

# **Mathematics Phobia among Senior Secondary School Students: Implication for Manpower Development in Science Education in Nigeria.**

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## **Abstract**

*The study seeks to investigate the disposition of phobia among senior secondary school students towards mathematics and its implication for manpower development in science Education in Nigeria. It is a correlational design comparing performance of students with phobia and those without in Mathematics. A sample of eighty (80) SSII students was chosen at random from two secondary schools in Bauchi state. A questionnaire that provided indications of how intensely students felt about Mathematics along a five point attitude scale was employed for data gathering. An achievement test consisting of 15 items was used to measure the performance of students with Mathematics phobia and those without. Among the null hypotheses formulated in the study is that there is no significant difference between the performance of students with phobia and those without phobia. T-test was used to test the null hypotheses. The result of the study revealed that students without phobia achieved more in Mathematics than those with phobia and a significant difference between male and female in the performance of students with mathematics phobia was observed in favor of the male. It was recommended among others that secondary schools in the state should have Mathematics laboratories where students will engage in practical mathematics learning so that the abstract nature of the subject may be minimized thereby arousing their interests and hence reducing the phobia.*

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## **Introduction**

In the entire history of education, mathematics has held its leading position among other school subjects because it is considered as an indispensable tool in the formation of Educated Man (Osafehinti, 1990). It is the central intellectual discipline of any technological society. Without Mathematics, the understanding of natural problems would be superficial. In Nigeria for instance, attention has been made on the teaching and learning of Mathematics, as a way of improving students' academic achievement in subjects at levels of Nigeria Education System (Kolawale, 2007).

The progress of any nation or state depends on her scientific and technological advancement which can be only built under a sound mathematical education capable of making the citizens effectively functional in the natural and applied sciences (Osafehinti, 1990 as cited in Odili, 2006). Consequently, the federal government of Nigeria paid a particular attention to Mathematics by making it a compulsory subject at both primary and secondary education as specified in the national policy on education (NPE, 2004).

It has been clear that without Mathematical literacy among sizeable proportion of the society the introduction of modern technology, which is believed to be a major new magic for achievement of modernization and would be excrement of difficulty if not impossible (Obioma, 1988).

In a developing country like Nigeria one cannot over emphasizes the need to help students to understand how they can use Mathematics knowledge to investigate, interpret and make useful decisions in their daily activities (Babalola, 1991). According to Lassa (2000), the power of Mathematics is found in its relevance to the solution of problems facing humanity. Among the present day applications of Mathematics are the building of models to eliminate or bound recessions and inflations, select portfolio of stocks, plan industrial capabilities, plan transportation networks, study the nature of compilation. Mathematics is also applied in the effect of business rivalry, investigate economic growth, and formulate models and population growth.

Despite the importance and usefulness of mathematics, it is a subject that is most feared by students. There is a common perception of Mathematics as a difficult subject and it is generally believed that only few students who are naturally gifted can study Mathematics. Supporting this statement, Adeniyi (1998), recounting from experience remarked that one's involvement in the marking of Mathematics in the WASSCE is enough to get any one sorrowful at the state of Mathematics in secondary schools. He stated that candidates would even submit their answer scripts without writing anything in them; some merely recopy the questions, while a high percentage of those who try to write something are mostly involved in cheating.

This project work is an educational research aimed at finding out the negative attitude (fear) of students towards learning mathematics and its implications to manpower development in science Education in Nigeria. It is primarily concerned with the Identification of such obstacles so that the result of the study may be of usefulness to government, authorities, parents, teachers and the students in helping other students who are willing and have interest in learning Mathematics to notify, identify, realize, and overcome the identified problems of the past.

### **Statement of the Problem**

The persistence phobia created in the peoples mind on Mathematics, especially students in senior secondary schools is a great problem facing the country in general and Bauchi State in particular.

### **Objective of the Study**

The following are the objectives of the study:

1. To find out if there is difference between the performance of students with phobia and those without phobia in Mathematics.
2. To find out if there is significant difference between male and female in the performance of students with Mathematics phobia.

### **Research Questions**

The study provides answers to the following questions:

1. Is there any significant difference between the performance of students with Mathematics phobia and those without Mathematics phobia?
2. Is there any significant difference in the performance of male and female students in relation to their phobia on Mathematics?

### Research Hypotheses

**H<sub>01</sub>:** There is no significant difference between the performance of students with phobia and those without phobia.

**H<sub>02</sub>:** There is no significant difference between the performance of male and female students with Mathematics phobia.

### Methodology

The study is a correlational design which employed the administration of questionnaire to identify students with Mathematics Phobia and those without phobia. The area of the study is Azare metropolis of Katagum local government area of Bauchi state, where the schools selected for the study are located.

The population of the study comprises of all SS II students in two senior secondary schools in Azare metropolis of Katagum local government area of Bauchi state. There are a total of one hundred (100) SS II students in the selected schools. Two senior secondary schools were used, out of the total enrolment of one hundred (100) SSII students, a random sample of 80 students (40 boys, 40 girls) were chosen. The instrument for data collection is the use of questionnaire. The suitability and validation of the instrument were ascertained by the experts from Mathematics Education in Abubakar Tafawa Balewa University Bauchi and other Mathematics teachers in College of Education, Azare Bauchi State.

A twenty items questionnaire that provided indications of how intensively students felt about Mathematics along a five-point attitude scale was employed for data gathering. A Mathematics Achievement Test (MAT) was also carried out to compare their general performance and gender differences. Data collected were analyzed using mean and standard deviation to answer the research questions while T-test was used to test the research hypotheses at 0.05 level of significance.

### Results

#### Hypothesis I

There is no significant difference between the performance of students with Mathematics phobia and those without.

Table 1: t-test analysis of mean scores of students with and without phobia

Group	N	X	SD	t-crit	t-cal	Remark
With phobia	40	13.13	3.07			
				1.66	14.50	Significant
Without phobia	40	23.90	3.56			

$P < 0.05$ ,  $df = 38$ . NOTE: N=number of sample, X =mean, SD =standard deviation

From table 1 above, results show that the t-calculated (14.50) is greater than the t-critical (1.66). Therefore, the null hypothesis 1 is rejected. Hence there is significant difference in the mean scores of students with phobia and those without phobia in Mathematics.

#### Research Questions 1

Is there any significant difference between the performance of students with Mathematics phobia and those without phobia?

Table 2: Mean and STD deviation of students with phobia and those without

Group	N	X	SD
With Phobia	40	13.13	3.073
Without Phobia	40	23.90	3.558

Result from table 2 above, shows that a mean score difference between students with Mathematics phobia and those without phobia of 10.77 was obtained and standard difference of 0.49 was obtained.

### Hypothesis II

There is no significant difference between the performance of male and female students with Mathematics phobia.

Table 3: t-test analysis of mean scores for male and female with phobia.

Group	N	X	SD	t-cri	t-cal	Remark
Male	20	15.20	2.22			
				2.02	5.78	Significant
Female	20	11.05	2.33			

$P < 0.05$ ,  $df = 38$ . NOTE: N=number of sample, X=mean, SD=standard deviation

Results from table 3 above, shows that at  $df = 38$ , at 0.05 level of significance, the t-cal (5.78) is greater than the t-cri (2.02). Therefore the hypothesis which says there is no significant difference between the performance of male and female students with Mathematics phobia is rejected.

### Research Question 2

Is there any significant difference in the performance of male and female students in relation to their phobia on Mathematics?

Table 4: Mean and Standard deviation of male and female with phobia

Group	N	X	SD
Male	20	15.20	2.215
Female	20	11.05	2.328

Result from table 4 above, shows that a mean score difference between male and female students with Mathematics phobia of 4.15 was obtained and standard difference of 0.11 was obtained.

### Discussions

Result from table 1 shows that students without phobia achieved more in Mathematics than those with phobia. This is confirmed by the result in table 2 which indicates that the mean achievement score of students in Mathematics favors those without phobia. Supporting the statement, Hembree (1990) determined that math phobia is related to poor math performance on math achievement test and that math phobia (anxiety) is related to negative attitudes concerning math. He also suggested that math anxiety is directly connected with math avoidance. This also confirms Ashcraft (2002) who suggests that highly anxious math students will avoid situations in which they have to perform Mathematical calculations. He added that unfortunately, math avoidance results in less competency, exposure and math practice, leaving students more anxious and mathematically unprepared to achieve.

Again from table 3, the mean achievement score of male and female students with Mathematics phobia is in favor of the male. That is to say, male achieve more in Mathematics than female. This supports the statement that men are inherently better in Mathematics than women. Historically, there have been more male mathematicians than female mathematicians. This finding is in line with (Umoven and Ogbene, 2006; Kurumeh and Iji,

2009) in their research on Gender difference and achievement in Mathematics, according to them, female students perform lower in Mathematics and that Mathematics is a masculine subject which belong to selected few. The work of Balogun, (1993) on Gender difference in Mathematics also confirms this result. His work showed a significant difference in favor of male, by indicating that male students have higher mathematical reasoning ability. In a similar study by Araoye, (1991) agrees with this study, he reported superior performance by male students over female students.

### **Conclusion**

In this research work it was found that there is significant difference between students with phobia and those without phobia in Mathematics. It shows that students without phobia achieve more in Mathematics than those with phobia and as well, a significant difference between male and female students with Mathematics phobia was observed in favor of the male.

From the finding of the study, it was concluded that Mathematics phobia affects the performance of students in senior secondary schools which as a result brings negative implication to manpower development in science Education.

### **Implication**

The study has far reaching implication in the sense that the nation technological development depends on both the quantity and quality of Mathematics being offered in the school system which also depends on the availability of professional and qualitative Mathematics teachers. It is so because the role Mathematics plays in the life of an individual and the development of a nation both scientifically and technologically is very vital as its knowledge is used in diverse fields of science such as Engineering, Geography, Physics, Chemistry, Medicine, Biology, Aviation just to mention a few. It is not only used in the science but also in the fields of art.

However, with the continuous fear of Mathematics by students of secondary schools, the society will continue to experience inadequate manpower development in science Education in Nigeria which may lead to backwardness in the technological advancement of the entire nation.

### **Recommendation**

- Adequate Mathematics laboratories should be established in both secondary schools and tertiary educational institutions. Students' interest is attracted when physical or visual objects are used in teaching and learning mathematics concepts.
- Mathematics teachers should design several phobia reducing techniques in teaching their students.
- Special scholarship scheme should be made available to all students who are studying mathematical sciences and Mathematics educations in tertiary institutions. This will attract the interests of secondary school students towards the subject.
- Mathematical associations and centers should be organizing workshops, seminars and conferences particularly on Mathematics Phobia for Mathematics teachers in the states and local government in the country.
- Academic visits/excursions to important places such as National Mathematical Centre should be organized in schools. This attracts students' interest towards Mathematics.
- Popularization of Mathematics through radio and television programs are lacking not only in rural areas but also in some of our urban areas. The impact of such programs in reducing Mathematics Phobia would be more than that of several lectures by the teachers.

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