The Relationship between Mathematics Performance and Anxiety Levels among Learners in Secondary Schools of Chisamba District, Central Province of Zambia

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Abstract: *The purpose of this study was to investigate the relationship between mathematics performance and anxiety levels among learners in the selected secondary schools of Chisamba district. Mixed research approach was used in this study and concurrent research design was used. The target population were learners, mathematics teachers, and guidance and counselling teachers. Purposive and simple random were used to select the respondents. Data were collected through questionnaire and interview methods. Qualitative data was analyzed by using thematic method in order to generate themes. SPSS version 20 was used to generate descriptive statistics in the form of frequency tables and percentage distribution in order to give clear explanations, presentation and interpretation of the research results. The study showed that the extent of mathematics performance and anxiety levels among secondary school learners varies widely. While some learners excel, others struggle significantly, often due to high levels of Mathematics anxiety. By implementing supportive educational practices and providing resources to manage anxiety, teachers can help improve Mathematics performance and create a more positive learning experience for all students. The study recommended teachers to be provided with professional development opportunities focused on understanding Mathematics anxiety and learning techniques and incorporation of anxiety-reduction practices in the math curriculum and screening of learners for Mathematics anxiety to identify those with high levels of Mathematics anxiety early.*

Key words: *Mathematics, Performance, Anxiety, Learners*

1. INTRODUCTION

Mathematics is a fundamental part of school curriculum as a subject and acts as a tool for the development of other sciences. Mathematics is essential in every facet of life as numeracy skills become a requirement to function effectively in daily life (Gafoor and Kurukkan, 2015). Mathematics stimulates involvement and success in many careers especially those in the fields of Science, Technology, Engineering, and Mathematics (STEM) (Ferguson et al., 2015). Following research findings that mathematics as a subject is poorly performed the following factors are attributed to the same; inadequacy of resources and teaching personnel, anxiety and fear of Mathematics, poor teaching methods, overcrowded classrooms and mathematics attitude of students. There is an observed consistent poor academic performance of learners in Mathematics from 15 % (2019), 27 % (2020), 30 % (2021), 36 % (2022) and 45 % (2023).

2. LITERATURE REVIEW

2.1. Relationship between Mathematics Anxiety and Mathematics Attitude

Americans stop the study of Mathematics and avoid many careers that related to mathematics. Mathematics anxiety is one of the main reasons for these avoidance behaviours (Gafoor and Kurukkan, 2015). Ashcraft (2002) reported that students show a severe negative emotional response in situations that involve numerical and mathematical activities, a situation referred to as Math anxiety (Ruff and Boes, 2014). Mathematics anxiety is a feeling of fear and tension towards mathematics which can result to an individual's inability to do mathematics. It is therefore vital to detect math anxiety in children to prevent them from developing an avoidance of mathematics which might bring about lasting effects (Aarnos and Perkkilä, 2012). The levels of anxiety can either be of high, moderate or low. Low/moderate levels result in students focusing on mathematics computations and problem solving,

while high levels result in much tension which prevents the students from participating in the mathematical task ahead. Haladyna et al. (2013) termed mathematics attitude as either a positive or negative feeling or expression towards mathematics. Zan and Martino (2009) identify three dimensions within attitude towards mathematics: emotional disposition, vision of mathematics, and perceived competence. This implies that Mathematics attitude is a feeling of like or dislike for mathematics (Zan and Martino, 2009; Haladyna et al., 2013). Mathematics attitude can either be positive or negative. Positive mathematics attitude enables the students to be focused on mathematics computations and problem solving; negative attitude diverts the students' mind from concentrating on mathematics computation and solving problems. They look at mathematics as challenging. Studies show a relationship between mathematics anxiety and attitude and the two variables influence mathematics performances. Students' performance in mathematics is influenced by Mathematics anxiety, Mathematics attitude, inadequate learning and teaching resources, strategies and the teaching and learning environments (Oyugi, 2018; Ndinda, 2016; Githaiga, 2019). Mathematics anxiety and Mathematics attitude are caused by environmental factors (Shaikh, 2013). Environmental factors are associated with the surrounding where students learn mathematics. Environment can influence students' attitude towards mathematics or cause anxiety. Students need conducive environment to learn mathematics.

Instructional methodologies that are used for teaching embrace a key role in children's ambitions to pursuing future career choices related to mathematics. The old teaching practices such as expectations on correct answers, fear of making errors, and rote calculations and memorizations are said to be the contributing factors to students' anxiety and attitude towards mathematics in basic classrooms (Haciomeroglu, 2017). According to Yeo et al. (2015), teachers can influence Mathematics attitude and anxieties in students when they embarrass them in front of others, assign many complex assignments and when they delay in helping students solve problem after consultation. The teacher's mode of introducing a concept to students plays a great role in a students' performance. If a teacher uses difficult terms to teach the students, this may disengage the students causing Mathematics anxiety. Teachers should avoid increasing the anxiety levels of Mathematics in students.

The students' attitude towards mathematics and anxiety can be promoted by their own family background factors in connection to Mathematics. A study carried out in India by Soni and Kumari (2017) asserts that parental Mathematics anxiety and attitude may lead to mathematics anxiety and influence students' attitude towards mathematics. When parents' anxiety is high that of their children increases especially if they help them to do their homework. This is because parents express to their own children their own dislike and frustration with Mathematics. According to Maloney et al (2015), attitude can be transmitted socially to students during early learning. Mathematics anxiety may influence mathematics attitude towards mathematics problems directly or indirectly (Kargar et al., 2010), where students develop avoidance behaviors towards mathematics. First, mathematics anxious students may avoid mathematics courses or subjects dealing with mathematical tasks and this may mean that these students do not gain competence or mastery of mathematics operations. Second, mathematics anxiety may influence mathematics attitude. Math's anxious students may attempt to evade particular classes and their anxiety may directly affect their ability to successfully complete math's problems (Plaisance, 2009).

Students who achieve a positive mathematics attitude can solve all mathematics problems provided that they have low level of mathematics anxiety. Akin and Kurbanoglu (2011) postulated that there is a negative link between math anxiety and positive attitudes. Math anxiety is related to insights of one's own mathematical abilities in relation to skills in other subject areas and with negative math attitudes. Simply, negative attitudes have negative results in mathematics thus generating math anxiety (Vinson, 2001). Also, when one takes math anxiety as a state of uneasiness which occurs in response to situations involving mathematical tasks which can often create a negative attitude toward the subject (Zettle and Raines, 2002), the relationships between math anxiety and math attitudes are easily understandable. That means that negative math attitudes promoted mathematics anxiety to be high while positive attitude decreased mathematics anxiety (Akin and Kurbanoglu, 2011). Chaman and Callingham (2013) posited that there is a relationship between mathematics anxiety and mathematics attitude.

The study in Kenya has shown that students had negative attitude towards mathematics (Githaiga, 2019). This is further supported by Ndinda (2016) who posited that poor attitudes towards mathematics lead to poor performance (Oyugi, 2018). Further, consistent failure in Mathematics is attributed to students' attitudes towards Mathematics as a subject (Manoah et al., 2011; Nui and Wahome, 2006). There existed a correlation between anxiety levels and academic achievement; high anxiety resulted in poor academic results while moderate levels of anxiety resulted in high academic results recorded in Mathematics by the students (Syokwaa et al., 2014). This shows that both Mathematics anxiety and attitude affect the performances in Mathematics, though attitude is directly proportional to achievement while anxiety is indirectly proportional (Mweni, 2015).

2.2. Relationship between Mathematics Anxiety and Academic Performance

Mathematics anxiety has been found to make students avoid Mathematics lessons resulting in poor performance in mathematics (Buckley et al., 2016). Individual and environment factors contribute to Mathematics anxiety leading to poor performance (Chang and Beilock, 2016). Individual factors may be the memory coordination while solving mathematical problems and again how one is motivated to undertake the problem at hand. Environmental factors that stimulate Mathematics anxiety include students' perception about the classroom environment, parental support and also teachers' classroom activities. The reasons for avoidance are often associated with fears and worries about their abilities to pass Mathematics (Maloney and Beilock, 2015). These fears result in difficulties in basic numerical processing and low performance in courses related to numerical reasoning (Nunez-Pena 2013; Maloney et al., 2011). These difficulties brought by avoidance of Mathematics therefore may result in Mathematics anxiety together with poor performance in Mathematics.

Radisic et al. (2015) provide evidence that students displaying high Mathematics anxiety symptoms score low marks; the lower level of Mathematics anxiety has been associated with the achievement and interest in Mathematics, and high Mathematics self-concept. This is because high anxiety results in less achievement in the performance of mathematical related problems (Ifamuyima and Rosanwo, 2016). They further argue that when the students have moderate anxiety they settle down and face the task at hand; and these results in better outcome in mathematics content and performance. Moderate level of Mathematics anxiety is linked to achievement and interest in Mathematics, high Mathematics self-concept, and conducive school and classroom atmosphere. Again the atmosphere in which the learning takes place is essential for students' Mathematics anxiety determination. Similarly, a study carried out in the Netherlands by Macher et al. (2012) postulates that Mathematics anxiety holds a crucial role in Mathematics performance. When students become anxious Mathematics performances becomes low compared to students with moderate levels of anxiety. Mathematics anxious students feel stressed and worried about carrying out simple mathematics tasks and they usually perform poorly in Mathematics (Bekdemir, 2010).

The relationship between mathematics anxiety and performance can be linked to arousal performance theory by Yerkes and Dodson (2008). In their theory, they posit that; 'if arousal increases, performance will also increase but if arousal becomes too great and continuous then performance would deteriorate'. The theory has two assumptions namely; increase in arousal results in decrease in performance and moderate arousal results in optimal performance. During the onset of arousal, a student is confident to have the ability to control the arousal pressure and this may increase his performance. Once the arousal becomes so great the student would start to become less confident on the ability to control the pressure and the performance would drop. For good performance, there is a need for little arousal. The arousal can be linked to a task that can influence anxiety levels. If there is no arousal then there is no anxiety which allows respondents to be relaxed and not engage in any Mathematics task resulting to poor performance. When the anxiety is mild or moderate the respondents enjoy the ability to control it and work towards the Mathematics task. This results in high performance; when the anxiety is very high then the respondents' performance is threatened since they cannot deal with the high anxiety together with the task. There is a relationship between mathematic anxiety and mathematical performance (Syokwaa et al., 2014). Further, there exists a correlation between anxiety levels and academic achievement; high anxiety leads to poor academic results while moderate levels of anxiety lead to high academic results. High anxiety affects students' ability to perform effectively in Mathematics.

3. RESEARCH METHODOLOGY

The study employed both quantitative and qualitative research approaches in collecting and analysing of the data. The study used concurrent research design. The target populations for this study were all Mathematics teachers, Guidance and Counseling teachers and learners in the selected secondary schools of Mansa district. This study's sample size was one hundred and ninety three (150) respondents. Simple random sampling was used to select the secondary schools in Chisamba district and learners while purposive sampling was used to select Mathematics teachers. Questionnaires and interview guide were used to collect data. The thematic analysis was used to analyse qualitative data. Statistical Package for Social Sciences (SPSS) software version 20 was used to analyse quantitative data by generating descriptive statistics in form of frequency tables and percentage distributions and graphs for clear presentation, and interpretation of the data.

4. RESULTS AND DISCUSSION

4.1. Extent of Mathematics Performance and Anxiety levels among Learners

This section presents the findings of the study based on the research question; how do anxiety levels related to learners' academic performance in mathematics among learners? The results of the study showed that anxiety influences poor academic performance of learners in Mathematics. Table 1 shows the responses from the respondents.

Table 1. *Extent of Mathematics Performance and Anxiety Levels among Learners*

Responses	Frequency	Percentage %
Impact cognitive function	35	28
Avoidance behaviour	28	22.4
Confidence and self-efficacy	25	20
Physiological effects	20	16
Performance pressure	17	13.6
Total	**125**	**100**

Source: Field work, 2024   N = 125

Table 1 shows that thirty-five (35) out of one hundred and twenty-five (125) representing 28 % indicated that anxiety levels impact cognitive function in mathematics among learners, twenty-eight (28) out of one hundred and twenty-five (125) representing 22.4 % of the respondents reported avoidance of behaviour among learners. The other twenty-five (25) out of one hundred and twenty-five (125) representing 20 % reduction in the confidence and self-efficacy among learners in mathematics. As shown in Table 1 twenty (20) out of one hundred and twenty-five (125) representing 16 % of the respondents indicated that anxiety bring about physiological effects, and seventeen (17) out of one hundred and twenty-five (125) representing 13.6 % of the respondents reported that anxiety bring about performance pressure among learners in mathematics.

The participants who were interviewed reported that:

> *Mathematics anxiety is quite common among secondary school students. It can range from mild nervousness to severe anxiety that significantly impairs performance. High levels of math anxiety can lead to avoidance; learners may avoid taking math classes or participating in math activities. (P10)*

> *Anxiety can impair cognitive function, leading to lower test scores and grades. Continuous anxiety can undermine learners' confidence in their mathematical abilities, further exacerbating the problem. (P7)*

The other participants indicated that:

> *Higher anxiety often correlates with lower performance, creating a vicious cycle where poor performance increases anxiety, and higher anxiety leads to even worse performance. (P12)*

> *Not all learners are affected by math anxiety to the same degree. Some may have high anxiety but still perform well, while others with lower anxiety may perform poorly due to other factors. The performance in mathematics is also influenced by factors such as*

quality of teaching. Effective teaching strategies significantly impact learner performance. Availability of resources enhances learning outcomes and encouragement from parents can improve learners' performance. (P15)

Mathematics anxiety among learners is a significant issue that can hinder their academic progress and overall attitude toward math. Several factors contribute to the development and persistence of math anxiety. Ruff and Boes (2014), inadequate or harsh teaching methods in early education can lead to negative experiences with math. If a teacher is overly critical or fails to make math engaging, students may develop a fear of the subject. Struggling with basic math concepts or facing repeated failures can make students feel incompetent, leading to anxiety. Cultural stereotypes, such as the belief that boys are naturally better at math than girls, can affect students' confidence and contribute to anxiety, particularly among girls. Parents who express negative attitudes towards math or their own math anxiety can inadvertently pass these feelings on to their children. Mutlu (2019), students who strive for perfection may fear making mistakes in math, leading to anxiety. The pressure to get everything right can be overwhelming. Students with low self-esteem may doubt their abilities in math, making them more prone to anxiety when faced with challenging problems.

The emphasis on high-stakes testing and timed exams can create a stressful environment. The fear of failure in these settings can contribute significantly to math anxiety. Fear of being judged by peers for asking questions or making mistakes can inhibit a student's willingness to participate in math class, increasing anxiety. Namkung (2019), teachers who do not provide positive reinforcement or constructive feedback can make students feel unsupported. This lack of encouragement can heighten anxiety. Teaching methods that do not cater to diverse learning styles can leave some students behind, making math seem inaccessible and increasing anxiety. Math problems often require holding multiple pieces of information in working memory. For students with weaker working memory skills, this can be overwhelming and lead to anxiety. Some students find it hard to grasp abstract math concepts, which can cause frustration and anxiety when they cannot see the practical application of what they are learning (Magnate, 2022).

Teachers and parents should provide encouragement and celebrate small successes in math to build confidence. Creating a classroom environment where mistakes are seen as learning opportunities rather than failures can reduce anxiety (Syokwaa, 2014). Using a variety of teaching techniques to cater to different learning styles can help make math more accessible. Teaching students techniques such as mindfulness, deep breathing, and positive self-talk can help them manage anxiety. Parents can support their children by maintaining a positive attitude towards math and helping them with homework in a constructive manner. Math anxiety is influenced by a combination of personal, social, and educational factors. Early negative experiences, societal attitudes, personal traits, classroom environment, teaching practices, and cognitive challenges all play a role. By recognizing and addressing these factors, educators and parents can help reduce math anxiety and support students in developing a more positive relationship with mathematics. The relationship between mathematics performance and anxiety levels among learners is a well-documented area of educational research. Math Anxiety is a feeling of tension, apprehension, or fear that interferes with math performance. It can manifest as nervousness, a racing heart, or even avoidance of math-related activities (Ashcraft, 2002).

Studies consistently show a negative correlation between math anxiety and math performance. This means that as anxiety levels increase, math performance tends to decrease. For example, a student with high math anxiety might struggle with solving math problems or performing well on tests. Mweni (2008), the relationship is often bidirectional. Not only can high anxiety lead to poor performance, but poor performance can also increase anxiety. A student who struggles with math might develop anxiety about their ability to succeed in future math tasks. Math anxiety can lead to avoidance behaviors, where students might skip math classes, avoid homework, or shy away from math-related careers. This avoidance can further impact their performance and deepen their anxiety (Ndinda, 2016).

Buckley (2016), negative experiences with math in early education can contribute to the development of anxiety. This might include struggles with understanding concepts or negative feedback from teachers. Societal norms and stereotypes, such as the belief that some people are just bad at math, can also play a role. These attitudes can discourage effort and reinforce anxiety. Traditional teaching methods that emphasize rote learning and timed tests can exacerbate anxiety. In contrast, more

supportive and understanding teaching approaches can help reduce anxiety. Creating a supportive learning environment where mistakes are seen as part of the learning process can help reduce anxiety. Encouraging a growth mindset that abilities can be developed through dedication and hard work can also be beneficial (Githaiga, 2019). Yeo (2015), techniques such as relaxation exercises, mindfulness, and positive self-talk can help students manage their anxiety. Using varied teaching strategies that include hands-on activities, real-life applications, and collaborative learning can make math more engaging and less intimidating. The correlation between math performance and anxiety is significant and well-established. Addressing math anxiety through supportive teaching methods and anxiety reduction techniques can help improve math performance and overall learning experiences for students (Kargar, 2010). By understanding and mitigating the factors that contribute to math anxiety, educators can create a more positive and effective learning environment for all students.

4.2. Factors Contributing to Mathematics Anxiety among Learners

In order to identify specific factors contributing to mathematics anxiety among learners, the respondents were asked the specific factors contribute to Mathematics anxiety among learners. Table 2 shows the factors contributing to Mathematics anxiety among secondary school learners.

Table 2. *Factors Contributing to Mathematics Anxiety among Learners*

Responses	Frequency	Percentage %
Negative experience	23	18.4
Teaching methods	21	16.8
Parental attitudes	18	14.4
Peer pressure	16	12.8
Stereotype threats	15	12
High stakes testing	13	10.4
Lack of confidence	11	8.8
Poor study habits	8	6.4
Total	**125**	**100**

Source: Field work, 2024   N = 125

Table 2 shows the factors that contribute to mathematics anxiety among learners. Twenty-three (23) out of one hundred and twenty-five (125) representing 18.4 % of the respondents indicated negative experience while twenty-one (21) out of one hundred and twenty-five (125) representing 16.8 % of the respondents reported teaching methods. Eighteen (18) out of one hundred and twenty-five (125) representing 14.4 % of the respondents indicated parental attitudes towards mathematics. Sixteen (16) out of one hundred and twenty-five (125) representing 12.8 % of the respondents indicated peer pressure and fifteen (15) out of one hundred and twenty-five (125) representing 12 % of the respondents reported stereotype threats. Table 2 also shows that thirteen (13) out of one hundred and twenty-five (125) representing 10.4 % of the respondents indicated high stakes testing and eleven (11) out of one hundred and twenty-five (125) representing 8.8 % of the respondents reported lack of confidence among the learners in mathematics and eight (8) out of one hundred and twenty-five (125) representing 6.4 % of the respondents poor study habits among learners contributes to mathematics anxiety among learners in the subject.

The interviewed participants reported that:

> *Inadequate or harsh teaching methods in early education can lead to negative experiences with math. If a teacher is overly critical or fails to make math engaging, learners may develop a fear of the subject. Struggling with basic mathematics concepts or facing repeated failures can make learners feel incompetent, leading to anxiety. (P3)*

The other participants from different schools reported that:

> *Cultural stereotypes, such as the belief that boys are naturally better at mathematics than girls, can affect learners' confidence and contribute to anxiety, particularly among girls. (P8)*

> *Parents who express negative attitudes towards mathematics or their own mathematics anxiety can inadvertently pass these feelings on to their children. Learners who strive*

for perfection may fear making mistakes in math, leading to anxiety. The pressure to get everything right can be overwhelming. Learners with low self-esteem may doubt their abilities in math, making them more prone to anxiety when faced with challenging problems. The emphasis on high-stakes testing and timed exams can create a stressful environment. The fear of failure in these settings can contribute significantly to math anxiety. (P9)

Furthermore, other participants indicated that:

Fear of being judged by peers for asking questions or making mistakes can inhibit a learner's willingness to participate in math class, increasing anxiety. Teachers who do not provide positive reinforcement or constructive feedback can make learners feel unsupported. This lack of encouragement can heighten anxiety. (P2)

Teaching methods that do not cater to diverse learning styles can leave some learners behind, making math seem inaccessible and increasing anxiety. Math problems often require holding multiple pieces of information in working memory. For students with weaker working memory skills, this can be overwhelming and lead to anxiety. Some learners find it hard to grasp abstract math concepts, which can cause frustration and anxiety when they cannot see the practical application of what they are learning. (P16)

Examining the extent of mathematics performance and anxiety levels among learners in secondary schools involves looking closely at how well students perform in math and how much anxiety they feel about the subject (Chaman and Callingham, 2013). This analysis includes understanding the severity, prevalence, and impact of these two factors on students' overall academic experience. Mathematics performance in secondary schools is typically assessed through standardized tests, class exams, quizzes, and homework assignments. Performance metrics might include grades, test scores, and the completion rate of math courses (Chang and Beilock, 2015).

Some students excel, while others struggle significantly. This disparity can be influenced by several factors including prior knowledge, quality of instruction, and available resources (Mahoney and Beilock, 2015). Performance in mathematics is often influenced by factors such as effective teaching strategies, teacher qualifications, and classroom management can significantly impact student performance. Availability of textbooks, technology, and extra tutoring can enhance learning outcomes. Encouragement and help from parents can improve students' performance. Nunez (2013), math anxiety is typically measured using psychological surveys and questionnaires that assess feelings of tension worry, and fear specifically related to math tasks. Studies show that math anxiety is quite common among secondary school students. It can range from mild nervousness to severe anxiety that significantly impairs performance. High levels of math anxiety can lead to Students may avoid taking math classes or participating in math activities. Anxiety can impair cognitive function, leading to lower test scores and grades. Continuous anxiety can undermine students' confidence in their mathematical abilities, further exacerbating the problem (Rudisic, 2015).

Macher (2012), there is a strong correlation between math performance and anxiety. Higher anxiety often correlates with lower performance, creating a vicious cycle where poor performance increases anxiety, and higher anxiety leads to even worse performance. Not all students are affected by math anxiety to the same degree. Some may have high anxiety but still perform well, while others with lower anxiety may perform poorly due to other factors (Beckdemir, 2010). Schools can implement various strategies to help students by Using engaging, student-centered teaching methods can make math more accessible and less intimidating. Providing tutoring, mentoring, and counseling can help students overcome both performance issues and anxiety. Encouraging a growth mindset and celebrating small successes can boost confidence and reduce anxiety. Techniques such as mindfulness, relaxation exercises, and cognitive-behavioral strategies can help students manage their anxiety. Encouraging a supportive environment at home and within the community can reinforce positive attitudes towards math.

Shaikh (2013), the extent of mathematics performance and anxiety levels among secondary school learners varies widely. While some students excel, others struggle significantly, often due to high levels of math anxiety. Understanding and addressing the root causes of both poor performance and high

anxiety are crucial. By implementing supportive educational practices and providing resources to manage anxiety, educators can help improve math performance and create a more positive learning experience for all students (Manoah, 2011).

5. CONCLUSION

Basing on the foregoing study objectives the following conclusions can be drawn: The extent of mathematics performance and anxiety levels among secondary school learners varies widely. While some students excel, others struggle significantly, often due to high levels of math anxiety. Understanding and addressing the root causes of both poor performance and high anxiety are crucial. By implementing supportive educational practices and providing resources to manage anxiety, educators can help improve math performance and create a more positive learning experience for all students. The correlation between math performance and anxiety is significant and well-established. Addressing math anxiety through supportive teaching methods and anxiety reduction techniques can help improve math performance and overall learning experiences for students. By understanding and mitigating the factors that contribute to math anxiety, educators can create a more positive and effective learning environment for all students. Math anxiety is influenced by a combination of personal, social, and educational factors. Early negative experiences, societal attitudes, personal traits, classroom environment, teaching practices, and cognitive challenges all play a role. By recognizing and addressing these factors, educators and parents can help reduce math anxiety and support students in developing a more positive relationship with mathematics.

6. RECOMMENDATIONS

Based on the information provided, the government can take several steps to address the issues of mathematics performance and anxiety among secondary school learners. Here are some recommendations

Training on Anxiety-Reduction Techniques: Provide teachers with professional development opportunities focused on understanding math anxiety and learning techniques to reduce it. This includes strategies such as mindfulness exercises, creating a supportive classroom environment, and recognizing signs of anxiety.

Effective Teaching Methods: Equip teachers with research-based instructional strategies that cater to diverse learning styles and needs, such as differentiated instruction, collaborative learning, and the use of manipulative and visual aids.

Incorporate Anxiety-Reduction Practices: Integrate practices such as relaxation techniques, growth mindset training, and positive reinforcement within the math curriculum.

Adaptive Learning Programs: Implement adaptive learning technologies that personalize math instruction to meet the individual needs of learners, providing additional support for those who struggle and advanced materials for those who excel.

Screening for Mathematics Anxiety: Develop screening tools to identify learners with high levels of mathematics anxiety early. Use these tools to provide targeted support and interventions.

Parental Workshops: Organise workshops to educate parents about mathematics anxiety and effective ways to support their children at home. Provide resources and strategies for creating a positive mathematics environment.

Community Involvement: Partner with local businesses and community organizations to create math-related extracurricular activities and mentorship programs that make learning mathematics more engaging and relevant.

Establish systems for regular feedback from learners, parents, and teachers to monitor the effectiveness of implemented strategies and make necessary.

REFERENCES

The Examinations Council of Zambia (2023). Results Analysis; Mansa District

Gafoor, K. A and Kurukkan, A. (2015). Why do High School Students Feel Mathematics is Difficult? An Exploration of Affective Beliefs. Online Submission.

Garba, A., Ismail, N., Osman, S and Rameli, M. R. M. (2020). Exploring peer effect on mathematics anxiety among secondary school students of Sokoto State, Nigeria through photovoice approach. Eurasia Journal of Mathematics, Science and Technology Education, 16(2).

Hamid, M. H. S., Shahrill, M., Matzin, R., Mahalle, S and Mundia, L. (2013). Barriers to Mathematics Achievement in Brunei Secondary School Students: Insights into the Roles of Mathematics Anxiety, Self-Esteem, Proactive Coping, and Test Stress. International Education Studies, 6(11), 1-14.

Maganga, J. (2016). Factors Affecting Students Academic Performance: A Case Study of Public Secondary Schools in Ilala District, Dar es Salaam, Tanzania. (Master of Education Thesis, University of Tanzania).

Magnate, F. R. (2022). Relationship between Mathematics Performance and Anxiety. Northern Iloilo State University, Philippine

Mutlu, Y. (2019). Math anxiety in students with and without math learning difficulties. International Electronic Journal of Elementary Education, 11(5), 471–475

Namkung, J. M., Peng, P and Lin, X. (2019). The relation between mathematics anxiety and mathematics performance among school-aged students: A meta-analysis. Review of Educational Research, 89(3), 459–496.

Magnate, F. R. (2022). Relationship between Mathematics Performance and Anxiety. Northern Iloilo State University, Philippine

Aarnos, E and Perkkila, P. (2012). Early signs of Mathematics anxiety. Procedia-Social and Behavioral Sciences 46:1495-1499. https://doi.org/10.1016/j.sbspro.2012.05.328

Akin, A and Kurbanoglu, I, N.(2011). The relationships between math anxiety, math attitudes, and self-efficacy: A structural equation model. Studia Psychologica 53(3):263.

Ashcraft, M, H. (2002). Math anxiety: Personal, educational, and cognitive consequences. CurrentDirections in Psychological Science 11(5):181-185.

Bekdemir, M. (2010). The pre-service teachers' Mathematics anxiety related to depth of negative experiences in Mathematics classroom while they were students. Educational Studies in Mathematics 75(3):311-328. https://doi.org/10.1007/s 10649-0 10-9260-7

Buckley S, Reid K, Goos M, Lipp, O, V and Thomson, S. (2016). Understanding and addressing mathematics anxiety using perspectives from education, psychology and neuroscience. Australian Journal of Education 60(2):157-170. https://doi.org/10.1177/0004944116653000

Chang H, Beilock, S, L. (2016). The math anxiety-math performance link and its relation to individual and environmental factors: A review of current behavioral and psychophysiological research. Current Opinion in Behavioral Sciences 10:33-38. https://doi.org/10.1016/j.cobeha.2016.04.011

Chaman, M, Callingham, R. (2013). Relationship between Mathematics Anxiety and Attitude towards Mathematics among Indian Students. Mathematics Education Research Group of Australasia.

Ferguson, A, M., Maloney, E, A., Fugelsang J and Risko EF (2015). On the relation between math and spatial ability: The case of math anxiety. Learning and Individual Differences 39:1-12. https://doi.org/10.1016/j.lindif.2015.02.007

Gafoor, K, A and kurakkan, A. (2015). Why high school students feel mathematics difficult? An exploration of affective beliefs. Online submission.

Githaiga, E, W. (2019). Factors influencing Mathematics performance in KCSE among learners in public secondary schools in Kilifi Sub- county (Doctoral dissertation, KeMU).

Gunderson, E, A., Park, D., Maloney, E, A., Beilock, S, L and Levine, S, C. (2018). Reciprocal relations among motivational frameworks, math anxiety, and math achievement in early elementary school. Journal of Cognition and Development 19(1):21-46.

Ifamuyima, S, A and Rosanwo, E, I. (2016). Improving Mathematics achievement of junior secondary school students using masterly learning instructional strategy. International Journal of İnnovation in Science and Mathematics 4(2).

Kargar, M, Tarmizi, R, A, Bayat, S. (2010). Relationship between mathematical thinking, mathematics anxiety and mathematics attitudes among university students. Procedia-Social and Behavioral Sciences 8:537-542. https://doi.org/10.1016/j.sbspro.2010.12.074

Macher, D., Paechter, M., Papousek, I and Ruggeri, K. (2012). Statistics anxiety, trait anxiety, learning behavior, and academic performance. European Journal of Psychology Of Education 27(4):483-498. https://doi.org/10.1007/s10212-011-0090-5

Maloney EA, Ansari, D and Fugelsang J, A. (2011). Rapid communication: The effect of mathematics anxiety on the processing of numerical magnitude. Quarterly Journal of Experimental Psychology 64(1):10- 16. https://doi.org/10.1080/17470218.2010.533278.

Maloney, E, A., Ramirez, G., Gunderson, E, A., Levine., S, C and Beilock, S, L. (2015). Intergenerational effects of parents' math anxiety on children's math achievement and anxiety. Psychological Science 26(9):1480-1488. https://doi.org/10.1177/0956797615592630

Manoah, S, A., Indoshi, F, C and Othuon LO (2011). Influence of Attitude on Performance in Mathematics. International Research Journal 2(3):965-981.

Mutai, J, K. (2011). Attitudes towards learning and performance in mathematics among students in selected secondary schools in Buret district, Kenya. Unpublished Masters Dissertation.

Mweni, N, T. (2015). Relationship between affective factors and achievement in Mathematics among secondary school students in Ganze District, Kilifi County Kenya (doctoral dissertation, Kenyatta University).

Ndinda, M, D. (2016). An analysis of the factors influencing achievement in mathematics geometry among secondary school students in Makadara Sub-County, Nairobi County.

Nuneez, M, I., Suare, M and Bono, R. (2013). Effects of math anxiety on student success in higher education. International Journal of Educational Research 58:36-43.

Oyugi, K, J. (2018). Factors Affecting Students' Performance in Mathematics at KCSE Level in Selected Mixed Secondary Schools in Njiru Sub county; Nairobi (Doctoral dissertation, University of Nairobi).

Plaisance, D, V. (2009). A Teachers' Quick Guide to Understanding Mathematics Anxiety. Lousiana Association of Teachers of Mathematics Journal 6(1):1-8.

Radisic, J., Videnovic, M and Baucal, A. (2015). Math anxiety-contributing school and individual level factors. European Journal of Psychology of Education 30(1):1-20. https://doi.org/10.1007/s10212-014-0224-7

Shaikh, S, N. (2013). Mathematics anxiety factors and their influence on performance in mathematics in selected international schools in Bangkok. Journal of Education and Vocational Research 4(3):77-85.

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