

Students' Learning Experiences: A case study of Cognitive, Environmental and Behavioral predispositions towards Math Anxiety

Onoshakpokaiye, E. Odiri

Institute of Education, Delta State University, Abraka, Delta State, Nigeria.

Email: vonos68@yahoo.ca

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Abstract

The purpose of the study is to 1) investigate problems of math anxiety among Diploma students 2) the ways students experience mathematics anxieties and 3) the aspect of mathematics learning experience that prompts mathematics anxiety in students. The design for this study is a case study. This study is divided into two stages. Stage one is obtaining students' results in mathematics. After that, the students' results were analyzed to enable the researcher to choose students with low and high performance for stage two. The researcher selects suitable students for stage two which is the semi-structured interview. The study instrument is a mathematics anxiety questionnaire and interview. Nine students were chosen through a purposive sampling technique. The SPSS and all the interviews recorded were coded using ATLAS. Ti version 8 to analyze the data collected to provide answers to the research questions. The findings uncovered that; tension and attitude were the primary concern of students' mathematics anxiety in the mathematics learning experience. It was revealed that evaluation causes math anxiety. It was revealed that students' math learning is influenced by cognitive, environmental and behavioral learning experiences. It was discovered that both low and high achievers students experience math anxiety. It was revealed that self-doubt and lack of confidence of students when solving equations, both causes mathematics anxiety. It was also revealed that conflict within regarded to be the source of experience through cognition for math low-achiever students.

Keywords: Environment, Mathematics Anxiety (MA), Learning experience, Behavioral, Cognitive

Introduction

Mathematics is a scientific discipline that investigates numbers, space, structure, quantity, problem-solving, and mathematical operations. It calls for analytical thinking and calculation skills (Roohi, 2012, Kusmaryono, Gufron and Rusdiantoro, 2020, Onoshakpokaiye,

2021a). Astonishing abilities are essential for students to pursue mathematics at a more important degree because mathematics is one of the fundamental knowledge to advance in fields like science, technology, and financial views. Mathematics shows that previously hidden pattern, aiding our understanding of the society we lived in. Every aspect of life involves mathematics in some way, and it has significantly enriched the field of education. Mathematics is also an essential instrument for any country's growth and development (Onoshakpokaiye, 2011, Roohi, 2012). Considering mathematics from the perspective of education, everyone agreed that its complexity and abstract nature made it the most difficult subject to learn (Haase, Guimares, and Wood, 2019). The interrelated nature of the mathematics learning process and the need for mastery and understanding of prior material cause students to struggle throughout mathematics classes. Concept comprehension issues, students' lack of confidence in their ability to solve problems, and inadequate math skills are some of the issues that students generally have when learning mathematics (Onoshakpokaiye, 2021b). Students will consequently frequently feel intimidated, concentrated, and less motivated to master mathematics in depth (Wern, Choo and Sook, 2015). To improve the nature of education and create a top-notch mathematical school system, educational strategies or school curriculum should be continuously investigated and evaluated.

According to reports, the majority of students who select STEM majors—Science, Technology, Engineering, and Mathematics—are underperforming because they perceive mathematics to be a challenging subject. Therefore, these unfavorable beliefs affect students' interest in mathematics, which leads to an increase in mathematics anxiety (Musa and Maat, 2021).

According to Ashcraft (2002), mathematics anxiety is described as a feeling of pressure, worry, or dread that interferes with one's ability to perform or engage in mathematical activities. Due to their learning experiences, people who have had negative thoughts or sentiments are more likely to avoid activities involving math (Andrews and Brown, 2015). If left untreated, mathematics anxiety can also result in major mental, physical, and psychological problems (Stoehr, 2017). Students with math anxiety struggle to manage the complexity of the activities and to overcome unfavorable emotions or thoughts (Ramirez, Shaw, and Maloney, 2018). As a result, students' confidence and level of math performance will be affected, which explains why students are generally not interested in learning mathematics (Arslan, 2020). In light of the previous study's findings that mathematics anxiety negatively affects or influences students' performance and competence in mathematics at all levels and adds to students'

mathematics failure, mathematics anxiety needs to be taken seriously (Ersozlu and Karakus, 2019).

Numerous studies have been conducted to investigate factors including self-efficacy, test anxiety, gender differences, and self-concept that are associated to mathematics anxiety in an individual context. In their 2016 study, Passolunghi and Mammarella identified cognitive, mental, and environmental factors as the primary causes of math anxiety. Chang and Beilock (2016) divided these factors into two categories: individual (affective/physiological, motivational, cognitive) and environmental (social/contextual). This finding is supported by Wern, Choo, and Sook (2015) as well as Garba, Ismail, Osman, and Rameli (2020), who identified three variables—social, individual, and cognitive—that affected math anxiety. Previous research on cognitive perspectives focused on working memory (WM), a cognitive resource, and self-efficacy (Beilock and Maloney, 2015, Ramirez, Shaw and Maloney, 2018, Ersozlu and Karakus, 2019).

According to Garba et al. (2020), Mann and Walshaw (2019), Escalera-Chávez, Moreno-Garcia, Garcia-Santillán, and Rojas-Kramer (2017), Batchelor, Gilmore, and Inglis), as well as Chang and Beilock (2016), social viewpoints looked into environmental factors like peer influence, teaching methods, and parents' attitudes and concerns regarding mathematics. The individual perspectives are seen by the student's behavior, such as their aptitude for math and enthusiasm to learn it (Reber, Isiksal, and Koç, 2018, Wang et al., 2015). Previous research demonstrates that behavior, environment, and cognition are all directly related to math anxiety. More extensive research in the future could therefore reveal important insights into these problems. Additionally, although many researchers have examined the problems of mathematics anxiety, the majority of the studies concentrated on the use of quantitative techniques and focused on common criteria including gender, age-level of schooling, mathematics performance and achievement (Garba et al., 2019, Gunderson et al., 2018, Wern, Choo and Sook, 2015). The majority of quantitative research focuses on how students' mathematics performance in school or during their postsecondary education is related to their level of math anxiety (Lindskog, Winman and Poom, 2017, Zakaria, Azziz, Yazid, and Saad, 2016). The focus of this study is similarly on students' learning experiences, their environment, and their cognitive and behavioral predispositions for mathematics anxiety. It is intended that the following questions be covered in this review: Which types of mathematical anxiety do students experience? What cognitive, environmental, and behavioral aspects of the mathematics learning experience cause students to exhibit math anxiety?

Review of related literature

The concept of mathematics anxiety (MA)

A state of worry or apprehension, tension, and stress that impairs mathematical ability is known as mathematics anxiety (Chang and Beilock, 2016). Due to the interaction of cognitive predispositions and exposure to unfavorable sentiments about mathematics, math anxiety is a complex phenomenon (Beilock and Maloney, 2015). It is defined as an emotional condition that causes anxiety, tension, and dread (Musa and Maat, 2021). By implication, this condition will affect how people behave and think. When one confronts challenging mathematical difficulties, one experiences mathematics anxiety (Wern, Choo and Sook, 2015). It is the type of anxiety that affects students the most frequently among others (Musa and Maat, 2021). This happens when someone feels unfavorable feelings or emotional disorders as a result of conditions involving routine tasks or math instruction (Escalera-Chávez, Moreno-Garcia, Garcia-Santillán, and Rojas-Kramer, 2017).

People who are afraid of mathematics typically exhibit physiological symptoms like sweating, trepidation, paleness, or hypertension as well as psychological ones like stress and negative reasoning. They also tend to avoid situations involving math (Andrews and Brown, 2015, Chang and Beilock, 2016). The impact of math anxiety on students' mathematics performance or accomplishments has been one of the primary areas of focus of research on math anxiety in earlier studies. According to research by Ramirez et al. (2018), and Foley, Herts, Borgonovi, Guerriero, Levine, and Beilock (2017), there is a link between high levels of math anxiety and low mathematics proficiency. Math anxiety affects the students' mathematical abilities, which leads to this disorder (Ramirez et al, 2018). This disrupts the student's learning process, making them feel demotivated, uncertain, and discouraged. As a result, the student's interest in mathematics declines, which then leads to math-evasion behavior (Passolunghi and Mammarella, 2016, Murphy, 2018, Mutodi and Ngirande, 2014). If the issues related to math fear are not properly addressed, fewer students will choose to study mathematics at postsecondary institutions (Musa and Maat, 2021) . Recognizing the problem of math anxiety is therefore crucial, especially in the early stages of active learning, to prevent negative outcomes later on and to simultaneously overcome math anxiety through a process of recovery and early mediation (Escalera-Chávez, Moreno-Garcia, Garcia-Santillán, and Rojas-Kramer, 2017).

The evaluation also has an impact on math anxiety in addition to learning. Anxiety in evaluation is the main factor causing math anxiety (Mann and Walshaw) (2019). This is because students who struggle with math anxiety experience high anxiety during assessments

and frequently have a negative perspective or anticipation regarding evaluation. Test anxiety is defined by Putwain et al. (2015) as the propensity for a person to perceive testing as a form of threat. In their study of college students, Andrews and Brown (2015) discovered a similar trend: students' math anxiety is significantly higher during the evaluation time than it is during the learning process. The anxiety that happens during the evaluation, as stated by Arslan (2020), is one of the circumstances that cause a high level of mathematics anxiety. Environmental elements like intense competition and high anxiety levels in a community are to blame for this (Passolunghi and Mammarella, 2016). In their study, Dowker et al. (2016) argued that while there was a relationship between test anxiety and mathematics anxiety, other dimensions of mathematics anxiety were more strongly linked, notably in terms of weak mathematical abilities and low mastery level.

Mathematics Learning Experience

Due to the transmission of knowledge and the development of skills during the process, learning leads to a series of behavioral modifications (results) (Gagné, 1985). Depending on the situation, learning via experience can have a negative or beneficial impact on a person's behavior. Experiences refer to any event or anything that students go through during the mathematics learning process and continue to remember (Musa and Maat, 2021). Three main principles—cognitive, environmental, and behavioral—have an impact on the educational or learning process, according to Bandura's Social Cognitive Theory. These components are linked to one another in both directions. As a result, according to previous studies (Chang and Beilock, 2016; Garba et al., 2020), the three perspectives of cognition, environment, and behavior are used to examine how students learn mathematics.

The cognitive viewpoint

The cognitive perspective of math anxiety addresses learning capacity, which includes individual views, interpretations of the future, and assessments of potential outcomes (Beilock and Maloney, 2015). According to Haase et al. (2019), mathematics anxiety upsets people's cognitive systems and causes perceptions about math, math self-efficacy, and math self-concept to grow. Low levels of mathematical proficiency and self-efficacy limit one's capacity for creative and critical thought and result in a lack of confidence, which in turn causes anxiety in mathematics (Musa and Maat, 2021, Ramirez et al., 2018, Batchelor et al., 2017). As stated by Foley et al. (2017), working memory (WM) is a part of the cognitive system where short-term data or information is kept as well as where the information processing operations are

carried out. In those with math anxiety, the disruption in WM processing leads to impaired working memory (WM) capacity, lower reaction times, and slower information processing, all of which have an adverse effect on mathematical aptitude and lead to subpar mathematics performance. That person will consequently be prone to worry, upset, and ultimately avoid participating in any math-related activity (Passolunghi and Mammarella, 2016, Haase et al., 2019; Ersozlu and Karakus, 2019).

Additionally, according to earlier studies, cognitive perspective and self-efficacy are related. Self-efficacy is the belief in one's capacity to carry out a certain task or finish a task successfully (Bandura, 1977). Many studies demonstrate a negative relationship between self-efficacy and mathematics anxiety because students who are less confident in their mathematics skills are more likely to experience worry or apprehension, especially in situations involving examinations or evaluations (Andrews and Brown, 2015, Rozgonjuk et al., 2020, Musa and Maat, 2021). Due to feelings of insecurity and doubt over one's math abilities, self-conflict can also develop and have an impact on learning. As a result, the children will have low levels of motivation for learning (Gunderson et al., 2018). This is because a key motivator for students and the component that determines how much effort or tenacity they will put into completing mathematics tasks is self-efficacy.

Environmental viewpoint

The impact of external elements like relatives, instructors, and companions as well as the nature and content of knowledge itself are all related to the environmental perspective. Parents are thought to help their kids reduce mathematics anxiety by regularly monitoring their learning progress and offering inspiration and support (Maloney et al., 2015, Wang et al., 2015). According to the research by Batchelor et al. (2017), parents' attitudes that place unreasonably high expectations on their children's academic success and high expectations due to society have a negative effect on the children's mathematics anxiety. Despite the fact that each family's state varies according to its experience, background, personality traits, upbringing, and parents' level of mathematical anxiety (Haase et al., 2019).

Regarding peer influence, Ditrick (2018) in his study stated that students will frequently seek assistance from their peers or friends instead of the teacher since they feel greater and less stressed to approach a friend for help in math. Additionally, the students work on their performance with the support and guidance of their peers (Moliner and Alegre, 2020). This advantageous result is a result of the active and cooperative learning strategies utilized in the classroom, which boost students' confidence, courage, and attitude toward math. The results of Garba et al. (2019) revealed that unfavorable viewpoints, such as attitude (excessively

dominating the class), conversation, and company, have the biggest effects of peer or companion effect on mathematics anxiety of the extraordinarily math-anxious pupils (negative words or provocation). Similar to how students' behavior and thoughts in tasks involving math are influenced, educators' attitudes and teaching methods play a big role. This is because effective teaching strategies that make use of a variety of tactics will pique students' interests and aid in their comprehension of mathematical concepts. Additionally, instructors help students emotionally by encouraging them, giving them helpful advice for difficult tasks, and fostering their confidence (Mann and Walshaw, 2019). On the other hand, Cumhur and Tezer (2019) found no evidence of a substantial association between students' mathematics anxiety levels and teachers' perspectives on students at the school level. This is due to the prevalence of other elements, such as motivation and emotions, in predicting math anxiety. Mathematics anxiety, according to Aydin and Keskin (2017), is mostly caused by the difficulty and abstraction of mathematical concepts as well as students' incapacity to relate them to actual events.

Behavioral viewpoints

The term "behavioral perspectives" refers to approaches and mindsets in mathematics learning. According to Recber et al. (2018), positive attitudes help students increase their sense of self-efficacy, which lowers their mathematics anxiety. Previous studies have shown that one of the key factors determining math proficiency is attitude because students who have a favorable attitude toward mathematics are constantly prepared and energized for the learning activities (Recber et al., 2018). By inference, this situation will encourage and help students thrive in math. However, because they believe mathematics is unimportant, they have low self-efficacy and do not hope to succeed in future mathematics, making them more likely to exhibit negative attitudes. However, worry at a manageable level is also crucial, especially for students who are highly motivated since it will encourage them to approach challenging mathematics problems with greater zeal and diligence. Additionally, students will think positively all the time and view mathematics as an enjoyable pastime (Wang et al., 2015).

Some people experience math anxiety as a result of their anger at not being able to grasp particular mathematical concepts and their lack of mathematical proficiency, which in turn lowers their level of drive. Student's ability to process information will be impacted if they are overly reliant on simple methodologies and less flexible critical thinking strategies because doing so will disturb their working memory-related cognitive systems, which is especially problematic for students who struggle with math (Morsanyi, Cheallaigh and Ackerman, 2019).

When abstract math problem-solving and High-Order Thinking Skills (HOTS) are involved, the situation is also made worse (Musa and Maat, 2021).

Research Methodology

This study's research design is a case study. It was utilized to gain a thorough knowledge of the respondent's experience with math anxiety. A case study is defined as an extensive, methodical assessment of a single individual, group, community, or other unit that the researcher seeks to explore. A case study is a comprehensive assessment of one specific experience that occurs in one unique group or person to obtain a thorough justification (Ghazali & Sufean, 2018, Musa and Maat, 2021). A case study approach was employed in this study to analyze and obtain a thorough understanding of the mathematics anxiety experiences of students enrolled in the diploma program at Delta State University, Abraka, Nigeria.

The following research questions were stated to guide the study.

Research Question 1

(RQ1). What types of mathematics anxiety do diploma students encounter during math exams?

Research Question 2

(RQ2). Does the student's viewpoint on the cognitive, environmental, and behavioral aspects of their mathematics learning experience affect their level of math anxiety (MA)?

Sample and Procedures

There are two parts to this investigation. The first stage involves gathering and analyzing students' math examination results. This was done to help the researcher narrow down the group of students who would be appropriate for the semi-structured interview that would comprise stage two. 120 diploma students from Nigeria's Delta State University Abraka participated in this study. The diploma program is a two-year regular course of study for which the students receive certificates upon completion. The math anxiety questionnaire was given to the students during the first step of the process. After that, the results of the students' math exams were examined in order to help the researcher identify those with low and high math proficiency. To ensure that they meet the criteria the researcher specified for the study, nine students were selected to move on to the second stage using the purposive sampling technique. Students with low and high math anxiety scores were chosen. The chosen students' profiles are displayed in Table 1.

Table 1: Profile of the selected diploma students

Category	Gender	Average grade in Mathematics	Mathematics Achievement	Average score in MA questionnaire	MA level
MLS1	Female	D	Low	4.01	High
MLS2	Male	E	Low	3.88	High
MLS3	Female	D	Low	4.30	High
MLS4	Male	D	Low	3.76	High
MLS5	Female	D	Low	3.87	High
MHS1	Female	A	High	4.20	High
MHS2	Female	A	High	4.56	High
MHS3	Male	A	High	3.84	High
MHS4	Male	A	High	4.76	High

In Table 1, MHS stands for math high achievers whereas MLS refers to math low achievers students. Instead of using the students' names, these acronyms were utilized to keep the report anonymous.

Instruments for data collection

Questionnaire

Sections A and B make up the two sections of the questionnaire. Section B, which had 20 items, was designed to gather data on the students' mathematics anxiety whereas Section A dealt with demographic variables. Using the average value of the overall score, the students' level of math anxiety (MA) was determined.

Interview

The researcher's structured interview, which consisted of 10 open-ended questions, was used in the second stage to discover more about the students' disposition toward their mathematics learning experience. Due to the open-endedness of the questions, the researcher was able to learn about the more crucial issue from the students' responses. With the students' permission, the 30- to 60-minute interviews were recorded.

Validity and Reliability of the Instruments

Experts in the fields of educational psychology and mathematics education evaluated the face and content validity of the two instruments. After that, a pilot research was conducted with 30 students who weren't involved in the study to assess the validity of the instruments. When Cronbach's Alpha was used to assess reliability, a reliability coefficient of 0.79 was discovered, indicating that the instrument is suitable for usage due to its high value.

Data Analysis

The Statistical Package for Social Science (SPSS) was used to analyze the data gathered. The MA levels of the students were ascertained by obtaining the total score and the average value of the total score using descriptive statistics. The final grade and average total mark were calculated from the students' marks on the mathematics exams, and these results were used to determine the students' math performance. All of the recorded interviews were manually converted into written form for data analysis in the second stage. Then, to establish the subtheme and theme, they were organized and coded using ATLAS. Ti version 8.

Results

Research Question 1

(RQ1)

What types of mathematics anxiety do diploma students encounter during math exams?

Table 2 shows diploma students ' experiences with math anxiety.

Topic	Subtopic	Problem	MLS 1	MLS 2	MLS 3	MLS 4	MLS 5	MHS 1	MHS 2	MHS 3	MHS 4
Anxiety in learning mathematics	tension	<ul style="list-style-type: none"> • failure to comprehend math concept • inability to meet up with study • tasks difficult or stressful 	X	X	X	X	X				
	mindset	<ul style="list-style-type: none"> • many assignments or tasks • peers or classmate' views • math difficulties at higher level 	X	X	X	X	X	X	X	X	X

Topic	Subtopic	Problem	MLS 1	MLS 2	MLS 3	MLS 4	MLS 5	MHS 1	MHS 2	MHS 3	MHS 4
Anxiety in mathematics evaluation	self-assurance	<ul style="list-style-type: none"> • absence of self-belief in one's solution 	X	X	X	X	X				
	eagerness	<ul style="list-style-type: none"> • capability to accomplish the desired objective 						X	X	X	X

With regard to sub-topic tension in Table 2, which deals with anxiety in math learning, students who scored poorly on math (math low-achiever students) were more likely to experience anxiety. This happens as a result of their inability to grasp tough or abstract mathematical concepts, their inability to keep up with their studies, or the fact that they find math issues or activities to be too demanding or challenging to handle. Below are some responses from the students:

"I feel down because I struggle to understand the math ideas being taught in class. Because mathematics is so difficult to learn, I always get nervous when I study it." (MLS4)

"I have no idea what was covered in class. Learning mathematics is too stressful and difficult. I'm too depressed to function." (MLS5)

"Since there isn't enough time for myself, the daily take-home assignments are simply too much. The majority of the exercises are too difficult to complete. I'm worn out and discouraged" (MLS3).

The biggest source of tension experienced by math high achiever students when learning mathematics is due to outside influences like classmates' or peers' opinions. This occurs as a result of uninvited remarks or criticisms they receive from classmates or peers who typically feel they are infallible and can solve any mathematics issue with ease.

Following is one student's response to this:

"Whenever our teacher assigns us mathematical tasks or exercises, my classmates always put pressure on me to assist them. Even when I'm having problems, they assume I'm lying and label me as selfish and wicked since they think I know it all." (MHS3)

Under the sub-topic mindset, all the math underachievers and one student of a high achiever recognized that mathematics is abstract and more difficult at the higher level, requiring strong skills and an in-depth understanding of mathematics to succeed.

Following are some examples of the students' responses:

“For me, higher level math is more challenging than secondary school mathematics. It gets more challenging the more I try to learn it. I'm sick of having to study mathematics”. (MLS3)

"Mathematics is extremely difficult; whenever I'm in a math lesson, I feel like quitting since I don't grasp it," (MLS4)

“Because of several challenging topics, I came to dislike math. To be completely honest, learning mathematics is impossible.” (MLS5)

All the students who score poorly in mathematics (math low-achiever students) run into this issue when it comes to the sub-subject of self-assurance under the topic of anxiety in mathematics evaluation. When taking tests or examinations, they become anxious because they lack confidence in their responses, which ultimately has an impact on how well they perform. These are a few of the responses:

"Whenever I take an exam, I always feel anxious and scared because of how tense the environment is due to the difficulty of the questions our lecturers assign us. In an exam, the questions I think I can answer become more challenging for me to answer. I assume it is due to a lack of confidence in oneself. (MLS3)

On the other hand, the main cause of the stress experienced by high achiever students who perform well in the subject during the mathematics examination was linked to their desire to outperform their potential and achieve the desired outcome.

Here are a few of the responses:

"I find it upsetting that my peers score better than me. I frequently compare my grades to those of my peers because I want to assess my abilities in light of others”. (MHS3)

"When I get stuck on a few questions in an exam, I worry that I'll get bad grades. I worry more about the results than about what students learn in class.” (MHS4)

Research Question 2 (RQ2)

Does the student's viewpoint on the cognitive, environmental, and behavioral aspects of their mathematics learning experience affect their level of math anxiety (MA)?

The researcher covered three subjects under RQ2 from the perspectives of cognitive, environmental, and behavioral aspects of mathematics learning experiences. Table 3 lists all of the subtopics and issues related to each theme.

Table 3: Findings in relation to Mathematics Learning Experiences.

Topic	Sub topic	problem	ML S1	ML S2	ML S3	ML S4	ML S5	MH S1	MH S2	MH S3	MH S4
Cognitive Experience perspectives	Self-conflict	<ul style="list-style-type: none"> uncertain about math abilities frustrated due to constant failure in exam need to sustain or always stand out in math 		X	X	X	X				
Environmental Experience perspectives	External pressure	<ul style="list-style-type: none"> influence from parents and relatives peer contrast or contest 			X	X	X		X	X	
	Nature and Content of knowledge of math	<ul style="list-style-type: none"> teachers' negative mind-set and poor teaching approaches solving of problem, applications and HOTS problems 	X	X	X	X	X		X	X	
	The mathematics importance	<ul style="list-style-type: none"> necessity to do better in 				X			X	X	

Topic	Sub topic	problem	ML S1	ML S2	ML S3	ML S4	ML S5	MH S1	MH S2	MH S3	MH S4
Behavioural Experience perspectives	Approaches to learning mathematics	future math • learn by memorizing working steps and referring to related math problems repetitively		X	X					X	X

The first subject in Table 3 is the cognitive experience perspective; students who perform poorly in mathematics (math low-achiever students) struggle with self-confidence as a result of their lack of confidence in their mathematical ability. Other than that, having a high level of math anxiety is a result of repeatedly failing math exams and getting inconsistent grades. These are a few of the student's responses to the aforementioned:

"I've always questioned the need for math instruction and have a bad attitude toward it. My perspective and behavior toward the subject have completely changed as a result of this." (MLS2)

"Because I've failed math tests numerous times, I thought I should just give up learning the subject. My decision to forgo learning mathematics entirely as a result of this experience has disappointed me". (MLS4)

Due to their capacity to consistently stand out and perform at the highest levels in mathematics, high achievers in mathematics experience self-confidence issues.

"Whenever I take an exam, I try to get the best score or the greatest grades. If I fall short of my goal, I become demoralized. But if that happens, I find a way to work harder to raise my grade" (MHS3)

Environmental experience viewpoints make up the second topic. According to the students, peer comparison or competition, parental and family influence, teachers' unfavorable attitudes and inadequate teaching methods were the issues related to external pressure. The following are some comments from the students:

"I felt inferior when my parents compared my academic performance with my other siblings." (MHS2)

“When we were in secondary school, the majority of my friends performed better in mathematics than I did. I thus experience an inferiority complex. I was disappointed since my scores were lower than I had anticipated after watching other people consistently earn great grades.” (MLS3)

"The disapproving attitude of my math teachers has had a significant impact on how I learn math. I'm tired since the teaching style is dull and challenging to understand." (MLS2)

Regarding the nature and content of mathematical knowledge, the main reasons why students struggle to acquire mathematics are the kind of questions they are asked to solve utilizing HOTS and application. Both math high achievers and math low achievers experience this circumstance.

"When the question involves a math word problem, it becomes tough for me to solve since I need to find out what the problems are and select proper formula," (MLS4)

The third item is behavioral experience perspectives, and both low and high math achievers believed that it is crucial to improve in future math in areas of vocation possibility and further studies had an impact on the students' perception of mathematics. They felt discouraged about the possibility of unfavorable outcomes, yet this served as motivation to be eager, more diligent, and eager in learning math. One student's response was as follows:

"When exams are approaching, I put more effort and spend the majority of my time studying, doing exercises, and revisions to earn a decent mark and have a better career in the future." (MHS3)

Both high achievers and math low-achiever students said that they frequently utilize memorization techniques to perform the steps and solve issues repeatedly while answering math questions in the subtopic about approaches to studying mathematics. As a result, because they frequently utilize the same strategies for related problems, this had an impact on students' math abilities later on.

"When I'm tackling arithmetic problems, I memorize a lot. I memorize all the solutions to relevant problems for the exam, and I write them down step-by-step to answer the math question. (MLS3)

Discussion of the results

Experience of students' mathematics anxiety

The results of this study showed that students' experiences with mathematics anxiety are based on two distinct situations, such as anxiety related to learning mathematics and anxiety related to mathematics evaluation. Students who have a lot of difficult mathematics content or concepts to master may experience learning anxiety. Because of this, they have difficulty understanding the material and solving challenging mathematics problems, which prevents them from performing well in class. Due to their weak skills and proficiency in mathematics,

low-achieving math students are more likely to encounter this predicament or dilemma. This supported the findings of studies by Musa and Maat (2001) and Murphy (2018), which showed that mathematics anxiety, is a product of the tensions students experience in the classroom. As a result, students who encountered these stressful situations as a result of learning mathematics are more likely to experience self-concept disruption, which makes it harder for them to remember the knowledge they have learned.

According to table 2, the majority of students agree that having too many assignments from their teachers leads to tension or anxiety in learning mathematics, especially when it comes to solving hard mathematics problems. This is consistent with Murphy's (2018) findings, which claim that students' agitation and tension during mathematics exercises are caused by their failure to understand the challenging math work. But math-proficient students also mentioned how important it is to complete a regular number of exercises and assignments to advance their skills. According to research (Cumhur & Terzer, 2019, Musa and Maat, 2019), regular mathematics practice can help students overcome their math fear.

For math high-achiever students, the views of their peers are a key source of stress when learning math. This syndrome is allegedly brought on by unwarranted criticism or attacks that exceptional students face from their colleagues or classmates on their capacity to complete any challenging mathematics problems. To corroborate this, Furner (2017) noted that excellent students learned that unwelcome comments or criticism from peers or friends may damage their emotions and ultimately prevent them from fulfilling their true self-potential. Anxiety in mathematics is also brought on by students' mindsets, which hold that higher-level mathematics is not very simple to study. These unfavorable feelings could be brought on by the complexity and variety of the tertiary-level mathematics courses that are offered. Aside from that, many new concepts are more difficult and odd, requiring strong mathematical abilities.

The educational transition from the lower to the higher level is one of the numerous reasons why math anxiety exists. This is due to how difficult and tedious it is to explain learning processes when studying more difficult arithmetic concepts. The results of the evaluation of mathematics anxiety demonstrate that math low achiever students have self-doubt and lack confidence when solving equations, both of which fuel mathematics anxiety. This is corroborated by Musa and Maat (2021) findings, who found that exam anxiety is caused by feelings of insecurity, which prevent students from using clear reasoning when being examined. This condition is more severe in math-phobic pupils because they are more likely to have unfavorable evaluative perceptions. However, Dowker et al. (2016) argued that other categories, such as math proficiency and skills, are more pervasive than test anxiety. Because

they are concerned about the results of the test and their capacity to reach their goals, high-performing students experience anxiety in evaluation. Due to the educational environment and social stigma, it is possible that students who excel academically set high educational goals and pass rigorous evaluation requirements. (Choi-Koh&Ryoo, 2019, Musa and Maat,2021). Koçolu and Kaya's (2016) findings, which claim that environmental factors like external pressure and fierce competition lead to math anxiety and high levels of anxiety in general, are also in agreement with these findings.

Mathematics Learning Experience

The cognitive perspective

Table 3 shows that conflict within is regarded to be the source of experience through cognition for math low-achiever students. Students become discouraged and develop a bad attitude toward a subject as a result of doubting their abilities and being disappointed after regularly failing exams. Gunderson et al. (2018) made the following claim in support of it: self-conflict can emerge due to confusion and doubt about one's math skills, which can alter the process of learning. According to Andrews and Brown (2015) and Rozgonjuk et al. (2020), this circumstance will gradually lower students' levels of self-efficacy, and when it persists, it will cause increased math anxiety. Additionally, these circumstances arise because students who believe they are inadequate or untalented in mathematics will be less motivated to complete mathematics assignments, adopt a pessimistic outlook, and avoid any acts involving mathematics (Ersozlu & Karakus 2019; Haase et al., 2019, Musa and Maat, 2021).

The urge to maintain their extraordinary performance causes self-conflict for math high achievers, as seen in table 2. Poor mathematics achievement will cause feelings of disappointment and unhappiness, which will lead to a low opinion of their ability. Students become anxious as a result, and if the issue is ignored, their motivation will decline, which will have an impact on how they learn (Gunderson et al., 2018). Maloney et al. (2015) provided evidence in support of this view, stating that unfavorable perceptions lower students' motivation and hence affect their efforts to learn math. If this happens, learning will be less enjoyable and eventually lead to math anxiety.

Environmental Experience perspective

The effect of outside influences gives rise to the perspective on the environmental experience. Both underachievers and high achievers agree that peer pressure and parental and family pressure are factors in math anxiety. One of the reasons students feel stressed and

anxious when they receive poor grades is parents' attitude toward comparing their children's success. These results are consistent with those of Batchelor et al. (2017) and Musa and Maat (2021), who hypothesized that parental attitudes including excessive control, comparison-making, and high expectations of their children's academic achievement negatively influence math anxiety. However, parents' roles in their children's mathematics education are crucial in the sense that their ongoing supervision and support of their wards can help to reduce math anxiety (Maloney et al., 201, Musa and Maat, 2021).

In the peer perspective, competitive variables relating to overall performance and exam outcomes have an impact on students' confidence in their mathematics abilities and make them feel inferior to others. According to Ditrick (2018), friends are among the various people considered to be important in educationally linked subjects. As a result, this notion may positively influence students by offering advice to increase performance or adversely influence them by using inappropriate language or behavior. Therefore, this notion may either have a favorable impact on students through coaching to improve overall performance or a negative impact due to inflammatory language or attitudes (Musa and Maat, 2021). According to Garba et al. (2020), on the other hand, peer competition is crucial in lowering math anxiety because student achievement will motivate them to try more when learning mathematics. The unfavorable attitudes of the teachers and the ineffective methods of instruction have an impact on the interest in learning mathematics of the math low-achievers (MLS). Students are less motivated to study math from teachers that are firm, weak, and limited to inefficient methods of instruction (Musa and Maat, 2021). This is the reality that teachers play a crucial role in creating an environment that is both practically and emotionally conducive to learning (Mann and Walshaw, 2019).

Most math low-achievers (MLS) find it challenging to understand math problems, especially those that include applications, word problems, and Higher Order Thinking Skills (HOTS). This difficulty arises as a result of the students' failure to find adequate solutions and choose the best method for solving math problems. Math anxiety is also caused by students' incapacity to connect abstract math concepts to real-world or everyday events, a lack of mathematical reasoning skills, and a limited capacity for solving mathematical problems (Aydin & Keskin, 2017, Musa and Maat, 2021). According to Ramirez et al. (2018), to address this specific issue, it is necessary to expose the students to more straightforward or adaptable mathematics teaching methodologies in order to develop in them a culture of mathematics learning throughout the learning process.

Behavioural Experience perspectives

According to the perspective of behavior, students' awareness of the importance of mathematics for the future indirectly contributes to their anxiety about math. Students believe that success in mathematics will ensure life security, including the chance to find employment or pursue higher education. Students must work hard, engage in thorough learning, and perform better in math because of this. Recber et al. (2018) made the argument that students' behavior or a positive attitude toward math can help lessen their anxiety. The low and high-achiever students both agreed that they frequently use the memorizing method and make reference to a related math problem they solve when discussing the methods they use to learn mathematics. They contend that by using these techniques, they are guaranteed to choose the right formula to use when solving problems and that they are more confident in their ability to work when they do so during tests, which is corroborated by Musa and Maat (2021). Because they believe that challenging math issues will ultimately necessitate in-depth study and the most effective use of critical or reasoning skills, students with high mathematics competency do not feel restricted by the use of the memory approach (Morsanyi et al., 2019).

Conclusion

Everyone needs a basic understanding of mathematics, yet there is a misconception that math is the hardest subject. Because of this, anxiety has also emerged as a significant obstacle to learning the subject. The stress of mastering the subject is common among students. Most of the students agreed that the difficulty of the mathematics concepts and content at the higher levels is the main cause of students' anxiety during learning. The anxiety that students feel during evaluations is a result of their unease and lack of confidence when solving math problems. The cognitive, environmental, and behavioral aspects of learning that influence students' anxiety related to math were three elements of the learning experience that were explored. According to the study, even students who performed well in mathematics could have math anxiety.

Recommendations

Teachers should alter their teaching methods to make math lessons more pleasant and useful in order to refute the notion that math is challenging and frequently causes anxiety. For psychological support to be given in addition to the present teaching method, it is critical to identify students who struggle with math fear. In addition to knowing rules and methods by

heart, students need also be investigating, speculating, and thinking in order to understand mathematics in any detail, which is possible with the assistance of the math teachers.

It is necessary to conduct research on anxiety in mathematics and at various academic levels. Math is best taught in a way that is applicable to students' daily life. Mathematics teachers must frequently receive fresh training in order to consider innovative approaches to teaching math, which will help to prevent anxieties in students.

Since we are aware that students with math anxiety experience difficulties in their daily life, careers, and math studies. The teacher has to receive training on how to reduce students' math anxiety. The potential negative impacts of math anxiety might be lessened by having discussions with the children about their emotional responses to math. Teachers of mathematics must therefore determine whether students' performance is being harmed by math anxiety. To assist students with math anxiety, the school should have a counseling department.

The use of math is necessary, for teachers to understand students with anxiety issues, they must build positive relationships with their students to encourage a solution. In order to lower students' anxiety about math, the math teacher should be approachable and open to inquiries from the class.

To foster their enthusiasm in the subject, parents should make every effort to teach and show their kids the value of math in both their daily lives and careers. Parents need to dispel in their children mind the idea that math is hard to learn. They must to make an effort to inspire and motivate their kids to show a genuine interest in learning about and understanding mathematical concepts and to persist in doing so.

The researcher suggests that further studies can be conducted on Students' Learning Experiences using math anxiety of gender. Since the research was conducted using diploma students, it can also be conducted using secondary or elementary schools.

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