.
- [18]. Frenzel, Za, Pekrun, L. & Goetz, (2007). The impact of power and water supply on the performance of students in mathematics. *Journal of Youth and Adolescent* 9(1), 93-102.
- [19]. Gbamanja, S.P.T. (2000). *Essentials of Curriculum and Instruction: Theory and Practice*. Port Harcourt: Paragraphics.
- [20]. Gwer-East Local Government Education Authority (2018). *Information Handbook on Schools in Gwer-East Local Government Area of Benue State*. Illustrations Ltd.
- [21]. Hornby, A.S. (2007). *Oxford Advanced Learner's Dictionary of Current English, 7<sup>th</sup> Edition*. New York: Oxford University Press.
- [22]. Kolawole, I. (2013). *The Sorry State of the Environment and its Effect on Teaching and Learning in Secondary Schools in Nigeria*. Lead Paper Presented at the 7<sup>th</sup> National Conference School of Sciences. AnkaKogi State College of Education.
- [23]. Makamura, A. (2014). The impact of school environment in the learning of mathematics. *Journal of the National academy for the advancement of science* 3(3), 92-104.
- [24]. Mbalisi, O.F. & Offor, B.O. (2015). Energy Crisis and its Effect on National Development: The Need for Environmental Education in Nigeria. *British Journal of Education*, 3(1) 22-37.
- [25]. Mulema, J. (2002). The challenges of providing quality science in Africa. In M.A.G. Akale, (Ed.). *Science technology and mathematics education for sustainable development in Africa. Proceedings of the 43<sup>rd</sup> annual conference of the science Teachers Association of Nigeria*, 22-27.
- [26]. Murugan, B. & Rajoo, S. (2003). The role of the physical environment in the health and performance of students. *Education Today*, 7(2), 18-24.
- [27]. Olugundudu, M.M. (2014). The Epileptic Nature of Electricity Supply and the Consequences of Industrial and Economic Performance in Nigeria. *Global Journal of Researches in Engineering*, 14(4) 79-86.
- [28]. Omoleke, I. (2011). Management of Electricity Generation and Supply in Africa: The Nigeria Experience. *Journal of Publish Administration and Policy Research*, 3(10), 266-277.
- [29]. Pavlov, I.P. (1927). *Conditioned Reflexes*. London: Oxford University Press.
- [30]. Salau, M.O. (2011). Significant Home and School Environmental Factors Associated with Students' High Achievement in Mathematics. *Journal of Science Teachers' Association of Nigeria* 36(1&2), 37-42.
- [31]. Shamaki, S.K. (2015). The impact and role of the physical environment of the school in teaching and learning mathematics. *American School Board Journals* 157,(3), 179-187.
- [32]. Skinner, B.F. (1953). *Verbal Behaviour*. New York: Appleton Century Crafts.
- [33]. Tella, S.O. (2008). Perspectives on Mathematics Teaching and Learning. *Journal of Education* 7 (e), 41-52.
- [34]. Tosin, O.L. (2010). *Comparative Impact of Small Schools and Large Schools, Class Size Influence on Mathematics Achievement in Secondary Schools in Ekiti State*. Unpublished undergraduate project, Ekiti State University.

- [35]. Ubi, A. and Effiong, O. (2013). The Dynamic Analysis of Electricity Supply and Economic Development: Lessons from Nigeria. *Journal of Sustainable Society*, 2(1), 1-11.
- [36]. Ugwuoke, O.A. (2009). *Factors that Affect Students Academic Performance in Secondary School Mathematics*. Unpublished M.Ed. Thesis University of Nigeria, Nsukka.
- [37]. Uharian, L. (2016). School environmental variables affecting achievement in mathematics. *West African Journal of Education* 2(2), 79-87.
- [38]. West African Examination Council (WAEC). *Chief examiners reports (2013, 2014, 2015 & 2016)*. Lagos: WAEC