Integrity Journal of Education and Training
Volume 9(1), pages 1-5, April 2025
Article Number: 44CF09EB1
ISSN: 2636-5995
https://doi.org/10.31248/IJET2025.225
https://integrityresjournals.org/journal/IJET
Full Length Research

Stress management strategies on students experiencing mathematics phobia as predictors to academic performance in secondary schools in Dutsinma, Katsina State, Nigeria

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Received 20th February 2025; Accepted 29th March 2025

ABSTRACT: Stress management strategy on students experiencing mathematics phobia as predictors to academic performance in secondary schools in Dutsinma local government area of Katsina State, Nigeria, is the crux of this study. The descriptive research design survey was used for this study. The population for this study was 1550 students from 10 secondary schools in the study area. The sample was 155 students randomly selected from three (3) schools through random sampling techniques. The data was collected using a self-constructed questionnaire to elucidate information from the respondents on Stress Management Strategies on Students Experiencing Mathematics phobia in secondary schools in Dutsinma local government area of Katsina State, Nigeria, (SMSSEMPPAP). The information collected was analyzed using Mean and Standard Deviation. The results indicated that there are so many prevalent occurrences of mathematical phobia in Secondary Schools in Dutsinma, in particular and Katsina State in general. It was also indicated that so many factors enhance mathematics phobia in the schools of study and beyond. The study therefore concluded that teachers, parents and other stakeholders should seek areas on how to remedy the stress found in students with mathematics phobia. It was therefore recommended among others that Teachers and facilitators should always use student-centred/innovative and concept mapping approach in teaching mathematics.

Keywords: Stress management strategy, students experiencing mathematics phobia, predictor.

INTRODUCTION

Mathematics is a universal, utilitarian subject that is needed for everyone's life activities. It is an integral part of the curriculum throughout the countries in the world. It is an interdisciplinary language and tool that is considered one of the fundamentals in the formal educational system (Amazigo, 2000). He further stated that mathematics is the study of quantity, structure, space and change. It is a human endeavor that encompasses the mathematics of measurement, time, distance and different systems of distance measurement that have been developed globally. Mathematics is a science about well-defined objects and notions which can be analyzed and transformed in different ways using 'mathematical reasoning' to obtain conclusions about which we are certain (Else-Quest *et al.,* 2008). It is an essential requirement in every field of intellectual endeavor and human development to cope with the challenges of life (Ashcraft, 2002).

The word 'mathematics' comes from the Greek word 'mathema', which means learning, study, science and additionally came to have the narrower and more technical meaning 'mathematical study' even in classical time (Amazigo, 2000). Mathematics is an important subject with broad applicability to everyday life, yet mathematics is often considered as a difficult subject in schools due to phobia (Onwioduokit and Akinbobola, 2005). This phobia has already been established before coming to school.

As stated by Ellsworth and Buss (2000), mathematical difficulties refer to the poor mathematics achievement of

the children caused by a variety of factors from poor instruction to environmental factors, which is hypothesized to be due to an inherent weakness in mathematical cognition not attributable to socio-cultural or environmental causes. Whichever factors may be involved here, it is a fact that students have a very low interest in Mathematics. Students hate or dislike Mathematics. As early as the primary school level, students can start displaying negative attitudes towards learning Mathematics, and gradually develop it in the form of mathematics phobia (fear) (Saage, 2009). Moreover, it seems that the school has not given special attention to classroom delivery and the approaches to teaching and learning of students with mathematics learning phobia (Breen, 2003). On the other hand, students' performance in mathematics is decreasing gradually as the students move to the Junior and senior secondary school levels. The reasons behind such aspects like negative attitudes, mathematics anxiety and decreasing students' performance on mathematics may be different prevailing factors. Among these different factors, somebody considers mathematics phobia as one of the important factors. It is the universal belief about mathematics as a 'difficult subject' by perception. In the Nigerian society, most of the school-level students, teachers as well as parents consider mathematics a difficult subject. So, those students who have already conditioned their minds that mathematics is a difficult subject are usually not serious in the learning of mathematics and therefore perform poorly in mathematics tests and examinations (Dossel, 2016).

Mathematics achievements of the students in Nigeria not only seem to be at a lower level as compared with their international status but also are in a rather decreasing direction in recent years (Lee, 2009). According to Jennison and Beswick (2009), the average score in mathematics of students in WASSEC, 2017 was 49.2 while the score in 2013 was 50.8. Jennison and Beswick (2009) continued by positing that huge mass of students is at the underperforming level especially in mathematics and is decreasing the students' mathematics achievement for some years. This situation also requires the necessity to enlighten the students with a phobia in mathematics for their better performance. Despite the continual efforts in the field of teacher development, cognitive aspect of learning and content organization, and timely amendments of the curriculum targeted at education reform in the Nepalese context, achievements in mathematics still seem to be at a lower place (Panthi *et al.,* 2019).

The cause of underperforming in mathematics is not clear, however, but there may be different factors that could influence mathematics achievement. Arguably, one reason for this is that students' perspectives are neglected in mathematics pedagogic practices, and the causes may be the negative perception about mathematics, and because of the phobia of mathematics as a difficult subject, the students could be affected from the beginning of school education. In the same way, another cause may be the lack of arousing students' positive attitude towards mathematics due to inadequate teaching materials, large classes, poorly motivated teachers, lack of laboratories and libraries, poor supervisory activities, inadequate mastery of the subject by the teacher and lack of overall students' assessment system and so on.

Ellsworth and Buss (2002) posited that mathematics phobia leads to the poor mathematics achievement of the students caused by a variety of factors, from poor instruction to environmental factors, which is hypothesized to be due to an inherent weakness in mathematical cognition not attributable to socio-cultural or environmental causes.

Due to the perceived phobia, mathematics is often considered a difficult subject by many students in schools (Fraser and Honeyford, 2013). The feeling or phobia of many students about mathematics as a difficult subject affects not only their liking of mathematics but also the perseverance, interest, boredom and self-efficacy beliefs related to mathematics (Furner, 2004).

The phobia of students in mathematics is not only the case of particular places or persons. It is a global issue. The phobia of mathematics is causing the students a negative attitude towards mathematics and a hindrance to the learner from focusing on the problem that they are meant to tackle. The phobia of students in mathematics also tends to make the learner get nervous, especially during the time of a test or examination. Phobia of mathematics clouds the minds of the students, and they cannot perform as well. Some of the reasons attributed to the phobia of mathematics may develop earlier in the learner and may have several possible causes, like: hereditary, social and environmental. A phobia of mathematics may be created due to the influence of the parents, teachers, classmates and seniors. In the same way, negative perception towards mathematics may also cause difficulty with mathematics.

Strategies to reduce mathematics phobia

Motivating an adult having a phobia or little interest in studying mathematics can be a challenging task, but with the right approach, enthusiasm, and encouragement can be ignited for better studying habits in the subject. There are eight (8) effective strategies to help motivate adults or students with a phobia in mathematics when they are reluctant to study the subject. These strategies include the following, as posited by Onwioduokit and Akinbobola (2005):

To create a positive study environment

The management of adult education should ensure that there is a comfortable, distraction-free space dedicated to studying. A well-organized environment with proper lighting

and minimal interruptions can help the students focus better and create a sense of discipline.

Set small and achievable goals

Breakdown larger tasks into smaller, manageable goals. This helps the student feel less overwhelmed and provides a sense of accomplishment when they are completing each step. Celebrate their progress to boost their morale, confidence and motivation.

Incorporate breaks and rewards

The management of schools should create and incorporate short, frequent breaks during study sessions to keep the students refreshed. Pair the breaks with smaller rewards like some favorite snacks or a few minutes of playtime. Rewards can motivate them to stay focused and complete their tasks.

Make learning fun and attractive

The teacher should be able to make learning fun and attractive by using games, puzzles, and interactive learning tools to make studying more engaging. Incorporating visuals, quizzes or educational applications can transform a dull session into an exciting activity, sparking their interest in the subject.

Connect the studies to their Interests

Relate the study material to the child's hobbies or interests. For example, if they love space, use astronomy examples in mathematics or sciences. When they see the real-world application of what they are learning, they will be more likely to stay engaged and motivated.

Offer encouragement and not criticism

Be supportive and positive, focusing on their effort rather than the outcome. Avoid criticizing or comparing them with others, as this can demotivate them for others. Instead, provide words of encouragement and a show of appreciation for their hard work.

Establish a routine

A consistent study schedule helps to create a sense of structure. Establish a routine that includes regular study times, balanced with time for rest and recreation. Having a predictable schedule helps reduce resistance to studying.

Statement of the problem

Mathematics is one of the most globally important subjects in secondary schools. Thus, it is made compulsory for all students to study at both Junior and Senior Secondary School Certificate Examination (SSCE) levels. This is because Nigeria as a nation depends upon Mathematics as one of the most important subjects that could help the nation meet its objective for science and technological advancement. It is a fact that students have a very low interest in Mathematics. Students hate or dislike Mathematics, they carry this dislike and hatred into the classroom, and with this, they do not pay attention to the teacher, invariably making the lesson difficult for the teacher and themselves. Mathematics difficulties are a major issue faced by the majority of students in schools now. Some studies have proved that mathematics difficulties are related to certain negative attitudes, or rather biases, that people have towards mathematics. These difficulties in mathematics have created a lot of apprehension in cognitive teaching and learning, leading to many failures in both internal and external examinations. So much efforts are continuously made to salvage this, using different pedagogical methods, yet so many students, even adults, still see mathematics as difficult. This is the reason why the researcher examined the stress management strategies on students experiencing mathematical difficulties in Secondary Schools in Dutsinma Local Government Area of Katsina State, Nigeria.

Objectives of the study

The main objective of this study is to examine the “stress management strategies on students experiencing mathematics phobia as predictors to academic performance in secondary schools” in Dutsinma, Katsina State, Nigeria. Specifically, the study examined:

1. The prevalent rate of students experiencing mathematics phobia in Secondary schools in Dutsinma Local Government Area of Katsina State;
2. To identify the causes of mathematical phobia among students in Secondary schools in Dutsinma Local Government Area of Katsina State;
3. To examine the effect of stress management strategy in remediating mathematical phobia among students in Secondary schools in Dutsinma Local Government Area of Katsina State.

Research questions

1. What is the prevalent rate of students experiencing mathematical phobia in secondary schools in Dutsinma Local Government Area of Katsina State?

2. What are the causes of mathematical phobia among the students in secondary schools in Dutsinma Local government area of Katsina State?
3. What is the effect of stress management strategy in remediating mathematical phobia among students in Secondary schools Dutsinma Local government area of Katsina State?

METHODOLOGY

The study was carried out in Dutsinma, Katsina State, Nigeria. The researchers used a descriptive survey research design for the study. The population for this study was 1550 students from 10 secondary schools in the study area. The sample was 155 students randomly selected from three (3) schools through random sampling techniques. The data was collected using a self-constructed questionnaire to elucidate information from the respondents on Stress Management Strategies on Students Experiencing Mathematics phobia in secondary schools in Dutsinma Local Government Area of Katsina State, Nigeria, (SMSSEMPPAP), with four Likert Scale of Strongly Agreed (SA 4), Agreed (A 3), Disagreed (D 2) and Strongly Disagreed (SD 1). The questionnaire contains fifteen (15) statements used to elucidate responses from the respondents. The information collected was analyzed using Mean and Standard Deviation.

RESULTS

The results indicated that there are so much prevalent occurrences of mathematical phobia in Secondary Schools in Dutsinma, in particular and Katsina State in general. It was also indicated that so many factors enhance mathematics phobia in the schools of study and beyond. These include, among others, perceived anxiety, negative attitude, and nervousness on hearing the name mathematics.

Research Question 1: What is the prevalent rate of students experiencing mathematics phobia in secondary schools in Dutsinma Local Government Area of Katsina State?

Research question 1 sought to find out the prevalent rate of students experiencing mathematics phobia in secondary schools in Dutsinma LGA. All 5 items on Table 1 indicated different levels and types of mathematics phobia expressed by the students. This ranges from the feeling of the students that mathematics is difficult, as indicated in item 1, expressing negative attitudes in item 2, feeling nervous in item 3, fear in item 4 and expressing so much anxiety in item 5. This fact was alluded to by the cumulative mean of 4.12. In line with the above, Furner (2004) posited that the feeling of mathematics as difficult for students affects not only their liking of mathematics but also the perseverance, interest, boredom and self-efficacy beliefs related to mathematics. The difficulty of mathematics is not only the case of particular places or persons. It is a global issue.

Research Question 2: What are the causes of mathematics phobia among the students in secondary schools in Dutsinma Local Government Area of Katsina State?

Research question 2 sought the causes of mathematics phobia in secondary school students in Dutsinma LGA, Katsina State. As indicated in Table 2, the responses range from item 1, indicating inappropriate teaching methods, item 2, poor background and negative information about mathematics, item 3 teachers' aggressiveness and stress, item 4 professionalism of teachers in mathematics and item 5 lack of interest and study habits on the part of the students. This assertion could also be seen in the cumulative mean of 4.17.

Research Question 3: What is the effect of stress management strategy in remediating mathematics phobia among students in secondary schools in Dutsinma Local Government Area of Katsina State?

Research question 3 sought to find out the measures teachers and management of schools use to reduce stress in managing students with mathematics phobia. Table 3 indicates the different strategies used as seen in items 1, 3, 4, and 5. The cumulative mean of 3.70 indicated that these items are been practiced by the management and teachers. Item 2 disagreed with the fact that teachers consider the different learning abilities of students while teaching mathematics. Furthermore, it was observed that if the teachers as well as the parents deal with the mathematics difficulty of students in time in different ways, it will shift into positive mindsets. This can also be overcome by controlling anxiety, improving mathematics skills and developing positive attitudes toward mathematics.

DISCUSSION

Findings of this study on the prevalence rate of students experiencing mathematics phobia revealed that many of the students have a phobia of mathematics. This can be seen from Table 1 of Research Question 1 and the cumulative mean of 4.12. The findings generally show that so many students in secondary schools in Dutsinma, in particular and in Nigeria in general, do not want to hear the name mathematics, let alone study it in school. It was

Table 1. Shows the responses of the respondents on prevalence rate of students experiencing mathematics phobia in secondary schools in Dutsinma LGA (N=155).

S/N	Items	SA	A	D	SD	X	STD	Decision
1	So many students feel that mathematics is difficult	75	30	22	4	4.37	0.87	Agreed
2	So many students have developed a negative attitude for mathematics	80	25	17	3	4.15	0.83	Agreed
3.	Many students become so nervous hearing the name mathematics	76	8	5	4	3.10	0.62	Agreed
4	So many students developed fear for mathematics early in life	68	28	3	1	3.33	0.67	Agreed
5	Perceived anxiety of the students in the class during mathematics lessons	77	22	5	5	3.63	0.73	Agreed
Cumulative mean						4.12		Agreed

Table 2. Shows the responses of the respondents on the causes of mathematics phobia phobia among the students in secondary schools in Dutsinma Local government area of Katsina State? (N=155).

S/N	Items	SA	A	D	SD	X	STD	Decision
1	Inappropriate and weak teaching methods used by teachers	95	23	12	4	4.47	0.90	Agreed
2	Poor background and negative information about mathematics from home or peers	103	15	6	2	4.20	0.84	Agreed
3	Teachers' aggressiveness, stressful and irritating characters of students in mathematics class	68	42	15	7	4.40	0.88	Agreed
4	Inadequate professional teachers and approach in mathematics class	98	12	5	1	3.87	0.77	Agreed
5	Lack of interest and study habits by the students in mathematics	112	3	3	1	3.97	0.80	Agreed
Cumulative mean						4.17		

Table 3. Effect of stress management strategy in remediating mathematics phobia among students in Secondary schools Dutsinma Local government area of Katsina State (N=155).

S/N	Items	SA	A	D	SD	X	STD	Decision
1.	Teachers of mathematics should cater for students' different levels of ability	91	23	9	2	4.17	0.83	Agreed
2	Students' different learning abilities are always considered by the mathematics teachers	17	25	20	10	2.40	0.48	Disagreed
3	Teachers of mathematics should always check individual students' work to support every one of them if derailing	50	43	31	15	4.63	0.93	Agreed
4.	Teachers should use teaching aids in mathematics are always used in teaching and learning of mathematics	55	38	22	8	4.10	0.82	Agreed
5.	Teachers Make mathematics teaching fun with games and puzzles	45	28	13	10	3.20	0.64	Agreed
Cumulative mean						3.70		

found that the pre-mindset of the students before going to school is a major impediment. This was alluded to by Furner (2004), who posited that the feeling of mathematics as difficult for students affects not only their liking of mathematics but also the perseverance, interest, boredom and self-efficacy beliefs related to mathematics. The difficulty of mathematics is not only the case of particular places or persons. It is a global issue. Furthermore, Ellsworth and Buss (2000) stated that this phobia has already been established before coming to school. They

continued by saying that mathematical difficulties refer to the poor mathematics achievement of the children caused by a variety of factors from poor instruction to environmental factors, which is hypothesized to be due to an inherent weakness in mathematical cognition not attributable to socio-cultural or environmental causes.

Similarly, Research Question 2 sought the causes of mathematics phobia in secondary school students in Dutsinma LGA. The findings revealed that there are many factors responsible for the phobia of mathematics among students in secondary schools in Dutsinma. These and more range from inappropriate teaching methods, poor background and negative information about mathematics, teachers' aggressiveness and stress, professionalism of teachers in mathematics, lack of interest and study habits on the part of the students and so on. In line with this, Ashcraft (2002) stated that mathematics difficulty can occur due to different causes. He continued by saying that a lack of different aspects related to teaching and learning, like: good teacher-student relationship, use of students-centered/innovative approach of teaching, counseling, positive attitude towards mathematics, improved mathematics curriculum, breaking down topics into units, application of ICTs in teaching mathematics etc. can cause mathematics phobia.

Research Question 3 on the effect of stress management strategy in remediating mathematics phobia among students in secondary schools, Dutsinma Local Government Area of Katsina State, reveals that some of the stress management strategies are used to remediate mathematics phobia in schools. This was revealed on the cumulative mean of 3.70. Though item 2 disagreed with the fact that teachers consider the different learning abilities of students while teaching mathematics. Furthermore, it was observed that if the teachers as well as the parents and the school management deal with the mathematics difficulty of students in time by different ways, it will shift into a positive mindset, hence removing the phobia before time.

In line with the above, Ashcraft (2002) stated that mathematics difficulty can occur due to different causes. They continued by saying that a lack of different aspects related to teaching and learning, like: good teacher-student relationship, use of students-centered/innovative approach of teaching, counseling, positive attitude towards mathematics, improved mathematics curriculum, breaking down topics into units, application of ICTs in teaching mathematics etc. can cause mathematics phobia. According to Hembree *et al*. (1990), mathematics anxiety is learned not from personal experience but from parents and teachers.

Conclusion

The study was on stress management strategies on students experiencing mathematics phobia as predictors of academic performance in secondary schools in Dutsinma, Katsina State, Nigeria. It was discovered that many students have a phobia of mathematics; its causes were also discovered, hence, it was concluded that different remediating strategies should be introduced by the management to reduce the phobia of mathematics in students. The study therefore concluded that teachers, parents and other stakeholders should seek areas on how to remedy the stress found in students with mathematics phobia. It was therefore recommended among others that Teachers and facilitators should always use student-centred/innovative and concept mapping approach in teaching mathematics.

Recommendation

Based on the findings, the following recommendations were made:

1. Management and the teachers should find out the level and rate at which students are suffering from mathematics phobia.
2. The causes of this mathematics phobia should also be discovered.
3. The school management and the teachers should also seek ways to remediate this stress.
4. Parents and peers should stop giving negative impressions about the difficulty of mathematics to their children, wards, and friends.
5. Adequate and qualified professionals should be employed to handle mathematics in secondary schools.
6. Innovative textbooks and modern methods of teaching mathematics should be introduced.
7. Teachers of mathematics should always be trained and retrained for innovative pedagogy.
8. Generally, there should be mind-reorientation on the importance of mathematics in everyday human activities.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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