

## INFLUENCE OF SCHOOL LOCATION ON STUDENTS ATTITUDE TOWARDS MATHEMATICS AND BASIC SCIENCE

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**ABSTRACT:** *The study investigated “influence of school location on student’s attitude towards mathematics and basic science”. It adopted survey design. One research question and one hypothesis was formulated and tested at 0.05 level of significance. One hundred and sixty six (166) students formed the sample of this study, two (2) validated and reliable instruments namely Mathematics and Basic Science Achievement Test (MBSAT) and Students Location Test (SLT) were used to collect data for this study. Analysis of the data results showed that; there was no significant difference in the mean performance scores between urban and rural school students with positive attitude towards mathematics and basic science using the independent t-test analysis. Based on these findings, some suggestions and recommendations were made on the need for students to develop positive attitude towards the study of mathematics and basic science despites a student location. This is because attitude is a good predictor of academic performance particularly in mathematics and basic science.*

**KEYWORDS:** School Location, Students, Attitude, Mathematics, Basic Science, MBSAT

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### INTRODUCTION

#### Background of the study

The national policy on education (Federal Republic of Nigeria, 2004) recognized mathematics and basic science as a core subject in the school system. This is in appreciation of its significant role in national development. This implies that mathematics and basic science as a subject occupies a significant position in the science curriculum. It serves as a pre-requisite for the study of Engineering, Computer Engineering, Geology, Electrical Electronics, among others.

A close look at the mathematics and basic science syllabus at all levels of the senior secondary school reveals the overall importance of the subjects to both the individual as a person and the society (Ukpong, 1999). The competence gain in the study of Mathematics and basic science are widely used in all spheres of human life. Mathematics and basic science plays a key role in shaping how individuals deal with the various spheres of private, social, and civil life (Mohd, 2011). This justifies the compulsion of the study of the subject by all students who go through basic and secondary education in most countries; mathematics and basic science are therefore a core subject at these levels of education in Nigeria. It is regrettable, therefore, that in the contemporary times many students struggle with Mathematics and basic science and perform abysmally low in their final examinations. In Nigeria, students’ performance in Mathematics at the West African Senior Secondary School Certificate Examination (WASSCE) has not been encouraging of late (Chief Examiner’s Report). However, the indispensable role of location and attitude in the learning of Mathematics and basic science has attracted the attention of basic science researchers and Mathematics educators for a very long time now due to the failure rate in the subject. Attitudes formed by students when learning mathematics and basic science tend

to remain for a long time and these attitudes may help him/her to learn mathematics and basic science better (Umoren 1999). This is so if the attitudes were favourable. But this may not always be the case. Students also form unfavourable attitudes as they learn mathematics and basic science in secondary schools. Findings of Abiam (2004) indicate that pupils in primary schools who have very positive attitudes towards learning mathematics and basic science have interest to do more mathematics and basic science later. Most students join basic secondary with positive attitudes, only to change their attitudes towards learning mathematics later in secondary school. WAEC Chief Examiner Report (2007) indicated that the most glaring weakness in students' mathematics attainment in WAEC is the students "lack of knowledge of elementary techniques and their ignorance of simple concepts and processes". This could have resulted from students' failure to learn these techniques, concepts and processes while being taught in class. The Ministry of Education, in collaboration with WAEC and NECO has initiated in-service training courses for mathematics and basic science teachers in secondary schools. This was in an effort to improve teacher's teaching techniques. Despite these efforts, students still did not learn mathematics and basic science adequately to enable them perform better in WAEC and NECO mathematics and basic science examinations. Failure to learn is an indication that there could be other factors such as student's attitudes and school location which may hinder them to adequately learn mathematics and basic science.

### **Concept of School Location and Students' Academic Performance**

School location refers to the particular place, in relation to other areas in the physical environment (rural or urban), where the school is sited. In Nigeria, rural life is uniform, homogenous and less complex than that of urban centers, with cultural diversity, which often is suspected to affect students' academic achievement. This is because urban centers are better favored with respect to distribution of social amenities such as pipe borne water, electricity, healthcare facilities while the rural areas are less favored. This is also true in the distribution of educational facilities and teachers. These prevailing conditions imply that learning opportunities in Nigerian schools differ from school to school. It would appear therefore that students in Nigerian urban schools have more educational opportunities than their counterparts in rural schools have. While some studies have shown positive influence, others have shown negative influence of school location on the students' learning outcome or achievement. Nwogu (2010) found that location was significant in learning aspects of mathematics and basic science that involve angles, with rural students exhibiting more learning difficulties than their urban counterparts do. Ahiaba and Igweonu (2003) investigated the influence of school location on the performance of mathematics and basic science students in rural and urban schools at the SSC examination and found that mathematics and basic science students in urban schools performed better with superior grades, than their rural counterparts while failure rate was higher in the rural schools. Some studies (Bosede, 2010; Ezeh, 1998) showed no difference in academic achievement of students because of location. Others showed that rural students performed better on practical skills in mathematics and basic science than their urban counterparts did. Bosede (2010) showed that there is no difference in performance of students because of location. Location here is in terms of whether the place of study or school is sited in rural or urban community.

Obe (2004) observed a significant difference in urban-rural performance of 480 primary six school finalist on the aptitude sub-tests of the (Nigeria) National Common Entrance Examination (NCEE) into secondary schools. In his study tagged scholastic aptitude test, he concluded that children from urban schools were superior to their rural counterparts. Also

others observed a significant positive relationship between size and location of school and performances in examination in Oyo State. They concluded that large schools in urban areas tend to perform better in mathematics and basic science examinations than small schools in rural areas. In their findings, however, Axtel and Bowers (2002) found that students from the rural areas perform significantly better than their urban counterpart in verbal aptitude, English Language and total score using the National Common Entrance as a base. In another development, a research team at University of Aston recorded that it had received several well-founded reports that secondary schools have found (pupils from small rural schools) not only as well prepared academically as pupils from other schools, but they generally had a better attitude to work. Having been accustomed to working most of the time on their own, they could be given more responsibility for the organization of their work. Size could not exert significant direct effect on pupils' attitude towards mathematics. Similar view was expressed by Gana (2007) when in his study on the effect of using designed visual teaching models on the learning of Mathematics and basic science at Junior Secondary level of Niger State, found that there was no significant difference in Mathematics and basic science achievement scores of students in urban and rural locations. From the various review of literature on locational influence on academic are not the same. While some maintain that urban students perform better in examinations than their rural counterparts, other has found that rural students (in spite of all odds) perform better. Some have submitted in their findings and concluded that no particular set up (urban or rural) can claim superiority over the other because their performances are the same.

### **Attitude and the Learning of Mathematics**

Attitude here is a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor (Fisher & Rickard, 1998). It is a predisposition or a tendency to respond positively or negatively towards a certain idea, object, person, or situation. Attitude simply means influence of an individual's choice of action, and responses to challenges, incentives, and rewards. Sampson (2000) postulates that attitudes are generally positive or negative views about a person, place, thing or event which are often referred to as the attitude object. He further quoted Allport's definition of attitude as "a mental and neural state of readiness organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related".(p.17) Implicit in the various definitions is that attitude is a psychological orientation developed as a result of one's experiences, which influences how a person views situations, objects or people, and how he or she appropriately responds to them. The response may be positive or negative; favorable or unfavorable; neutral or ambivalent According to Wiener (2006), attitudes express our evaluation of something or someone. They are based on our knowledge, feelings and behavior and they may influence future behavior. A target is essential for attitude. Our attitude is always directed towards something or someone. Attitudes are highly composite and they can affect learning comprehensively. Attitude will affect behavior, influencing what the learner selects from the environment, how he will react towards teachers, towards the material being used and towards the other students. Ibitoye (2003) identified four broad areas where we might wish to explore attitudes in relation to students;

- Attitudes toward subjects being studied
- Attitudes towards study itself
- Attitudes towards the implications arising from topics being studied

In general, attitude in life allows us to:

- a) Make sense of ourselves
- b) Make sense of the world around us
- c) Make sense of relationships in different dimensions.

Ekweme (2013), reported that students' attitude towards studies fall under the following four sub-headings:

- a) Student's perceptions about the nature of knowledge;
- b) Student's perceptions about the role of the teachers in their learning;
- c) Student's perceptions about their own role in learning;
- d) Student's perceptions about the nature and role of assessment.

However, some authorities regard attitude towards Mathematics as just a like or dislike for Mathematics and basic science, while others extend the meaning to embrace beliefs, ability, and usefulness of Mathematics and basic science. For Zan and Martino (2007), attitude towards Mathematics and basic science is just a positive or negative emotional disposition towards Mathematics and basic science. Neale (1999:632), however, defines attitude towards Mathematics and basic science as an aggregated measure of "a liking or disliking of Mathematics and basic science, a tendency to engage in or avoid Mathematical and basic science activities, a belief that one is good or bad at Mathematics and basic science, and a belief that Mathematics and basic science is useful or useless" Similarly, Hart (2009) considers attitude towards Mathematics and basic science from multidimensional perspectives and defined an individual's attitude towards Mathematics and basic science as a more complex phenomenon characterized by the emotions that he associates with Mathematics and basic science, his beliefs about Mathematics and basic science and how he behaves towards Mathematics. Attitude towards Mathematics and basic science includes the tendency to be fearful of and anxious about Mathematics and basic science. Attitude towards Mathematics and basic science has cognitive, affective and behavioral components; and like any other kind of attitude, it can be formed through any of the three processes described earlier. A student can develop positive attitude towards Mathematics and basic science because he or she learns to associate positive experiences or events with it. Also, positive reinforcement creates room for the formation of positive attitude towards Mathematics and basic science.

The conceptions, attitudes, and expectations of students regarding Mathematics and basic science and Mathematics teaching have been considered to be very significant factors underlying their school experience and their performance. In general, the concepts students hold about Mathematics and basic science determine how they approach the subject. In many cases, students have been found to approach Mathematics and basic science as procedural and rule oriented. This prevents them from experiencing the richness of Mathematics and basic science and the many approaches that could be used to develop competence in the subject.

### **Purpose of the study**

Specifically, the study is aimed at determining;

- Whether school location affect the performance of students with positive attitude towards the study of mathematics and basic science.

### **Research hypothesis**

The following null hypothesis were formulated to test the above stated students research questions.

- There is no significant difference in the mean performance scores between urban and rural school students with positive attitude towards the study of mathematics and basic science.

### **Assumptions**

The following assumptions are made to guide the understanding of this study;

1. It is assumed that the sample is a true representation of the population of these studies.
2. It is assumed that the research instruments used for these studies are valid and reliable.
3. It is assumed that the responses obtained from the sample are a true expression of their opinions.

### **Significance of the study**

The significance of the research work is to contribute to the benefit of the students, by way of proving that attitude towards studies could enhance their academic performance in mathematics and basic science.

It will benefit the teachers, by way of putting up a new attitude to the teaching of mathematics and basic science to enhance the performance of students in mathematics and basic science.

It will enable educational planners and policy makers in policies relating to teaching methodology that enhances performance of students in secondary schools.

It will also add to the already existing pool of knowledge and serve as a guide for future researchers and the general public to draw there from.

## **METHODOLOGY**

### **Research design**

This work on the influence of school location on students attitude towards mathematics and basic science adopted the ex-post facto design. This was because the study is aimed at investigating the possible cause and effect relationship between a student attitude and academic performance in mathematics and basic science. However, the research questionnaire was constructed to elicit response of the students' attitude towards mathematics and basic science.

### **Population of the study**

The population of this study comprises all senior secondary school 2 students in Akamkpa LGA. The information on enrollment figure of the ss2 students is 6,850, comprising of 3950

females and 2900 males from State Secondary Education Board (PPSMB) calabar, which form the population of the study.

### Sample and sampling technique

The sample for the study consist of one hundred and sixty-six (166) ss2 students drawn from both private and public co-educational secondary schools in Akamkpa LGA.

The purposive sampling technique was used to select six (6) secondary schools based on the following;

- Schools that are co-educational
- Schools with at least one university graduate mathematics teacher with a minimum of three years teaching experience.

Six (6) secondary schools met the criteria. A simple random sampling technique was used to select one hundred and sixty six (166) students that formed the sample used in this research. 14% ratio of the population of each schools using hat and draw method was adopted across board to draw samples from each school as shown in the table below.

**Table 1**

| S/N | Schools     | Number of students | Percentage Ratio for selection | Sample Selected |
|-----|-------------|--------------------|--------------------------------|-----------------|
| 1   | A (urban)   | 120                | 14%                            | 17              |
| 2   | B (urban)   | 110                | 14%                            | 15              |
| 3   | C (urban)   | 115                | 14%                            | 16              |
| 4   | D (rural)   | 255                | 14%                            | 36              |
| 5   | E (rural)   | 250                | 14%                            | 35              |
| 6   | F (rural)   | 335                | 14%                            | 47              |
|     | Grand Total | 1185               |                                | 166             |

### Research instrument

The main instruments used in collecting the needed data for this study are Mathematics and Basic Science Achievement Test (MBSAT) and Students Location Test (SLT) . SLT consist of two sections (1) is concern with the demographic data of students. Section (2) is a four point Likert scale type questionnaire design to measure students' location.

The four point Likert-type questionnaire response range from strongly agree (SA) agree (A) disagree (D) strongly disagree (SD). Respondents were to place a tick (✓) against any column as the items appeal to them. They are altogether twenty-five (25) items on the Students mathematics and Basic Science Achievement test (MBSAT), with four options (A,B,C,D) respondents were required to tick(✓) in each case the option they feel satisfied.

### Method for data analysis

After the data were collected, the responses to the question were score. The scoring of the questionnaire was done as follows:

|                        |          |
|------------------------|----------|
| Strongly agree (SA)    | 4 points |
| Agree (A)              | 3 points |
| Disagree (D)           | 2 points |
| Strongly disagree (SD) | 1 point  |

From the Mathematics and Basic Science Achievement Test (MBSAT), 4% was awarded for each correct answer and 0% for wrong answer. Each hypothesis of the study was re-stated and the variables in it identified and also appropriate statistical tool for it is given.

There is no significant difference in the mean performance scores between urban and rural school students with positive attitude towards mathematics and Basic Science .

Independent variable                      Location (urban and rural)

Dependent variable                      Academic performance

Statistical analysis                      Independent t-test

## RESULTS

**Table 4.2 t-test analysis of the mean performance scores between urban and rural school students with positive attitude towards mathematics**

| Variable | N   | Mean | SD   | DF  | Standard Error | t-cal | t-critical | P-value |
|----------|-----|------|------|-----|----------------|-------|------------|---------|
| Rural    | 118 | 2.83 | 0.68 |     |                |       |            |         |
|          |     |      |      | 164 | 0.12           | 0.35  | 1.98       | 0.73    |
|          |     |      |      |     |                |       |            |         |
| Urban    | 48  | 2.79 | 0.67 |     |                |       |            |         |

The results of the above analysis showed that the calculated t-value of 0.63 was less than the critical t-value of 1.98 when tested at 0.05 level of significance and 164 degrees of freedom. We have enough evidence to retain the null hypothesis. It implies that there is no significant difference in the mean performance scores between urban and rural school students with positive attitude towards mathematics and basic science . It also implies that urban and rural school students have the same positive attitude towards mathematics and basic science .

### Summary of findings

The major findings in this study can be summarized as follows

There is no significant difference in the mean performance scores between urban and rural school students with positive attitude towards mathematics and basic science . It also implies

that urban and rural school students who have the same positive attitude towards mathematics and basic science will performance academically the same in mathematics and basic science .

### **Discussion of findings**

There is no significant difference in the mean performance scores between urban and rural school students with positive attitude towards mathematics and basic science .

The analysis of the third hypothesis showed that there is no significant difference in the performance between urban and rural students with positive attitude towards mathematics and basic science. This implies that geographical location of a student does not affect his performance in mathematics and basic science provided students possess a positive attitude in mathematics they will perform academically very high, some of such positive attitude may include, studying mathematics and basic science more often than other science subjects, enjoying solving and finding solutions to any mathematical problem, having a personal interest in the subject etc. This agrees with the findings of Ibitoye E. (2003) who asserts that understanding and performance in mathematics and basic science is independent of location, cultural affiliation and family background. He further stated that anyone can understand mathematics and basic science when provided with the right opportunity in terms of quality of teachers, instructional materials and strategies. But this study contradicts Yara (2009) assertion that urban students do better in mathematics and other sciences than the rural students. From this research it has been proven that it does not matter the students location whether rural or urban performance in mathematics and basic science remains the same provided there is an inculcation of a positive attitude.

### **CONCLUSION**

On the basis of the findings in this study, a conclusion has been drawn.

It has been proven that there is no difference in mathematics and basic science performance of students with positive attitude in urban schools with those in rural schools.

### **RECOMMENDATIONS**

From the findings and conclusion drawn in this study, the following recommendations are hereby made:

- Since students' academic performance is closely linked with positive attitude, it demands that the government should provide an enabling environment that will create a positive attitude in the students. This can be achieved through the provision of required facilities such as library facilities, mathematics laboratory, qualified teachers and above all a manageable class size.
- Students should be encouraged to study mathematics and basic science irrespective of their location since ones location does not affect his performance when a positive attitude towards the subject is inculcated.



Other recommendations include that negative attitude should be curtailed professionally and early enough before students utterly give up in learning of mathematics and basic science which may in turn affect their performance. Also mathematics and basic science teachers should wisely utilize available learning resources to enhance positive attitude and discourage any negative attitude towards learning mathematics and basic science. Finally, efforts should be made to ensure gender does not hinder learning mathematics and basic science amongst students. Teachers, parents and siblings of the students should encourage both the female and male learners to equally embrace mathematics and basic science.

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