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EFFECT OF MATHEMATICS PHOBIA ON ATTITUDE AND ACADEMIC PERFORMANCE OF SCIENCE EDUCATION STUDENTS IN SA'ADU ZUNGUR UNIVERSITY BAUCHI STATE, NIGERIA

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Abstract

The study investigated the impact of mathematics phobia on attitude and academic performance of science education students in Sa'adu Zungur University Bauchi State, Nigeria. The study adopted a descriptive survey research design, the population of the study was the entire 350 year III students from Department of Science Education, Sa'adu Zungur University. The sample size of the study was 186 students drawn from the population using , the samples were selected using simple random sampling technique. Three objectives, research questions and two hypotheses were formulated to guide the study. Instrument used for data collection was a self-develop structured questionnaire titled "Mathematics Phobia on Science Education Students Performance and Attitude Questionnaire (MPSESPAQ)". The reliability of the MPSESPAQ was obtained using internal consistency and reliability coefficient lies between 0 to 1. The data collected was analyzed using frequency count and mean to answer the research questions and Pearson Product Moment

Keywords:
Mathematics phobia, Attitude, Academic Performance, Science Education,learner_friendly strategies

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Correlation to test the hypotheses at 0.05 level of significance. The findings of the study revealed that; there was prevalence of mathematics phobia among science education students, there was strong and significant inverse relationship between mathematics phobia and science education students' academic performance, and there was significant relationship between mathematics phobia and science education students' attitude towards science subjects. Based on the findings it was recommended that mathematics teachers should identify the level of mathematics phobia in students, counsel the students and thereafter employ learners' friendly instructional strategies that would help to minimises the phobia.

Introduction

The role of Mathematics in teaching and learning of science subjects cannot be overemphasized. Mathematics affects our daily life as it helps us to do everyday tasks like cooking, cleaning, shopping, and many others without messing up. Mathematics empowers students with better reasoning skills for problem solving and critical thinking; as a result, no student can gain admission into the tertiary institution without a credit pass in Mathematics. However, with all the roles play by mathematics there is generally wrong perception by most students that mathematics is a difficult subject to study and students still have negative attitude towards the subject and run away from any discipline that has mathematics as a mandatory course to offer (Edoho et al., 2021). This condition, characterized by avoidance, negative attitude, and low confidence in tackling mathematical tasks, has become increasingly prevalent in classrooms and is referred to as mathematics phobia.

Mathematics phobia, also known as mathematics anxiety is fear associated with mathematical tasks. According to (Mutodi & Ngirande,2014) mathematics phobia is a state of a sinking feeling, uncertainty and despair at doing and understanding mathematics. Mathematics phobia is a global issue affecting students across educational systems. Studies by (Luttenberger et al, 2018) estimated that approximately 30% of students worldwide experience level of mathematics anxiety, which can escalate to a phobia. This fear continues to hinder educational progress in Nigeria as it negatively affects students, academic performance (Adeniyi & Modebelu, 2024). This prevalence is influenced by societal, pedagogical, and individual cognitive and emotional factors. Research findings have shown that the fear of Mathematics among students had a negative Effect on their achievement in Mathematics. (George,2021) posited that what increases the mathematics phobia among students is the myths that surround the subject matter of Mathematics. Going with the above, it becomes evident that the information

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that students receive from their predecessors, peers, siblings and parents concerning Mathematics impact their attitude towards the subject. The global impact of mathematics phobia underscores the need for widespread educational reforms, including teacher training and student support systems, to mitigate its effects on learning outcomes and career choices. It is against this background that the study investigate the Effect t of mathematics phobia on the attitude and academic performance of science education students in Sa'adu Zungur University Bauchi State, Nigeria.

STATEMENT OF THE PROBLEM

Despite the central role of mathematics in Science Education, a significant number of students at Sa'adu Zungur University, Bauchi exhibit a persistent phobia of mathematics. This mathematics phobia hinders students' academic performance, cognitive development and confidence in numerical reasoning which results to poor engagement in mathematics lesson, avoidance of core science courses, and declining in students' Cumulative Grade Point Average (CGPA) (Saadu et al., 2025). If left unaddressed, this phobia will not only hinder the academic success of these students but also threatens the quality of future science teaching and learning in Bauchi State, as these students may carry their phobia into their future classrooms. It is in this regard that the study investigated the Effect of mathematics phobia on the attitude and academic performance of science education students in Sa'adu Zungur University Bauchi State, Nigeria.

OBJECTIVES

The aim of the study is to investigate the Effect of mathematics phobia on the attitude and academic performance of science education students in Sa'adu Zungur University Bauchi State, Nigeria. Specifically, the study sought to find out the:

1. Find out prevalence of mathematics phobia amongst science education students.
2. Investigate the relationship between mathematics phobia and science education students' academic performance.
3. To examine the relationship between mathematics phobia on science education students' attitudes toward science subjects.

RESEARCH QUESTIONS

In order to provide direction and focus to the study, the following research questions were raised:

1. What is the prevalence of mathematics phobia among the science education students?

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2. To what extent does mathematics phobia affects science education students' academic performance?
3. To what extent does mathematics phobia affects science education students' attitude toward science subjects?

HYPOTHESES

The following hypotheses were formulated and tested at 0.05 level of significance.

H_{01}: There is no significant relationship between mathematics phobia and science education students' academic performance.

H_{02}: There is no significant relationship between mathematics phobia and science education students' attitude toward science subjects.

METHODOLOGY

The study adopted a descriptive survey research design. Descriptive survey research design according to (Nworgu,2015) is a research design in which the results of data analyzed on samples of a population are generalized over the entire population. Descriptive survey research design is suitable for this study as it seeks to provide an accurate picture of the current situation of the Effect of mathematics phobia on the attitude and academic performance of science education students at Sa'adu Zungur University Bauchi and generalize the common characteristics of the sample study to the total population. The population for the study consists of all the three hundred and fifty (350) 300 level students from Department of Science Education, Faculty of Education, Sa'adu Zungur University Bauchi. The sample size of the study was 186 students drawn from the population using (Krejcie & Morgan,1970) table for determining sample size of the study. The samples of the study were selected using simple random sampling technique.

The instrument used for data collection was a self-develop structured questionnaire titled "Mathematics Phobia on Science Education Students Performance and Attitude Questionnaire (MPSESPAQ)". The MPSESPAQ was validated by two experts for face and content validation, two experts from the Department of Science Education Sa'adu Zungur University Bauchi. The reliability of the MPSESPAQ was obtained using content and face method and the scores of the pilot study was subjected to statistical analysis using Pearson Product Moment Correlation Coefficient (PPMCC) and the reliability coefficient obtained was 0.75. The data collected for the study was analyzed using descriptive statistics of frequency count and mean to answer the research question and inferential statistics of Pearson Product Moment Correlation to test the hypotheses.

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RESULTS

Research Question 1: What is prevalence of mathematics phobia among science education students?

Table 1: Mean Distribution of respondents rating on Extent of Mathematics phobia among Science Education Students

S/n	Statements	SA 5	A 4	N 3	D 2	SD 1	N	Mean $\bar{X}$	Decision
1.	I feel nervous when I am given Mathematics problems to solve.	65 325	56 224	22 66	18 36	25 25	186 676	3.63	Accepted
2.	I do runaway from Mathematics problems if it is possible for me.	71 355	45 180	27 81	22 44	21 21	186 681	3.66	Accepted
3.	I am worried whenever I have Mathematics tests more than any subject.	67 335	38 152	22 66	32 64	27 27	186 644	3.46	Accepted
4.	I am tensed and stressed whenever I am to solve Mathematics problems.	87 435	41 164	26 78	20 40	12 12	186 729	3.92	Accepted
5.	I am not confident in my ability whenever I am to handle Mathematics tasks.	83 415	42 168	21 63	24 48	16 16	186 710	3.82	Accepted
6.	I am scared whenever homework is given to me.	58 290	55 220	19 57	23 46	31 31	186 644	3.46	Accepted
7.	I am frustrated to understand Mathematics.	74 370	45 180	25 75	23 46	19 19	186 690	3.71	Accepted
8.	I feel uncomfortable when asking me questions relating to Mathematics.	77 385	47 188	18 54	21 42	23 23	186 692	3.72	Accepted
	Grand mean							**3.67**	**Accepted**

Accept if mean score ≥ 3.00

Source: Field work, 2025

Table 1: Presents the respondents' responses on the prevalence of mathematics phobia among science education students at Sa'adu Zungur University. The mean responses scores of all the 8 statements on the table ranged from 3.92 – 3.46 with grand mean score

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of 3.67. Since the benchmark is 3.00, it can be deduced that, all the statements were accepted. The analysis of the respondents' responses on each statement on the questionnaire revealed that: I feel nervous when I am given Mathematics problems to solve (mean = 3.63), I do runaway from Mathematics problems if it is possible for me (mean = 3.66), I am worried whenever I have Mathematics tests more than any subject (mean = 3.46), I am tensed and stressed whenever I am to solve Mathematics problems (mean = 3.92), I am not confident in my ability whenever I am to handle Mathematics tasks (mean = 3.82), I am scared whenever homework is given to me (mean = 3.46), I am frustrated to understand mathematics (mean = 3.71) and I feel uncomfortable when asking me questions relating to mathematics (mean = 3.72). The grand mean score of 3.67 indicates that, there was prevalence of mathematics phobia among science education students at Sa'adu Zungur University.

Research Question 2: To what extent does mathematics phobia affects science education students' academic performance?

Table 2: Mean Distribution of respondents rating on effects of Mathematics Phobia on Science Education Students' Academic Performance

S/n	Statements	SA 5	A 4	N 3	D 2	SD 1	N	Mean $\bar{X}$	Decision
1.	My phobia in Mathematics affects my performance in other science subjects.	67 335	54 216	25 75	21 42	19 19	186 687	3.69	Accepted
2.	My performance is poor in science subjects whenever mathematical concepts are involved.	72 360	61 244	17 51	16 32	20 20	186 707	3.80	Accepted
3.	Despite my efforts in study Mathematics, my phobia in Mathematics affects my grades.	66 330	54 216	19 57	20 40	27 27	186 670	3.60	Accepted
4.	Too much of my phobia lowered my academic performance in Mathematics.	61 305	56 224	20 60	27 54	22 22	186 665	3.57	Accepted
5.	I can perform better in other science subjects if my phobia in Mathematics is lessened.	63 315	68 272	26 78	17 34	12 12	186 711	3.82	Accepted
6.	The more nervous I feel about Mathematics, the worse I perform academically.	66 330	57 228	32 96	18 36	13 13	186 703	3.78	Accepted
7.	When I manage my Mathematics phobia, I see improvements in my science grades.	73 365	56 224	25 75	15 30	17 17	186 711	3.82	Accepted
8.	My math phobia is a barrier to achieving academic success.	64 320	57 228	19 57	25 50	21 21	186 676	3.63	Accepted
	Grand mean							**3.71**	**Accepted**

Accept if mean score ≥ 3.00

Source: Field work, 2025

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Table 3 presents the respondents' responses on the extent to which mathematics phobia affects science education students' academic performance. The mean responses scores of all the 8 statements on the table ranged from 3.82 – 3.57 with grand mean score of 3.71. Since the benchmark is 3.00, it can be deduced that, all the statements were accepted. The analysis of the respondents' responses on each statement on the questionnaire revealed that: my phobia in mathematics affects my performance in other science subjects (mean = 3.69), my performance is poor in science subjects whenever mathematical concepts are involved (mean = 3.80), despite my efforts in study mathematics, my phobia in mathematics affects my grades (mean = 3.60), too much of my phobia lowered my academic performance in mathematics (mean = 3.57), I can perform better in other science subjects if my phobia in mathematics is lessened (mean = 3.82), the more nervous I feel about mathematics, the worse I perform academically (mean = 3.78), when I manage my Mathematics phobia, I see improvements in my science grades (mean = 3.82) and my math phobia is a barrier to achieving academic success (mean = 3.63). The grand mean score of 3.71 indicates that mathematics phobia affects science education students' academic performance to high extent.

Research Question 3: To what extent does mathematics phobia affects science education students' attitude toward science subjects?

Table 3: Mean Distribution of respondents rating on effects of Mathematics Phobia on Science Education Students' Attitude towards Science Subjects

S/n	Statements	SA	A	N	D	SD	N	Mean	Decision
		5	4	3	2	1		$\bar{X}$	
1.	Sequel to my phobia in Mathematics, I have negative attitude toward science.	53 265	51 204	27 81	30 60	25 25	186 635	3.41	Accepted
2.	My Mathematics phobia makes me dislike subjects that require calculations.	73 365	54 216	12 36	25 50	22 22	186 689	3.70	Accepted
3.	I enjoy science subjects that do not involve Mathematics.	82 410	35 140	29 87	23 46	17 17	186 700	3.76	Accepted
4.	As a result of my phobia in Mathematics, my interest in becoming science teacher has reduced.	54 270	45 180	29 87	31 62	27 27	186 626	3.36	Accepted
5.	I feel depressed in pursuing science-related courses as a result of my Mathematics phobia.	64 320	54 216	26 78	23 46	19 19	186 679	3.65	Accepted
6.	My motivation in involving science-related courses has reduced due to my Mathematics phobia.	59 295	43 172	27 81	31 62	26 26	186 636	3.42	Accepted
7.	My confidence in science learning is lowered by my fear of mathematics.	61 305	53 212	20 60	25 50	27 27	186 654	3.52	Accepted

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S/n	Statements	SA 5	A 4	N 3	D 2	SD 1	N	Mean $\bar{X}$	Decision
8.	I would participate more actively in science class if I were more confident in math.	75 375	55 220	26 78	18 36	12 12	186 721	3.88	Accepted
	Grand mean							**3.59**	**Accepted**

Accept if mean score ≥ 3.00

Source: Field work, 2025

Table 3 presents the respondents' responses on the extent to which mathematics phobia affects science education students' attitude towards science subjects. The mean responses scores of all the 8 statements on the table ranged from 3.88 – 3.36 with grand mean score of 3.59. Since the benchmark is 3.00, it can be deduced that, all the statements were accepted. The analysis of the respondents' responses on each statement on the questionnaire revealed that: sequel to my phobia in mathematics, I have negative attitude toward science (mean = 3.41), my mathematics phobia makes me dislike subjects that require calculations (mean = 3.70), I enjoy science subjects that do not involve mathematics (mean = 3.76), as a result of my phobia in mathematics, my interest in becoming science teacher has reduced (mean = 3.36), I feel depressed in pursuing science-related courses as a result of my mathematics phobia (mean = 3.65), my motivation in involving science-related courses has reduced due to my mathematics phobia (mean = 3.42), my confidence in science learning is lowered by my fear of mathematics (mean = 3.52) and I would participate more actively in science class if I were more confident in mathematics (mean = 3.88). The grand mean score of 3.59 indicates that mathematics phobia affects science education students' attitude towards science subjects to high extent.

Hypotheses One: There is no significant relationship between mathematics phobia and science education students' academic performance.

Table 4: Pearson Product Moment Correlation Analysis of Mathematics Phobia and Science Education Students' Academic Performance

		Mathematics Phobia	**Students' Academic Performance**
Mathematics Phobia	Pearson Correlation	1	-.520**
	P (2-tailed)		.028
	N	186	186
Students' Academic Performance	Pearson Correlation	-.520**	1

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		Mathematics Phobia	Students' Academic Performance
	P (2-tailed)	.028	
	N	186	186

****** Correlation is significant at the 0.01 level (2-tailed)

Table 4: presents the Pearson Product Moment Correlation analysis of the relationship between mathematics phobia and science education students' academic performance. The result of the analysis revealed that, *P* = 0.028 and the Pearson Correlation Coefficient (**r**) = - 0.520. Since the *P* value 0.028 is less than the 0.05 level of significance (*P* < 0.05) this implies that, a strong and significant inverse relationship between mathematics phobia and science education students' academic performance was observed. Therefore, it can be concluded that, the hypothesis one which states that "there is no significant relationship between mathematics phobia and science education students' academic performance" was rejected. Therefore, there was significant relationship between mathematics phobia and science education students' academic performance and the relationship was inversed. This finding implied that the higher the mathematics phobia, the lower the students' academic performance, and the lower the mathematics phobia, the higher the students' academic performance.

Hypotheses Two: There is no significant relationship between mathematics phobia and science education students' attitude towards science subjects.

Table 5: Pearson Product Moment Correlation Analysis of Mathematics Phobia and Science Education Students' Attitude towards Science Subjects

		Mathematics Phobia	Students' Attitude
Mathematics Phobia	Pearson Correlation	1	.432**
	P (2-tailed)		.007
	N	186	186
Students' Attitude	Pearson Correlation	.432**	1
	P (2-tailed)	.007	
	N	186	186

******. Correlation is significant at the 0.01 level (2-tailed)

Table 5: presents the Pearson Product Moment Correlation analysis of the relationship between mathematics phobia and science education students' attitude towards mathematics. The result of the analysis revealed that, that, *P* = 0.007 and the Pearson Correlation Coefficient (**r**) = 0.432. Since the *P* value 0.007 is less than the 0.05 level of significance (*P* < 0.05) this implies that, a moderate and significant relationship between

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mathematics phobia and science education students' attitude towards science subjects was observed. Therefore, it can be concluded that, the hypothesis two which states that "there is no significant relationship between mathematics phobia and science education students' attitude towards science subjects" was rejected. Therefore, there was significant relationship between mathematics phobia and science education students' attitude towards science subjects.

DISCUSSION OF FINDINGS

The study investigated the effect of mathematics phobia on the attitude and academic achievement of science education students at Sa'adu Zungur University Bauchi State of Nigeria. Finding from the first objective of the study revealed that, the grand mean response score of the respondents was 3.67 which was greater than the benchmark of 3.00. This implies that, there was prevalence of mathematics phobia among science education students at Sa'adu Zungur University. This finding is in harmony with that of (George,2021) and (Saadu et al.,2025) who in their studies reported that mathematic phobia is prevalent among students. According to (Saadu et al., 2025) the prevalence of mathematic phobia is influenced by societal, pedagogical, and individual cognitive and emotional factors.

Finding from the second objective of the study revealed that, the grand mean response score of the respondents was 3.71 which was greater than the benchmark of 3.00. This implies that, mathematics phobia affects science education students' academic performance to high extent. This is testify by test of hypothesis one presented on table 4 which revealed that, *P* = 0.028 and the Pearson Correlation Coefficient (**r**) - 0.520. This implies that, there was significant inverse relationship between mathematics phobia and science education students' academic performance. The negative Correlation Coefficient (**r**) - 0.520 clearly indicates that as mathematics phobia increases students' academic performance decreases and vice versa. This signifies that this correlation is not due to random chance but a meaningful relationship between mathematics phobia and students' academic performance. This finding confirmed the previous findings of (Salahot,2022); (Ekeh & Onuike ,2025) who found significant inverse relationship between mathematics phobia and students' academic performance. However, this finding contradicts that of (Edu et al., 2012) who found that there is no significant relationship between mathematics phobia and science education students' academic performance.

Finding from the third objective of the study revealed that, the grand mean response score of the respondents was 3.59 which was greater than the benchmark of 3.00. This implies that, mathematics phobia affects science education students' attitude towards science subjects to high extent. This is confirmed by the test of hypothesis two presented

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on table 5 which revealed that, *P* = 0.007 and the Pearson Correlation Coefficient (**r**) 0.432. This implies that, there was significant relationship between mathematics phobia and science education students' attitude towards science subjects. This finding is in harmony with that of (Mutegi et al., 2021); (Sur & Roy,2025) who conducted studies and found significant relationship between mathematics phobia and students' attitude. Therefore, it was concluded that, mathematics phobia influences students' attitude towards science subjects.

CONCLUSION

Based on the findings, the investigation into the impact of mathematics phobia on the attitude and academic achievement of science education students at Sa'adu Zungur University Bauchi State of Nigeria conclude that, it was concluded that the prevalence of mathematics phobia among science education students was high, also mathematics phobia have impact on students' academic performance and attitude towards science subjects.

RECOMMENDATION

Based on the findings of the study, the study recommended that; mathematics teachers should identify the level of mathematics phobia in students, counsel the students and thereafter employ learners' friendly instructional strategies that would help to minimises the phobia.

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