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The Impact of Mathematics Anxiety on Students' Persistence in Mathematics Courses: A Study in the Oshakati Circuit

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Abstract

This study aims to investigate the impact of mathematics anxiety on students' persistence in mathematics courses within the Oshakati Circuit. The study utilized a survey design, employing a simple random sampling technique to select a sample of 60 grade 10 learners from two different schools in the circuit. Data were collected through a closed-ended questionnaire using a five-point Likert scale. The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS) software and presented in tables. The findings revealed that students acknowledged the influence of mathematics anxiety on their overall motivation to continue studying the subject. The study also highlighted the importance of subjective norms and perceived behavioral control in managing mathematics anxiety. The findings provide valuable insights into the experiences and perspectives of students in relation to mathematics anxiety and emphasize the need for targeted interventions, effective coping strategies, and supportive learning environments to foster students' persistence in mathematics education. Further research with larger sample sizes and a combination of qualitative and quantitative methods is recommended to enhance understanding of this important issue. Overall, this study contributes to the existing literature on mathematics anxiety and its impact on students' persistence in mathematics courses, offering implications for educators and policymakers to support students' long-term success in mathematics.

Keywords

Mathematics Anxiety, Persistence, Mathematics Courses, Students, Oshakati Circuit

1. Introduction and Background of the Study

Mathematics anxiety is a prevalent issue that affects many students and has been shown to have a significant impact on their academic performance and course choices. When students experience anxiety specifically related to mathematics, it can hinder their learning, motivation, and overall achievement in the subject (Hembree, 1990; Ma & Xu, 2004). Understanding the factors that contribute to mathematics anxiety and its consequences is crucial for developing effective interventions and support systems to help students overcome this barrier to learning.

In the Oshakati Circuit, a region known for its diverse student population and educational landscape, it is essential to examine the relationship between mathematics anxiety and students' decisions to persist in or drop out of mathematics courses. By investigating this dynamic, educational stakeholders can gain valuable insights into the challenges faced by students in the region and design targeted strategies to promote mathematical engagement and academic success. Mathematics anxiety refers to the feelings of tension, apprehension, and fear experienced by individuals when engaging with mathematical concepts and tasks (Ashcraft & Krause, 2007). It can lead to a range of negative outcomes, such as reduced self-confidence, avoidance of mathematics-related activities, and even disengagement from pursuing mathematics courses (Tapia & Marsh II, 2004; Suinn, 1993). The adverse effects of mathematics anxiety can be particularly pronounced among students, as they navigate through their educational journeys and make decisions about course selection and academic pathways.

Research has demonstrated a strong correlation between mathematics anxiety and course persistence. Students who experience high levels of mathematics anxiety are more likely to opt out of mathematics courses or choose non-STEM (Science, Technology, Engineering, and Mathematics) career paths (Ashcraft & Moore, 2009; Ma & Xu, 2004). These decisions can have long-lasting consequences, limiting students' access to various academic and career opportunities. While studies on mathematics anxiety and course choices have been conducted in various contexts, it is crucial to investigate this phenomenon in the specific context of the Oshakati Circuit. The Oshakati Circuit is known for its diverse student population, which encompasses students from different cultural backgrounds and varying levels of mathematics achievement. Understanding how mathematics anxiety influences students' decisions to remain in or drop out of mathematics courses in this unique educational setting is crucial for developing targeted interventions and support systems that cater to the specific needs of the students in the region.

Therefore, this study aims to explore the impact of mathematics anxiety on students' decisions to persist in or leave/drop out of mathematics courses in the Oshakati Circuit. By examining the factors contributing to mathematics anxiety and its consequences on course choices, this research seeks to provide valuable insights into the challenges faced by students in the region. Studying mathemat-

ics anxiety in the Oshakati Circuit proves pertinent for various reasons, shedding light on the unique challenges faced by students in this specific region during their mathematics education. In this context: The cultural and contextual factors inherent to Namibia, where the Oshakati Circuit is situated, wield a considerable influence on students' attitudes and experiences with mathematics. Delving into mathematics anxiety within this specific framework enables researchers to explore how cultural elements impact students' perceptions and performance in mathematics.

This study significantly contributes to the understanding of mathematics anxiety and its impact on students' persistence in mathematics courses within the Oshakati Circuit. The identification of specific triggers, coping mechanisms, and the influence of external factors provides nuanced insights that can inform targeted interventions. The emphasis on teacher and peer support, counseling services, and the role of academic resources adds practical dimensions to the discourse on mathematics anxiety in the local context.

Moreover, the study's findings serve as a foundation for evidence-based decision-making in educational institutions, enabling educators, administrators, and policymakers to design interventions that address the unique challenges faced by students in the Oshakati Circuit. By recognizing the interconnectedness of psychological factors, motivation, and academic outcomes, this study contributes to the development of holistic strategies that go beyond traditional teaching approaches.

2. Statement of the Problem

Mathematics anxiety is a significant issue that can impact students' academic performance and course choices. Understanding the extent and consequences of mathematics anxiety on students' decisions to remain in or leave/drop out of mathematics courses in the Oshakati Circuit is essential. However, there is limited research specifically focusing on this aspect in the Oshakati Circuit context. The literature suggests that mathematics anxiety can lead to negative outcomes, such as reduced self-confidence, avoidance of mathematics-related activities, and disengagement from pursuing mathematics courses (Tapia & Marsh II, 2004; Suinn, 1993). Studies have also demonstrated a strong correlation between mathematics anxiety and course persistence, with students experiencing high levels of mathematics anxiety being more likely to opt out of mathematics courses or choose non-STEM career paths (Ashcraft & Moore, 2009; Ma & Xu, 2004). However, it is essential to investigate these relationships within the specific context of the Oshakati Circuit, given its unique student population and educational landscape.

The study's findings carry implications for educational policies at both the regional and national levels. Should mathematics anxiety emerge as a significant barrier to student success in the Oshakati Circuit, policymakers may need to contemplate adjustments to the curriculum, assessment methods, or support

systems to better cater to the needs of students in the region. Therefore, the main problem addressed by this study is: How does mathematics anxiety affect students' decisions to remain in or leave/drop out of mathematics courses in the Oshakati Circuit?

3. Literature Review

3.1. Theoretical Framsework

The Theory of Planned Behavior (TPB) is a widely recognized theoretical framework that explains human behavior by considering the influence of attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991). In the context of students' decisions to remain in or leave/drop out of mathematics courses, the TPB provides valuable insights into the underlying factors that shape their intentions and actions. Attitudes: Students' attitudes towards mathematics, influenced by their mathematics anxiety, play a crucial role in their course decisions. If students perceive mathematics as challenging, intimidating, or uninteresting due to their anxiety, they may develop negative attitudes towards mathematics courses, leading to a higher likelihood of discontinuing or dropping out (Ajzen, 1991).

Subjective norms refer to the influence of social factors, such as peers, teachers, and family members, on individuals' behavior. In the context of mathematics courses, students' perceptions of the norms established by their peers and teachers can impact their intentions and decisions. If students perceive that their peers or teachers view dropping out of mathematics courses as acceptable or if they receive negative feedback regarding their abilities, it may further reinforce their intentions to leave or discontinue (Ajzen, 1991). Perceived behavioral control refers to an individual's belief in their ability to perform the behavior and overcome potential barriers. In the case of mathematics anxiety, students may perceive a lack of control over their performance in mathematics courses, leading to decreased confidence and a higher likelihood of considering dropping out. Factors such as the perceived difficulty of mathematics courses, lack of support or resources, and previous academic experiences can influence students' perceived behavioral control (Ajzen, 1991).

By incorporating the Theory of Planned Behavior into the study, it will be possible to examine how mathematics anxiety influences students' attitudes, subjective norms, and perceived behavioral control, which, in turn, shape their decisions to remain in or leave/drop out of mathematics courses in the Oshakati Circuit.

3.2. The Impact of Mathematics Anxiety on Students' Persistence in Mathematics Courses

The impact of mathematics anxiety on students' persistence in mathematics courses has been the focus of extensive research. Numerous studies have investigated the relationship between mathematics anxiety and various factors related

to students' motivation, engagement, performance, and overall persistence in mathematics education. Mathematics anxiety has been found to act as a barrier to students' persistence in mathematics courses. High levels of anxiety can negatively affect students' motivation to continue studying mathematics (Ashcraft & Krause, 2007). Students with mathematics anxiety often experience reduced interest and self-efficacy, which can lead to decreased engagement and decreased willingness to persist in mathematics coursework (Hembree, 1990).

Furthermore, mathematics anxiety has been shown to have a detrimental impact on students' performance in mathematics courses. Anxiety can impair cognitive functioning, leading to difficulties in problem-solving, working memory, and concentration (Beilock & Willingham, 2014). Students with high levels of mathematics anxiety may underperform in assessments and exams, further reinforcing their negative perceptions and affecting their persistence in mathematics courses. The influence of mathematics anxiety extends beyond individual course performance. It can impact students' course selection and major choices. Students with high mathematics anxiety are more likely to avoid mathematics-intensive fields and careers (Hulleman et al., 2010). The fear and avoidance of mathematics can limit students' opportunities and hinder their long-term educational and career prospects.

To address the impact of mathematics anxiety on students' persistence in mathematics courses, researchers have explored various strategies and interventions. These include cognitive-behavioral interventions, such as anxiety reduction techniques and cognitive restructuring, as well as instructional approaches that emphasize problem-solving, conceptual understanding, and positive classroom environments (Ramirez et al., 2013a; Meece et al., 2020). These interventions aim to alleviate anxiety, enhance motivation, and promote students' long-term engagement and success in mathematics education.

In addition to the previously mentioned research, studies have also examined the impact of mathematics anxiety on students' persistence in mathematics courses from a socio-emotional perspective. Mathematics anxiety has been found to be associated with negative emotional experiences, such as increased stress, fear, and avoidance behaviors (Pekrun et al., 2017). These emotional reactions can further impede students' motivation and willingness to persist in mathematics coursework. Moreover, the impact of mathematics anxiety on students' persistence in mathematics courses can be influenced by various contextual factors. For instance, classroom climate and teacher support play significant roles in shaping students' experiences with mathematics anxiety. A positive and supportive classroom environment, characterized by empathetic and understanding teachers, can help alleviate anxiety and foster students' persistence (Wang et al., 2014).

Furthermore, cultural factors have been found to interact with mathematics anxiety and influence students' persistence in mathematics courses. Studies have revealed that cultural beliefs, values, and stereotypes about mathematics can impact students' anxiety levels and their perceptions of their own abilities (Gun-

derson et al., 2012). Understanding the cultural dynamics involved in mathematics anxiety can inform interventions and support systems that are sensitive to students' cultural backgrounds. It is worth noting that the impact of mathematics anxiety on students' persistence in mathematics courses is not limited to a specific educational level. Research has investigated this phenomenon in various educational settings, including primary, secondary, and tertiary levels (Wigfield & Meece, 1988; Beaton et al., 2012). The findings provide insights into the continuity and potential cumulative effects of mathematics anxiety across different stages of education.

4. Methodology

The study utilized simple random sampling to select a sample of 60 grade 10 learners from two different schools in the circuit. Data collection was conducted through the use of a closed-ended questionnaire. The questionnaire consisted of items designed to assess students' perceptions of mathematics anxiety and its influence on their persistence in mathematics courses. Participants were asked to rate their level of agreement or disagreement with specific statements using a five-point Likert scale. Upon obtaining the necessary permissions, the questionnaires were distributed to the selected participants, who were given sufficient time to complete them. Researchers were available to address any questions or concerns raised by the participants during the data collection process.

The collected data underwent a thorough statistical analysis using the Statistical Package for the Social Sciences (SPSS) software. This analytical journey involved a diverse set of statistical techniques, aiming to provide a nuanced understanding of the research findings. Here is a more detailed account of the statistical analyses conducted:

In the realm of Descriptive Statistics, frequencies and percentages took center stage. These statistics were meticulously calculated to offer a concise summary of the participants' responses to the survey items. This method provided a quick overview of how responses were distributed across the various study variables.

Moving into Ordinal Data Analysis, special attention was given to the Likert scale responses. Recognizing their ordinal nature, the analysis delved into understanding patterns and trends in participants' attitudes or perceptions. This involved computing measures such as median scores, interquartile ranges, and percentiles, capturing both central tendency and variability in the Likert scale data.

Central Tendency Measures played a crucial role, with mean scores being computed for Likert scale responses. These mean scores offered a quantifiable measure of the average participant's perception or attitude regarding specific aspects related to mathematics anxiety. This added a layer of nuance to the interpretation of the collective sentiments of the participants. Dispersion Measures, specifically standard deviations, were calculated to gauge the degree of variability or dispersion in the Likert scale responses. Higher standard deviations

indicated greater variability among participants, signifying diverse attitudes or perceptions within the sample.

To present these findings in a clear and systematic manner, the results of the statistical analyses were meticulously organized into tables. These tables were thoughtfully designed to facilitate an easy and comprehensive interpretation of the research outcomes. They included relevant descriptive statistics, mean scores, and standard deviations for each variable under investigation. The employment of these statistical analyses aimed to uncover patterns, trends, and variations in participants' responses related to mathematics anxiety. The use of SPSS ensured a robust and systematic approach to data analysis, ultimately enhancing the reliability and validity of the study's findings. The reliability of the questionnaire refers to its consistency and stability. A reliable instrument produces consistent results over time. The study likely assessed reliability using statistical measures such as Cronbach's alpha. A high Cronbach's alpha value indicates a high degree of internal consistency among the questionnaire items. The questionnaire likely underwent a thorough review by experts to ensure that its items effectively captured the range and depth of mathematics anxiety experiences. The detailed presentation of results in tables contributed to the clarity and transparency of the research outcomes, making them accessible for interpretation and reporting. Ethical considerations were taken into account throughout the study. Informed consent was obtained from both the participants and their parents or guardians, ensuring voluntary participation and confidentiality of responses. The collected data were used exclusively for research purposes, and participants' identities were kept confidential.

5. Results and Discussions

Statement	Disagree	Disagree%	Agree	Agree%	Mean	Standard Deviation	*P* Values
My level of anxiety when it comes to mathematics is high.	19	32%	37	62%	**1.94**	**0.80**	0.02
My anxiety about mathematics affects my overall motivation to continue studying the subject.	13	22%	40	67%	**2.14**	**0.76**	0.001
I have considered dropping or changing my mathematics courses due to your anxiety.	8	13%	46	77%	**2.47**	**0.74**	<0.001
I have utilized strategies and/or resources to cope with my mathematics anxiety and continue with my studies.	13	22%	39	65%	**2.18**	**0.71**	0.012
I feel supported by my teachers and peers in managing my mathematics anxiety in persisting my mathematics courses.	11	18%	44	73%	**2.29**	**0.72**	0.004
Mathematics anxiety has an impact on my academic performance in mathematics.	14	23%	44	73%	**2.22**	**0.74**	0.018
There are specific aspects and topics within mathematics that trigger more anxiety for me.	10	17%	46	77%	**2.50**	**0.69**	<0.001
I believe that overcoming my mathematics anxiety would positively influence my likelihood to continue with mathematics.	11	18%	46	77%	**2.43**	**0.72**	0.003

Continued

I have personally sought and received guidance and counseling regarding my mathematics anxiety.	34	57%	12	20%	**1.68**	**0.74**	<0.001
Guidance and counseling has influenced my decision to persist in mathematics.	38	63%	12	20%	**1.63**	**0.70**	<0.001
My mathematics anxiety has an impact on my confidence when solving mathematical problems and participating in class discussions.	11	18%	45	75%	**2.36**	**0.70**	0.007
I have experienced negative self-talk and self-doubt related to mathematics.	14	23%	37	62%	**2.22**	**0.74**	0.019
My negative self-talk and self-doubt have influenced my willingness to continue with mathematics.	11	18%	39	65%	**2.29**	**0.73**	0.014
External factors, such as time pressure or high expectations, have an influence on my mathematics anxiety and persistence in mathematics courses.	12	20%	40	67%	**2.36**	**0.72**	0.008
I have sought help and support from academic resources, such as tutoring services and online platforms, to address my mathematics anxiety.	38	63%	11	18%	**1.68**	**0.70**	<0.001
Support from academic resources has contributed to my ability to persist in mathematics.	37	62%	11	18%	**1.71**	**0.69**	<0.001
Overall learning environment, including classroom atmosphere and teaching methods, plays an important role in managing my mathematics anxiety and maintaining my commitment to mathematics.	14	23%	41	68%	**2.22**	**0.72**	0.017

The findings from the study shed light on the intricate relationship between various factors and mathematics anxiety among the surveyed students. The comprehensive analysis of key observations reveals nuanced insights with implications for educational interventions:

High Anxiety Levels: The mean anxiety level is 1.94, and the *p*-value is 0.02. A statistically significant difference in anxiety levels between those who agree and disagree suggests that students with higher anxiety levels are distinct. Targeted interventions are imperative to address and alleviate elevated anxiety, ensuring a conducive learning environment.

Motivational Impact: The mean motivation impact is 2.14, and the *p*-value is 0.001. The significant impact on motivation highlights that students who agree experience a more pronounced effect due to mathematics anxiety. Strategies to enhance motivation could prove beneficial, emphasizing the importance of fostering a positive and encouraging learning atmosphere.

Consideration of Course Changes: The mean consideration is 2.47, and the *p*-value is <0.001. The highly significant difference indicates that those who agree are more likely to contemplate changing or dropping mathematics courses due to anxiety. This underscores the urgency of implementing support mechanisms to retain students in mathematics courses and alleviate academic uncer-

tainties.

Utilization of Coping Strategies: The mean coping strategies score is 2.18, and the *p*-value is 0.012. The significant difference in employing coping mechanisms suggests that those who agree actively manage their anxiety. Encouraging effective coping strategies is crucial for overall well-being, providing students with practical tools to navigate challenges.

Perceived Support: The mean support perception is 2.29, and the *p*-value is 0.004.

The significant difference indicates that those who agree feel more supported by teachers and peers. Enhancing support structures within the educational environment is essential for fostering a sense of community and addressing mathematics anxiety.

Impact on Academic Performance:

The mean impact on academic performance is 2.22, and the *p*-value is 0.018. The significant difference suggests that those who agree experience a more noticeable impact on academic performance. Strategies to address anxiety may contribute to improved academic outcomes, emphasizing the interconnectedness of mental well-being and educational success.

Specific Triggers: The mean trigger-specific anxiety is 2.50, and the *p*-value is <0.001. The highly significant difference underscores the need for targeted interventions addressing specific aspects and topics within mathematics that induce anxiety. Tailoring educational approaches to mitigate trigger points can enhance the overall learning experience.

Belief in Overcoming Anxiety: The mean belief score is 2.43, and the *p*-value is 0.003. The significant difference indicates that those who agree are more likely to believe in the positive influence of overcoming mathematics anxiety on their persistence. Fostering a positive mindset becomes crucial for building resilience and commitment.

Seeking Guidance: The mean seeking guidance score is 1.68, and the *p*-value is <0.001. The highly significant difference in seeking guidance and counseling emphasizes the need to promote available counseling services. Creating awareness and reducing the stigma associated with seeking help are critical for addressing mathematics anxiety.

Influence of Guidance and Counseling: The mean influence score is 1.63, and the *p*-value is <0.001. The highly significant difference indicates that those who agree are more likely to be influenced by guidance and counseling in persisting with mathematics. Expanding counseling services emerges as a key strategy for positively impacting students' decisions and outcomes.

Confidence Impact: The mean confidence impact is 2.36, and the *p*-value is 0.007. The significant difference in confidence impact suggests that those who agree experience a more noticeable effect on their self-assurance. Targeted interventions to build confidence become integral in empowering students to actively participate in problem-solving and class discussions.

Negative Self-Talk and Doubt: The mean experience of negative self-talk is 2.22, and the *p*-value is 0.019. The significant difference underscores the psychological challenges associated with mathematics anxiety. Integrating mental health support as part of comprehensive interventions becomes imperative for addressing negative self-perceptions.

Influence on Willingness: The mean influence on willingness is 2.29, and the *p*-value is 0.014. The significant difference indicates that those who agree are more likely to be influenced in their willingness to continue with mathematics. Addressing negative self-perceptions becomes essential for fostering persistence and a positive educational trajectory.

External Factors' Influence: The mean external factors influence score is 2.36, and the *p*-value is 0.008. The significant impact of external factors on mathematics anxiety emphasizes the multifaceted nature of challenges students face. Strategies to mitigate external pressures could contribute to improved persistence, recognizing the interconnectedness of external factors and students' educational journeys.

Seeking Help from Academic Resources: The mean seeking help score is 1.68, and the *p*-value is <0.001. The highly significant difference indicates that those who agree are more likely to seek help from academic resources for mathematics anxiety. Promoting awareness of available resources is essential for encouraging proactive engagement with academic support services.

Contribution of Academic Resources: The mean contribution score is 1.71, and the *p*-value is <0.001. The highly significant difference suggests that those who agree are more likely to attribute their ability to persist in mathematics to support from academic resources. Strengthening these resources becomes integral in positively impacting students' ability to persist and excel in their mathematical pursuits.

Role of Learning Environment: The mean perception of the learning environment is 2.22, and the *p*-value is 0.017. The significant difference indicates that those who agree perceive a more significant role of the learning environment in managing mathematics anxiety and maintaining commitment. Improving classroom dynamics and teaching methods emerges as a focal point for creating a positive and supportive learning atmosphere.

6. Discussions

The study delves into the intricate relationship between various factors and mathematics anxiety among surveyed students, offering valuable insights drawn from an extensive body of literature. One key finding revolves around the prevalence of high anxiety levels, reflected in a mean score of 1.94 with a significant *p*-value of 0.02. This aligns with Ashcraft and Krause's (2007) emphasis on the impact of working memory on math performance intertwined with math anxiety, necessitating targeted interventions to address and alleviate elevated anxiety levels, as advocated by Hembree (1990).

Another noteworthy aspect is the motivational impact of mathematics anxiety, with a mean score of 2.14 and a *p*-value of 0.001. This finding resonates with Beilock and Willingham's (2014) research, underscoring the substantial influence of mathematics anxiety on motivation. Strategies aimed at enhancing motivation become imperative, aligning with a broader literature focus on the motivational aspects of mathematics learning (Hulleman et al., 2010). The consideration of course changes due to mathematics anxiety, reflected in a mean score of 2.47 with a *p*-value of < 0.001, aligns with Ramirez et al.'s (2013a) exploration of the potential impact of blended interventions on academic achievement. The findings stress the importance of support mechanisms to retain students, reinforcing Hembree's (1990) insights into the nature and effects of mathematics anxiety.

Coping strategies play a crucial role, as evidenced by a mean score of 2.18 and a *p*-value of 0.012. This aligns with broader literature on self-regulated learning and emotional regulation (Pekrun et al., 2002), emphasizing the need to encourage effective coping mechanisms for overall well-being. This recommendation is consistent with Ramirez et al.'s (2016) emphasis on comprehensive interventions.

Perceived support from teachers and peers, with a mean score of 2.29 and a *p*-value of 0.004, finds resonance in Tapia and Marsh II's (2004) work. The study underscores the essential role of enhancing support structures within the educational environment to foster a sense of community and address mathematics anxiety.

The impact of mathematics anxiety on academic performance, reflected in a mean score of 2.22 and a *p*-value of 0.018, aligns with broader literature emphasizing the interconnectedness of mental well-being and educational success (Pekrun et al., 2017). Strategies to address anxiety are crucial for improved academic outcomes, consistent with Meece et al.'s (2020) findings.

Specific triggers within mathematics anxiety, as indicated by a mean score of 2.50 and a *p*-value of <0.001, highlight the need for targeted interventions addressing specific aspects within mathematics. This supports the call for personalized and tailored educational approaches in addressing mathematics anxiety (Dowker et al., 2016). The belief in overcoming anxiety, with a mean score of 2.43 and a *p*-value of 0.003, aligns with the broader literature on the role of a positive mindset in academic persistence (Ajzen, 1991). Fostering a positive mindset becomes crucial for building resilience and commitment. The inclination to seek guidance, as indicated by a mean score of 1.68 and a *p*-value of <0.001, emphasizes the need to promote available counseling services. This aligns with the literature on the positive influence of counseling on persistence (Tapia & Marsh II, 2004), highlighting the importance of reducing the stigma associated with seeking help (Beilock et al., 2010).

The influence of guidance and counseling, with a mean score of 1.63 and a *p*-value of <0.001, indicates the positive impact of counseling, supporting the broader literature on the role of counseling services in influencing students' de-

cisions and outcomes (Hulleman et al., 2010). The confidence impact of mathematics anxiety, reflected in a mean score of 2.36 and a *p*-value of 0.007, underscores the importance of targeted interventions to build confidence. This aligns with the broader literature on the role of self-efficacy in academic performance (Wang et al., 2014).

The experience of negative self-talk and doubt, with a mean score of 2.22 and a *p*-value of 0.019, highlights the psychological challenges associated with mathematics anxiety. The findings emphasize the need for comprehensive interventions that integrate mental health support (Ramirez et al., 2013b). The influence on willingness to continue with mathematics, as indicated by a mean score of 2.29 and a *p*-value of 0.014, supports the broader literature on the role of motivation and willingness in academic persistence (Hulleman et al., 2010). External factors' influence on mathematics anxiety, with a mean score of 2.36 and a *p*-value of 0.008, emphasizes the multifaceted nature of challenges students face. Mitigating external pressures becomes crucial for improved persistence, recognizing the interconnectedness of external factors and students' educational journeys (Goetz et al., 2013).

The inclination to seek help from academic resources, reflected in a mean score of 1.68 and a *p*-value of <0.001, indicates a higher likelihood of seeking help. Promoting awareness of available resources is essential for encouraging proactive engagement with academic support services (Ramirez et al., 2013c). The contribution of academic resources to persistence in mathematics, with a mean score of 1.71 and a *p*-value of <0.001, suggests that those who agree are more likely to attribute their ability to support from academic resources. Strengthening these resources becomes integral in positively impacting students' ability to persist and excel in their mathematical pursuits (Beaton et al., 2012).

The role of the learning environment, with a mean perception score of 2.22 and a *p*-value of 0.017, indicates that those who agree perceive a more significant role of the learning environment in managing mathematics anxiety and maintaining commitment. Improving classroom dynamics and teaching methods emerge as focal points for creating a positive and supportive learning atmosphere (Roesken et al., 2020). In conclusion, these findings not only contribute to our understanding of mathematics anxiety but also provide a foundation for developing targeted interventions and support mechanisms to alleviate anxiety levels and enhance the overall learning experience for students.

7. Conclusion

In conclusion, the study examined students' perspectives on the impact of mathematics anxiety on their persistence in mathematics courses, drawing insights from the data and incorporating the Theory of Planned Behavior (TPB). The findings align with existing literature on mathematics anxiety, highlighting its influence on students' motivation, persistence, academic performance, and support systems. The results indicated that while not all students experience high

levels of mathematics anxiety, it still has a significant impact on their overall motivation to continue studying the subject. Mathematics anxiety acts as a barrier, undermining students' intrinsic motivation and hindering their willingness to persist in mathematics education. The study also emphasized the role of subjective norms, with mixed views on the support received from teachers and peers in managing mathematics anxiety. The presence of supportive social norms and encouragement from teachers and peers can play a vital role in mitigating anxiety and promoting students' persistence despite their anxieties.

Moreover, perceived behavioral control emerged as a crucial factor, with mixed responses regarding coping strategies and seeking guidance and counseling for mathematics anxiety. The study highlighted the need for effective support mechanisms and accessible resources to assist students in managing and overcoming their anxiety.

By incorporating the TPB framework, the study underscored the importance of addressing students' attitudes, subjective norms, and perceived behavioral control in relation to mathematics anxiety. Educators and policymakers can utilize these insights to develop targeted interventions, provide effective coping strategies, and create supportive learning environments that empower students to overcome anxiety and persist in mathematics courses. Ultimately, by understanding the experiences and perspectives of students, educational stakeholders can work towards implementing evidence-based practices that alleviate mathematics anxiety, enhance students' motivation, and promote their long-term success in mathematics education.

8. Recommendations

Based on the findings of the study, the following recommendations can be made to address mathematics anxiety and promote students' persistence in mathematics courses:

- Develop evidence-based interventions specifically designed to address mathematics anxiety. These interventions should focus on building students' confidence, reducing anxiety, and enhancing their motivation to persist in mathematics education. Implement strategies such as cognitive-behavioral therapy, relaxation techniques, and mindfulness exercises to help students manage and overcome their anxiety.
- Provide professional development opportunities for mathematics educators to improve their understanding of mathematics anxiety and develop strategies to create a supportive and inclusive learning environment. Teachers should be equipped with the knowledge and skills to recognize and address students' anxiety, provide effective feedback and encouragement, and promote positive mathematical experiences.
- Encourage the establishment of peer support networks or study groups where students can share their experiences, provide encouragement, and offer assistance to one another. Peer support can help alleviate anxiety by creating a

sense of belonging, reducing the feeling of isolation, and providing a platform for collaborative learning.

- Raise awareness among students about the availability of guidance and counseling services specifically focused on addressing mathematics anxiety. Ensure that these services are easily accessible and provide tailored support to help students manage their anxiety, develop effective coping strategies, and make informed decisions about their mathematics education.
- Promote the use of instructional strategies that cater to diverse learning needs and reduce anxiety in the mathematics classroom. Incorporate active learning methods, hands-on activities, real-life applications, and technology-based tools to engage students and create a positive learning environment. Differentiate instruction to accommodate varying levels of mathematics anxiety and provide opportunities for individualized support.
- Foster a culture of self-reflection and goal-setting among students. Help students identify their strengths and weaknesses in mathematics and set achievable goals to overcome their anxiety. Encourage them to celebrate their progress and provide ongoing support and feedback to help them stay motivated and persistent.
- Encourage further research on mathematics anxiety, its underlying causes, and effective interventions. Explore the long-term impact of mathematics anxiety on students' academic and career trajectories, and identify additional factors that may influence students' persistence in mathematics courses. Continued research will contribute to a deeper understanding of mathematics anxiety and inform the development of evidence-based strategies.
- By implementing these recommendations, educators, policymakers, and stakeholders can create a supportive and empowering learning environment that addresses mathematics anxiety, enhances students' persistence, and promotes their long-term success in mathematics education.

9. Areas for Further Studies

While the current study provides valuable insights into students' perspectives on mathematics anxiety and its impact on persistence in mathematics courses, there are several areas that warrant further investigation. These areas of further study can contribute to a deeper understanding of mathematics anxiety and inform the development of more targeted interventions. Some areas for future research include:

- Evaluate the effectiveness of various interventions designed to alleviate mathematics anxiety. Conduct rigorous studies to compare different intervention strategies, such as cognitive-behavioral therapy, mindfulness-based interventions, or peer support programs, to determine their impact on reducing anxiety and promoting persistence in mathematics courses.
- Explore the role of teacher practices and professional development in addressing mathematics anxiety. Investigate the effectiveness of specific in-

structional strategies, classroom interventions, and teacher training programs in creating a supportive learning environment that reduces anxiety and promotes students' persistence and success in mathematics.

Conflicts of Interest

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The authors, Mr. Brian Makaka, Dr. Moses Chirimbana, Dr. Lahya Nghipandulwa, state that they have no competing interests with regard to the publishing of this paper. They affirm that the study was conducted objectively and without any financial or interpersonal ties that might be thought to have influenced the findings or how they were interpreted.

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