



## **Influence of Gender and Learning Environment on Students' Academic Achievement in Mathematics in Akwa Ibom State**

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### **ABSTRACT**

This study investigated the influence of gender and class learning environment on students' academic achievement in Mathematics in Akwa-Ibom State, Nigeria. The study adopted was a descriptive survey design. The population of the study comprised one thousand six hundred and twenty (1620) Senior Secondary two Students in eight randomly Sampled Urban and Rural schools in Abak and EtimEkpo Local Government Area of Akwa Ibom State. A proportionale Sample Technique was applied to sample 20% of the population to have a sample size of 324. The instrument for data collection was questionnaire constructed by the researcher and records of student's cumulative result from the teacher. The questionnaire was validated and a reliability coefficient of 0.81 was obtained. Two research questions and two research hypotheses were provided to guide the study. The research questions were analyzed using mean while the hypotheses were tested using t-test statistics. Results of the study indicated significant difference between gender and learning environment on students' academic achievement in senior secondary school mathematics. Based on the findings, it was recommended that school authorities should encourage both male and female students to take mathematics seriously. It was also suggested that the same study should be carried out to cover both junior and senior secondary schools in all the local government areas of Akwa- Ibom state.

**Keywords:** Mathematics, academic achievement, student, schools

### **INTRODUCTION**

The contributions of Mathematics to the development of nations of the world have long been recognized. It is said that Mathematics is the gate and key of all sciences. The study of Mathematics gratifies a wide range of interest and abilities, in making crucial contribution to our understanding and appreciation of the world we live in. Mathematics as a school subject is fashioned to provide mathematical knowledge, understanding and skills to diverse students irrespective of their background. The way people use the knowledge of Mathematics on daily basis reflects its importance (Sidhu,2008). The study of Mathematics is directly proportional to its cultural value unlike other subjects. The teaching of Mathematics as a school subject is not only useful, it is universal in nature. Academic achievement is the level of proficiency attained in some specific area concerning scholastic domain such as reading Mathematics, science and social studies and some other subjects (Ergene, 2011). To optimize academic achievement, parents, teachers and educational planners have a great role to play. Modern age is an age of science and technology, every student must need to outperform in science and Mathematics.

Gender is the range of physical, biological, mental and behavioural characteristics pertaining to and differentiating between masculinity and femininity (Flynn, 1998). The question of gender is a matter of grave concern especially among academics and policy formulators. The importance of examining achievement in relation to gender is based primarily on the socio-cultural differences between boys and girls. Traditionally, there are some works that are being reserve for boys and girls, as such, believe is still extended to the educational setting. There are vocations that are regarded as men's and women's. Intellectuals are worried about the role of male and female in the social, psychological, religious, technological, political and scientific development of nations.

Learning environment which include classroom spaces planning, administrative places planning, circulation spaces planning, spaces or convenience planning, general infrastructure planning, the teachers as well as the student themselves are essential in teaching-learning process. The extent to which students' learning could be enhanced depends on their location within the school compound, the structure of their classroom, availability of instructional facilities and accessories (Adeyemo, 2012). It is believed that a school with adequate learning environment contributes to stir up expected outcomes of learning that will facilitate good academic achievement by encouraging effective teaching and learning.

### **Statement of the Problem**

There are definite determinants that are really responsible for the constant failure or success of various schools. The alarming issue in Mathematics could be discussed from the social aspect and each individual point of view. The problem of students' under-achievement in secondary school has been a much discussed educational issue. These causes are looked into from different perspectives including gender and learning environment. Nigeria has been the site for numerous cities and consists of several tribes with different socio-cultural backgrounds and believes system, therefore gender equality and learning environment in different parts of the country varies from one place to another. It may be reasonable to expect a uniform achievement from all the students since they were taught using the same syllabus but in most cases some students outperform others in all ramifications. To this end, it has become necessary to investigate the general belief and pattern of our students and schools so as to evaluate the academic achievement in Mathematics with respect to the gender and learning environment.

### **Purpose of the Study**

The purpose of this study is to investigate the influence of gender and learning environment on students' academic achievement in senior secondary school Mathematics; the specific objectives of this study are to:

- (1) determine how gender influence students' academic achievement in senior secondary school Mathematics.
- (2) Determine how learning environment influence students' academic achievement in senior secondary school Mathematics.

### **Research Questions**

The study was guided by the following research questions:

- (1) How does gender influence students' academic achievement of senior secondary school Mathematics.
- (2) How does student taught in an urban area and student taught in a rural area of learning influence academic achievement of senior secondary school Mathematics.

### **Hypotheses**

The following null hypotheses were formulated in the study at 0.05 level of significance

**Ho<sub>1</sub>:** There is no significant mean difference between male and female students in academic achievement of Mathematics.

**Ho<sub>2</sub>:** There is no significant mean difference between in the academic achievement of students taught in urban schools and students taught in a rural schoolsin senior school mathematics.

### **Scope of the Study**

The study was designed to cover the following components of gender (male and female) and learning environment (urban and rural). Also the research was delimited only on SS2 students being selected from eight secondary schools in Abak and EtimEkpo local government areas of Akwa Ibom State. These schools are; ABAK (urban and rural schools) – Community Secondary School (CSS)- EdieneAbak,

Mcintre Secondary School (MCS)-Utu Abak, Christian Secondary School (CSS)- Ukpom, Community High School (CHS)-AfahaObong; ETIM EKPO (urban and rural schools)- Northern Annang Secondary Commercial School (NASCO), IkonoAnnang Comprehensive Secondary School (IACSS)-Nkwot, Community Secondary Commercial School (CSCS)-EkaObong, Community Secondary School (CSS)-Uruk Ata2.

## **METHODOLOGY**

### **Research Design**

This study adopted a descriptive survey design. The study investigated the influence of gender and learning environment on students' academic achievement in senior secondary schools Mathematics.

### **Sampling and sampling Techniques**

The sample and sampling technique used in the study was proportionate random sampling technique to select 20% of the total population which was 324 of the selected schools in the two local government areas of Akwa Ibom State. Also random sampling was used to select four schools each from two local government areas under study. The environmental factor was achieved by the classification of the schools into urban and rural areas.

### **Method of data Collection**

The instruments for data collection that guided the study were structured questionnaires and teacher records of students test. The questionnaire consisted of 22 items, sixteen for gender and six for learning environment under investigation. The likert scale Four (4) point scale was used; it contains lists of statements which students were asked to respond. The teacher made test is the scores from the students' cumulative records. This approach is consistent with the method used by some researchers (Panda & Panda, 1987) andUbulom (1993). These researchers used the students' final examination grade as a measure of students' academic achievement. Thus the data collected were subjected to descriptive statistical analysis by computing the mean (average) of each item. The decision rule was to reject an item whose mean falls below 2.50. To the hypotheses, the data were analyzed using inferential statistics of t-test.

**DATA ANALYSIS AND INTERPRETATION**

**Research Questions 1**

*How does gender influences students' academic achievement in Mathematics?*

**Table 1: Summary of mean series of respondents on students' gender**

S/N	Items	SA (4)	A (3)	D (2)	SD (1)	Total score	Mean - $\bar{X}$	Remarks
1.	Males are not naturally better than females in Mathematics	70 (280)	80 (240)	110 (220)	64 (64)	324 (804)	2.48	Rejected
2.	Women do not generally aspire to study courses that need higher mathematics	120 (480)	78 (234)	53 (106)	73 (23)	324 (893)	2.76	Accepted
3.	When a woman has to solve a Mathematics problem, she should ask a man for help.	58 (232)	35 (105)	107 (214)	124 (124)	324 (675)	2.08	Rejected
4.	I would have more faith in the answer for a Mathematics problem solve by a man than a woman	84 (336)	93 (279)	72 (216)	75 (26)	324 (520)	2.80	Accepted
5.	I would trust a female just as much as I would trust a male to solve important Mathematics problem	67 (268)	53 (159)	121 (242)	83 (83)	324 (518)	2.32	Rejected
6.	Studying mathematics is just as good for women as for men	133 (532)	94 (282)	50 (120)	47 (47)	324 (981)	3.03	Accepted
7.	Women do not generally aspire to study courses that need higher mathematics	84 (336)	93 (279)	72 (216)	75 (26)	324 (520)	2.80	Accepted
8.	Most women prefer to study Social Sciences and humanities which do not task them for mathematical ability.	84 (336)	93 (279)	72 (216)	75 (26)	324 (520)	2.80	Accepted
9.	Less number of women than men excel in mathematics.	120 (480)	110 (330)	40 (80)	54 (54)	324 (944)	2.91	Accepted
10.	Boys are better than women at mathematics test scores.	115 (460)	97 (291)	48 (96)	64 (64)	324 (911)	2.81	Accepted
11.	Women perform less at visual-spatial competitions than men.	84 (336)	93 (279)	72 (216)	75 (26)	324 (520)	2.80	Accepted
12.	Science, technology, engineering and mathematics are predominantly male disciplines.	84 (336)	93 (279)	72 (216)	75 (26)	324 (520)	2.80	Accepted
13.	Inborn differences in aptitudes affects women interest in mathematics.	84 (336)	93 (279)	72 (216)	75 (26)	324 (520)	2.80	Accepted
14.	Societal expectations for women present less challenge in mathematics task.	115 (460)	97 (291)	48 (96)	64 (64)	324 (911)	2.81	Accepted
15.	Girls show less interest in pursuing careers in science, technology and mathematics.	84 (336)	93 (279)	72 (216)	75 (26)	324 (520)	2.80	Accepted
16.	Less number of women than men teach maths, science and engineering in schools.	115 (460)	97 (291)	48 (96)	64 (64)	324 (911)	2.81	Accepted
	<b>Grand Mean</b>	94 (375)	87 (261)	70 (174)	73 (73)	324 (883)	2.73	Accepted

The table 1 above shows that the responses disbelieved that male are not naturally better than females in Mathematics with the mean score of (2.48); in effect, male are naturally better than female in Mathematics. The result also indicated that it is hard to believe a female could be a genius in Mathematics with a mean score of (2.76). This means the students doubt the possibility of women performing better in Mathematics. The result in item three (3) shows that when a woman has to solve a Mathematics problem, she would ask a man for help with a mean score of 2.08; In effect, they believe that woman can solve some Mathematical problem without consulting a man. The respondents also believed that they would have more faith in the answer for a Mathematical problem solved by a man than a woman with a mean score of 2.80. The results also indicated that they would not trust female just as much as they would trust a male to solve important mathematical problem with a mean score of 2.32. Other role disparities and expectation that influence women performance negatively in mathematics are: women do not generally aspire to study course that need high mathematics, most women prefer to study social sciences and humanities which do not task them for mathematical ability, inborn differences in aptitudes affects women interest in mathematics, societal expectation for women present less challenge in mathematic tasks, girls show less interest in pursuing careers in science, technology and mathematics and less number of women than men teach mathematics, science and engineering in schools. Finally, both sexes agreed that studying Mathematics is just as good for woman as for man with a mean score of 3.03. On the whole, the grand mean score is 2.73 which is greater than the cut-off mean score of 2.50. Therefore, based on the findings, gender has positive influence on students' academic achievement in Mathematics.

**Research Question 2**

*How does learning environment influences students' academic achievement in Mathematics?*

**Table 2: Summary of mean series of respondents on students' learning environment**

S/N	Item	SA (4)	A (3)	D (2)	SD (0)	Total score	Mean x	Remarks
17.	The classroom are bright enough for learning Mathematics	93 (372)	84 (252)	70 (140)	77 (77)	324 (771)	2.38	Rejected
18.	Adequate air ventilation during Mathematics lesson would improve my performance	120 (480)	110 (330)	40 (80)	54 (54)	324 (944)	2.91	Accepted
19.	The classroom has enough seats and desks for every student	83 (332)	64 (192)	90 (180)	87 (87)	324 (791)	2.44	Rejected
20.	The classroom has enough space for each and every student	79 (316)	60 (180)	98 (196)	87 (87)	324 (779)	2.40	Rejected
21.	I can clearly see all writing on the board from my seat	115 (460)	97 (291)	48 (96)	64 (64)	324 (911)	2.81	Accepted
22.	Your classroom is always noisy during Mathematics lesson	103 (412)	98 (294)	42 (84)	81 (81)	324 (871)	2.69	Accepted
	<b>Grand mean</b>	98 (395)	86 (257)	66 (122)	75 (75)	324 (849)	2.62	Accepted

From the table above, on the first item, the students' disbelief that classroom is bright enough for learning with mean score of 2.38; this means the classroom are not bright enough for teaching and learning. Item two (2) mean score is 2.91 which supports that adequate air ventilation during Mathematics lesson would help to improve students' performance. The result also indicated that the classroom do not have enough

seats and desks for every student with a mean score of 2.44. The respondents also affirm that the classroom do not have enough space for every student with a mean score of 2.40. On item five (5), the respondents can see clearly all writing on the board from their seat with a mean score of 2.81. The table also revealed that the classroom is always noisy because of bad sitting arrangement and lack of space. On the whole, the grand mean of 2.62 is greater than the cut-off mean score of 2.50. This implies that learning environment positively influences academic achievement of students in Mathematics.

Now in an attempt to ascertain the influence of gender on students' academic achievement in mathematics, it is thus required to test the hypothesis using t-test of the students, achievement score.

**Hypothesis 1**

There is no significant mean difference between male and female students in academic achievement of Mathematics.

**Table 3:T-test analysis of the respondent responses on the influence of gender on students' academic achievement in Mathematics**

Gender	N	Mean	STD	DF	T.Cal	T.Crit	Remarks
Male	162	2.86	0.64				
Female	162	2.29	0.93	322	5.77	1.96	Rejected

The t-test analysis finds out that there is no significant difference between the two variables under consideration. The calculated t-test value gives 5.77 while the critical t-value is 1.96 at 0.05level of significance. Since the calculated t-value is greater than the critical t-value, the decision is to reject the null hypothesis (Ho) and uphold the alternative hypotheses. There is no significant mean difference between student taught in an urban area and student taught in a rural area of learning in academic achievement of Mathematics.

**Hypothesis 2**

There is no significant mean difference between student taught in an urban schools and student taught in a rural schools of learning in academic achievement of Mathematics.

**Table 4: T-test analysis of the respondents' responses on theinfluence of learning environment on students' academic achievement in Mathematics**

Learning environment	N	Mean	STD	DF	T.Cal	T.Crit	Remarks
Urban	162	2.76	0.68				
Rural	162	2.40	0.84	322	3.70	1.96	Rejected

Data on table 4 shows that the mean ratings of students' responses for urban and rural areas are 2.76 and 2.40 respectively. The data was subjected to t-test analysis to find out whether there is no significant difference between the mean ratings of the two groups. The result of the analysis shows that the t-calculated value (3.70) is greater than the t-critical value of 1.96; the decision is to reject the null hypothesis (Ho) and uphold the alternative hypothesis. This implies that there is significant difference between the mean score of students taught in an urban area and students taught in a rural area of learning of senior secondary school Mathematics.

**DISCUSSION OF FINDINGS**

The findings of this study provided information on the influence of gender in students' academic achievement in senior secondary school Mathematics in Akwa Ibom State. This study has help to define

the achievement of male and female students in Mathematics. From the table, it therefore shows that males performed better than females in Mathematics. This finding agreed with the finding of Oleabhieli (2011) who held that male students perform better than female students in any classroom instructional activities that involve calculation. Ajaebu (1999) stressed that students perform better in languages and arts while male perform better in Mathematics and related subjects. Sweeny (2003) notes that female students are lower in Mathematics and spatial ability, as males were superior to females on problem solving tasks and on specific abilities related to problem solving. This study also agrees with view of Etsey and Snetzler (2010) found that gender difference in students' achievement toward Mathematics do exist but are small. The results indicate that males show more positive achievement.

Table 4 shows that learning environmental condition and the quality of infrastructure has strong bearing to academic achievement among students. In this study, some of these variables and their influence on achievement of schools were examined. These are classrooms, furniture, building that contributes to a positive learning environment for both schools and students. The negative performance of students in school between the urban and rural areas had been largely attributed to inadequate learning and teaching facilities in addition to inadequate learning environment. In the course of this research, the results make clear that students can perform if classroom have enough seats and space for each and every student. According to Basque and Dare (1998), higher achieving students are likely to have exposed to curriculum under and ideal learning environment.

### **CONCLUSION**

From all indications, there is gender and learning environment differences in academic achievement. This study further confirmed that there exist differences. And the differences are significant.

### **RECOMMENDATIONS**

- (1) School authorities should encourage male and female students to take Mathematics seriously
- (2) Parents should provide the right education they can afford for their children irrespective of gender
- (3) Effective maintenance or renovation of old buildings, chairs, desks, recreation equipment among others should be part and parcel of the school system.

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