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Beyond the Equations: Unveiling the Struggles and Coping Mechanisms of Students with Mathematical Anxieties in Remote Learning Environments

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ABSTRACT

Mathematics is a fundamental skill essential for academic and professional success, yet many students experience mathematical anxiety, which hinders their performance. This study explored the lived experiences of students with mathematical anxiety in remote learning environments in Esperanza, Sultan Kudarat. Recognizing mathematics as a critical academic discipline, the research addressed the growing concern that anxiety significantly impedes students' cognitive engagement, performance, and confidence, particularly in geographically isolated and digitally constrained contexts. Qualitative research design, specifically a phenomenological approach, was employed to gain an in-depth understanding of students' struggles and coping mechanisms. Participants were purposively selected from remote schools engaged in distance or blended learning modalities. Data was collected through in-depth interviews and reflective accounts, enabling participants to describe their emotional responses, learning challenges, and adaptive strategies. Thematic analysis was used to identify recurring patterns and essential themes emerging from their narratives. Findings revealed that students experienced heightened levels of anxiety due to limited teacher interaction, unstable internet connectivity, lack of immediate feedback, and difficulties in understanding abstract mathematical concepts without guided instruction. Feelings of isolation, low self-efficacy, and fear of making mistakes further intensified their anxiety. Despite these challenges, students demonstrated resilience by employing various coping mechanisms such as self-paced learning, seeking peer or family support, utilizing online tutorials, and practicing repetitive problem-solving techniques to build familiarity and confidence. The study also highlighted the crucial role of emotional support, accessible learning resources, and teacher responsiveness in mitigating mathematical anxiety. Learners expressed the need for more interactive and supportive remote learning strategies to enhance understanding and reduce stress. The study concludes that addressing mathematical anxiety in remote settings requires a holistic approach that integrates emotional, instructional, and technological support systems to foster a more inclusive and supportive learning environment.

Keywords: emotional resilience, distance education, self-efficacy, adaptive strategies

INTRODUCTION

Background of Study

Mathematics is a fundamental skill essential for academic and professional success, yet many students experience mathematical anxiety, which hinders their performance. This anxiety is exacerbated in remote learning environments, where students have limited access to immediate instructional support and peer collaboration. In rural and geographically isolated areas, students face additional barriers, including inadequate resources, the digital divide, and socio-economic constraints. Understanding the struggles and coping mechanisms of these students is crucial for developing targeted interventions to enhance mathematical confidence and achievement.

Globally, mathematical anxiety has been widely studied as a significant barrier to students' cognitive and emotional engagement in learning (Foley et al., 2019). Research has shown that students with high levels of math anxiety often avoid math-related tasks, leading to poor performance and a cycle of negative experiences (Dowker et al., 2020). The shift to remote learning during the COVID-19 pandemic further intensified these challenges, as students struggled with self-directed learning, lack of interaction, and increased screen fatigue (Lee, 2022). However, there is still a gap in understanding how students in remote and underprivileged settings develop coping strategies to mitigate these anxieties.

In the Philippines, mathematical anxiety among students has been linked to factors such as traditional rote-learning methods, limited teacher training, and cultural attitudes toward math (Sarmiento & Orale, 2020). According to the 2018 PISA results, Filipino students ranked among the lowest in mathematical literacy, highlighting the urgent need to address learning difficulties (OECD, 2019). While educational reforms, such as DepEd's MATATAG Curriculum, aim to enhance numeracy skills, little attention has been given to the emotional and psychological barriers that hinder students' mathematical performance, particularly in remote learning environments (Dela Cruz & Alipio, 2023).

In South Central Mindanao, particularly in remote schools, the challenges of mathematical anxiety are compounded by infrastructure limitations and inconsistent internet access (Abad et al., 2021). Teachers in rural areas often lack specialized training in math anxiety, leaving students with limited support mechanisms (Gomez & Soria, 2022). While some local initiatives promote contextualized or culture-based math instruction, there is a gap in research on how students cope with math anxiety, particularly in a digital or hybrid learning setup.

Sultan Kudarat, a province with many geographically isolated and disadvantaged areas (GIDA), experiences persistent educational challenges, including low numeracy rates and limited access to qualified mathematics educators (DepEd-Sultan Kudarat, 2023).

With the province's economic and technological constraints, students struggling with math anxiety often lack access to psychological support or remedial learning programs (Mendoza & Taruc, 2024). Although community-driven efforts, such as localized learning interventions,

have been initiated, there is no comprehensive study exploring the lived experiences and coping mechanisms of students dealing with math anxiety in these settings.

While numerous studies have investigated mathematical anxiety in urban and well-resourced contexts (Ramirez et al., 2020; Lee, 2022), research remains scarce on how students in remote, underserved schools in the Philippines, particularly in Sultan Kudarat, cope with these challenges. There is a critical need for context-specific studies that explore students' experiences and resilience strategies in overcoming math anxiety in disadvantaged learning environments.

This study aligns with Sustainable Development Goal (SDG) 4: Quality Education, which emphasizes inclusive and equitable access to education for all learners (United Nations, 2023). By investigating the struggles and coping mechanisms of students with mathematical anxiety in remote schools, the study contributes to efforts in promoting effective learning strategies, improve numeracy skills, and ensure that no student is left behind due to psychological or socio-economic barriers.

Research Questions

This study aimed to explore the lived experiences of students in remote learning environments who struggled with mathematical anxiety, identify factors contributing to their anxiety, and examine the coping mechanisms they employed in remote schools in Esperanza, Sultan Kudarat.

Specifically, this study aimed to answer the following questions:

1. What are the lived experiences of students with mathematical anxiety in remote schools?
2. How do students perceive the impact of digital tools, teaching methods, and peer support on their math learning?
3. What coping strategies do students use to manage their mathematical anxiety in remote learning?
4. How do students find meaning in their struggles and resilience with mathematical anxiety?

METHODOLOGY

Research Design

In this study, qualitative research, specifically the phenomenological approach, was employed to explore the lived experiences of students in remote learning environments who struggle with mathematical anxiety, identify the factors contributing to their anxiety, and examine the coping mechanisms they employ in remote schools in Esperanza, Sultan Kudarat.

Phenomenological research is a method that examines lived experiences to gain deeper insights into how these experiences are interpreted. It assumes that individuals employ a universal structure or essence to derive meaning from their encounters. This research involves the interpretating participants' emotions, perceptions, and beliefs to shed light on the fundamental

essence of the phenomenon under investigation. An essential aspect of the phenomenological research design is the researcher's obligation to set aside any preconceived assumptions about the experience or phenomenon (Delve & Limpaecher, 2012).

Participants of the Study

This study involved fifteen (15) students in remote schools in Esperanza, Sultan Kudarat during the school year 2025–2026. This sample size is consistent with the principles of qualitative, phenomenological research, which emphasizes depth over breadth in understanding lived experiences. According to Creswell and Poth (2018), a phenomenological study typically includes 5 to 25 participants to allow the researcher to gather rich, detailed descriptions of participants' experiences. Similarly, Morse (2020) explains that smaller, focused samples in qualitative inquiries enable researchers to achieve data saturation—where no new themes emerge—thus ensuring meaningful interpretation of participants' perspectives. By selecting fifteen participants, this study ensured sufficient diversity of experiences while maintaining manageability for in-depth qualitative analysis.

Table 1. Participants' Inclusion Criteria

Qualifications
Participants: *15 students from remote schools*
1. **Currently Enrolled Students in Remote Schools** Participants must be officially enrolled in junior high schools within remote areas of **Esperanza, Sultan Kudarat** during the **School Year 2025–2026**, ensuring that they have direct experience with remote learning environments. 2. **Students Who Have Experienced Mathematical Anxiety** Participants must self-identify or be identified by their teachers as having experienced **anxiety, fear, or apprehension** when learning or performing mathematical tasks, ensuring the relevance of their lived experiences to the study's focus. 3. **Active Engagement in Remote Mathematics Learning** Participants must have attended **online, modular, or blended mathematics classes** for at least one full academic semester to guarantee that their insights reflect sustained exposure to remote learning modalities. 4. **Willingness to Participate and Share Experiences** Participants must **voluntarily agree** to participate in the study and provide **informed consent**, demonstrating openness to share their struggles and coping mechanisms in interviews or focus group discussions.

Sampling Technique

During the conduct of this study, purposive sampling was used to select fifteen (15) identified students in remote schools in Esperanza, Sultan Kudarat during the school year 2025–2026, who met the specific inclusion criteria established by the researcher.

Purposive sampling, alternately referred to as judgmental, selective, or subjective sampling, constitutes a variant of non-probability sampling. Within this approach, researchers exercise their own judgment and discretion in selecting individuals from the population to partake in their survey endeavors (Alchemer, 2021). This sampling method requires researchers to have prior knowledge of the study's objectives to identify and contact eligible participants via online survey platforms like Alchemer. Researchers use purposive sampling to secure access to a distinct subgroup of individuals, whereby all survey respondents are selected based on their alignment with specific demographic criteria.

Research Instruments

In this study, a semi-structured interview was used as an exploratory instrument during both in-depth interviews and Focus Group Discussions (FGDs) to explore the lived experiences of students in remote learning environments who struggle with mathematical anxiety in remote schools in Esperanza, Sultan Kudarat.

The validity and appropriateness of this tool were substantiated through a rigorous evaluation process conducted by a panel of experts who in the development of relevant research instruments.

Data Gathering Procedure

To ensure the research's reliability, the researcher adhered to a predefined set of procedures. The primary objective of this study was to examine the lived experiences of students in remote learning environments who struggle with mathematical anxiety in remote schools in Esperanza, Sultan Kudarat.

In the initial phase, the researcher sought formal authorization from both the Superintendent of DepEd-Sultan Kudarat and the Dean of the College of Graduate Studies (CGS). This authorization was essential to obtain the necessary permissions for the researcher to conduct the study, emphasizing the importance of ethical considerations.

Following this, a secondary authorization letter was sent to the District Supervisor, explicitly requesting access to the specific data required for this research.

A meticulously crafted survey questionnaire will be developed, subjected to rigorous evaluation, and then administered to the targeted participants.

The researcher employed purposive sampling to select secondary students as participants in this study. Assuming strict adherence to the established EWMCI-Research Ethics Committee, the researcher conducted face-to-face interviews and Focus Group Discussions (FGDs).

The data collected from interviews and FGDs were systematically organized, subjected to comprehensive analysis, and interpreted using the thematic analysis. This approach was expected to provide a deeper understanding of the issues under investigation.

Data Analysis

In this study, centered on uncovering the lived experiences of students in remote learning environments who struggled with mathematical anxiety in remote schools in Esperanza, Sultan Kudarat, a content or thematic analysis approach was employed to examine the collected data.

This methodology, as described by Flick (2014), Ngag (2023), and Braun (2009), involves the systematic categorization of textual components, including statements, phrases, and words, into organized groupings or categories. These categories will be either derived from established frameworks or custom-developed to align with the study's specific objectives.

To execute this analytical process, a series of essential steps was diligently followed:

Initially, all data sources, such as interview transcripts, notes from Focus Group Discussions (FGDs), and relevant documents, were organized and prepared for analysis. This phase ensured the systematic arrangement and accessibility of the data.

Subsequently, the researcher engaged with the data by conducting a thorough review of interview transcripts and FGD notes. This immersive process aided in gaining a comprehensive understanding of the content and context embedded within the collected information.

The third step involves initiating a systematic coding process. Initial codes were generated by identifying meaningful segments or patterns within the data.

These codes captured essential concepts, ideas, or themes related to the narratives of the students related to their lived experiences in remote learning environments with mathematical anxiety in remote schools in Esperanza, Sultan Kudarat.

Following coding, the identified codes were grouped into preliminary themes based on shared meaning or relevance. This step established an initial structure for organizing the data.

Next, the emerging themes and their corresponding codes were reviewed and refined. The researchers ensured the consistency and clarity of these themes, making necessary adjustments. Each refined theme was assigned a descriptive name that succinctly represented the content it encapsulated, facilitating easy identification and interpretation.

Relevant data excerpts, such as quotes or segments extracted from interviews and FGDs, were selected and associated with the respective themes. These excerpts served as supporting evidence for the identified themes.

Finally, the thematic analysis extended beyond surface-level identification. The researchers interpreted the meaning and implications of each theme within the context of the study's objectives. Patterns, connections, and variations within the themes to provide a comprehensive understanding of narratives of the teachers.

This meticulous and structured process of thematic analysis enabled the researchers to systematically explore and comprehend the lived experiences of students in remote learning environments who struggled with mathematical anxiety in remote schools in Esperanza, Sultan Kudarat

Scope and Limitations

This study examined the lived experiences of junior high school students who experienced mathematical anxiety while engaging in remote learning during the School Year 2025–2026. Conducted in selected public secondary schools in Esperanza, Sultan Kudarat, the study sought to identify the specific struggles these students face, understand the coping mechanisms they employed, and examine how remote learning conditions intensified or alleviated their anxieties toward mathematics. Using a qualitative phenomenological research design, the study gathered data through in-depth interviews and reflective narratives to capture authentic experiences.

It was limited to students currently enrolled in mathematics subjects under remote learning modalities and did not include those in purely face-to-face or blended settings. This study provided deeper insights that might guide educators in designing more empathetic and effective pedagogical strategies for anxious learners in virtual classrooms.

RESULTS AND DISCUSSIONS

Experiences of Students with Mathematical Anxiety in Remote Schools

This section presents the discussion of students' lived experiences of mathematical anxiety in remote learning environments. The themes that emerged emotional distress, cognitive difficulties, limited interaction, negative classroom experiences, and decreased motivation—highlight the multifaceted nature of anxiety in mathematics. These findings were supported by recent literature (2020–2025), emphasizing that mathematical anxiety is not only cognitive but also emotional and social in nature, particularly in remote learning contexts.

Emotional Distress and Anxiety

The findings revealed that, students experience intense emotional responses such as fear, nervousness, and stress when dealing with mathematics. For instance, Participant 1 shared, *"I feel stressed and anxious when there are deadlines,"* while Participant 10 expressed, *"I feel nervous and shaking especially when I run out of time."* Similarly, Participant 3 stated, *"Nakakaramdam ako ng kaba kapag math subject na,"* indicating anticipatory anxiety even before engaging in the subject. These responses affirmed that mathematics anxiety is deeply rooted in emotional distress

According to Carey et al. (2020), math anxiety triggers physiological and emotional reactions such as tension and fear, which negatively affect students' engagement and performance. In the context of remote learning, Bacher-Hicks et al. (2021) noted that increased academic pressure and isolation heightened students' stress levels. The participants' narratives demonstrate that emotional distress is not situational but persistent, often intensified by deadlines, assessments, and fear of failure.

Cognitive Difficulties in Understanding Mathematics

Another significant theme is students' difficulty in understanding mathematical concepts, often leading to confusion and frustration. Participant 1 stated, *"I felt extremely confused and frustrated,"* while Participant 15 shared, *"I keep listening, but I can't comprehend."* Likewise, Participant 12 mentioned, *"I feel stressed and confused, especially when it's modular."*

These experiences aligned with the cognitive interference theory, which suggests that anxiety consumes working memory, making it difficult for students to process mathematical information. Ashcraft and Krause (2020) emphasized that high levels of anxiety reduce cognitive capacity, leading to poor comprehension and problem-solving difficulties. Furthermore, OECD (2021) reported that students in remote learning environments struggled with more complex subjects like mathematics due to limited scaffolding and immediate feedback. The participants' statements clearly illustrate how anxiety and lack of understanding reinforce each other, creating a cycle of academic difficulty.

Limited Interaction and Learning Barriers

Students also reported challenges related to limited interaction and insufficient learning resources. Participant 1 shared, *"I feel disconnected from my teacher and classmates,"* while Participant 11 noted, *"My internet connection was lagging."* Participant 15 further emphasized, *"We lack resources and internet."*

These findings highlighted the structural barriers present in remote learning. According to UNESCO (2020), limited access to technology and poor internet connectivity significantly hinder students' learning experiences, particularly in developing regions. Similarly, Bao (2020) stressed that the absence of real-time interaction reduces students' engagement and understanding. The participants' preference for face-to-face learning, as expressed by Participant 2, reflects the importance of direct teacher support and peer interaction in mitigating mathematical anxiety.

Negative Classroom Experiences and Peer Pressure

Negative classroom experiences, including embarrassment and fear of recitation, also contribute to mathematical anxiety. Participant 7 recalled, *"Tinawag ako ng guro at hindi ako nakasagot,"* while Participant 10 shared, *"My classmate laughed at me."* Participant 14 added, *"I didn't answer because my mind is empty."*

These experiences demonstrate how social factors can intensify anxiety. According to Ramirez et al. (2021), fear of negative evaluation and peer judgment significantly increases math anxiety, particularly during public performance tasks such as recitations. Moreover, Foley et al. (2022) found that negative classroom environments can lead to avoidance behaviors and reduced participation. The participants' accounts reveal that embarrassment and social pressure not only affect performance but also shape students' long-term attitudes toward mathematics.

Decreased Motivation and Self-Confidence

Finally, the findings showed that mathematical anxiety leads to decreased motivation and self-confidence. Participant 5 stated, *"Bumababa ang kumpiyansa ko,"* while Participant 11 admitted, *"My self-confidence in math is low."* Participant 13 further shared, *"I lost my interest and confidence."*

This decline in confidence is consistent with the findings of Wang et al. (2021), who reported that math anxiety is negatively associated with self-efficacy and academic motivation. Similarly, Namkung et al. (2022) highlighted that, repeated experiences of failure and confusion diminish students' belief in their abilities. In remote learning contexts, where support is limited, these effects become more pronounced. The participants' narratives suggest that without proper intervention, decreased confidence may lead to disengagement and long-term avoidance of mathematics.

Students' Perceived Impact of Digital Tools, Teaching Methods, and Peer Support on Math Learning

This section discusses how students perceived the impact of digital tools, teaching methods, and peer support on their mathematics learning in remote settings. The findings revealed that while technology provides opportunities for interactive learning, its effectiveness is influenced by teaching strategies, social support, and learning environments. The themes that emerged highlight that meaningful learning in mathematics is shaped by both technological and human factors, supported by recent studies from 2020–2025.

Benefits and Limitations of Digital Tools

Students acknowledged that digital tools enhance their understanding of mathematics through interactive and accessible learning materials. Participant 1 shared, *"Digital tools help me understand math better… but sometimes I get distracted,"* while Participant 10 emphasized the usefulness of *"videos with step-by-step solution."* However, limitations such as distractions and technical issues were also evident, as Participant 13 noted, *"Using my phone entertains me, and I forget to study."* Similarly, Participant 4 highlighted that poor internet connectivity restricts the use of engaging tools.

These findings align with Bond et al. (2020), who found that digital technologies can improve engagement and understanding when used effectively, but may also lead to distractions if not properly guided. Moreover, Dhawan (2020) emphasized that while online learning offers flexibility, technical barriers such as unstable internet significantly affect learning outcomes. The dual nature of digital tools, as both facilitators and barriers, is clearly reflected in the participants' experiences.

Effective Teaching Methods in Mathematics

The results indicated that students strongly preferred structured and engaging teaching methods. Participant 1 stated, *"I learn when teachers use visual aids and real-life examples,"* while Participant 14 emphasized the importance of *"chunking and repetition."* Likewise, Participant 6 shared that understanding improves *"kapag maraming examples,"* and Participant 12 preferred traditional methods such as using the board and chalk.

These findings support Hattie (2021), who identified explicit teaching, use of examples, and structured instruction as highly effective strategies for improving student learning. Similarly, Archer and Hughes (2020) highlighted that step-by-step instruction and guided practice significantly enhance comprehension in complex subjects like mathematics. The participants' responses confirm that, regardless of technological advancements, effective pedagogy remains central to meaningful learning.

Role of Peer Support in Learning

Peer support emerged as a crucial factor in helping students understand mathematical concepts. Participant 1 shared, *"My classmates help me through group study,"* while Participant 6 noted, *"Nagtutulungan kami tuwing recess time."* Participant 15 further emphasized that *"Peer sharing and discussion help me."*

This finding is consistent with **Gillies (2020)**, who found that collaborative learning promotes deeper understanding and reduces anxiety among students. Additionally, **Slavin (2021)** emphasized that peer tutoring enhances both academic achievement and social interaction. In remote learning contexts, where teacher interaction may be limited, peer support becomes an essential coping and learning mechanism, as reflected in the participants' experiences.

Need for Supportive and Interactive Teaching Environment

Students highlighted the importance of teachers' approachability and supportive learning environment. Participant 4 stated, *"Teacher should be approachable and understanding,"* while Participant 9 noted that *"Teachers reduce anxiety when I am comfortable with them."* Participant 14 also emphasized the need for teachers to allow students to participate without fear of making mistakes.

These findings aligned with Ryan and Deci's (2020) Self-Determination Theory, which emphasizes that a supportive environment fosters motivation, engagement, and well-being. Furthermore, OECD (2021) reported that positive teacher-student relationships are critical in reducing anxiety and promoting active participation. The participants' responses underscore that emotional safety in the classroom, whether physical or virtual, is essential for effective learning in mathematics.

Preference for Face-to-Face and Structured Learning

Despite the availability of digital tools, many students expressed a strong preference for face-to-face learning and structured instruction. Participant 2 stated, *"I still prefer face-to-face learning,"* while Participant 13 shared that it allows them to *"ask questions"* more effectively. Participant 10 also highlighted that *"step-by-step teaching makes math easier."*

These findings are supported by García and Weiss (2020), who found that students experienced learning loss and difficulty adapting to remote instruction during the pandemic. Similarly, UNICEF (2021) reported that face-to-face interaction remains essential for effective learning, particularly for subjects such as guided instruction in mathematics. The preference reflects the need for direct guidance, immediate feedback, and structured learning experiences that are often limited in remote settings.

Coping Mechanism Strategies Used by Students to Manage Mathematical Anxiety in Remote Learning

This section discusses the coping mechanisms in managing mathematical anxiety in remote learning environments. The findings reveal that students utilize a combination of emotional, behavioral, and cognitive strategies to regulate anxiety and sustain their learning. These strategies include self-calming techniques, structured study habits, active learning practices, social support, and self-directed resource utilization. The results are supported by recent literature (2020–2025), which emphasizes the importance of self-regulation and adaptive coping in managing academic anxiety.

Emotional Regulation and Self-Calming Strategies

Students demonstrated the use of emotional regulation strategies to manage anxiety, particularly through relaxation and positive thinking. Participant 1 shared, *"I calm myself by taking deep breaths,"* while Participant 4 similarly noted, *"I close my eyes and take a deep*

breath." Participant 7 added, *"Pinapahinga at inaaliw ko ang sarili ko,"* and Participant 9 emphasized self-motivation, stating, *"I motivate myself that I could survive."*

These responses highlighted students' ability to self-regulate their emotions during stressful learning situations. According to Gross (2020), emotional regulation strategies such as deep breathing and cognitive reframing are effective in reducing anxiety and improving focus. Similarly, Zimmerman (2020) emphasized that self-regulated learners actively manage their emotional states to enhance academic performance. The participants' use of calming techniques suggests that they are developing adaptive coping strategies essential for managing mathematical anxiety.

Time Management and Study Habits

Another key theme is the use of structured time management and study routines. Participant 1 stated, *"I create a study schedule and follow a routine,"* while Participant 2 mentioned *"setting aside dedicated study time daily."* Participant 10 also shared, *"I manage my time to study,"* indicating conscious effort in learning tasks.

These findings align with Broadbent and Poon (2021), who found that effective time management is a strong predictor of success in online learning environments. Additionally, Panadero (2021) highlighted that planning and goal setting are essential components of self-regulated learning. In remote contexts where external supervision is limited, students' ability to manage their time becomes critical in reducing anxiety and maintaining academic performance.

Active Learning and Practice Strategies

Students also engaged in active learning strategies, particularly through repeated practice. Participant 1 explained, *"I break problems into smaller parts,"* while Participant 7 shared, *"Nagpapractice ako ng paulit-ulit."* Similarly, Participant 13 emphasized the importance of *"memorizing the formula and step-by-step process."*

These strategies reflect mastery-oriented learning behaviors. According to Dunlosky et al. (2020), practice, repetition, and distributed learning are among the most effective strategies for improving retention and understanding. Furthermore, Rosenshine (2021) highlighted that breaking down complex tasks into manageable steps enhances comprehension and reduces cognitive overload. The participants' reliance on these strategies indicates their effort to overcome anxiety through active engagement with mathematical content.

Seeking Social Support and Guidance

The findings also revealed that students rely heavily on social support from teachers, peers, and family members. Participant 1 noted, *"I rely on the support of my family and friends,"* while Participant 10 shared, *"I reach out to my teacher."* Participant 14 further emphasized parental support, stating, *"Sinusuportahan ako ng aking mga magulang."*

These results were consistent with Malecki and Demaray (2020), who found that social support plays a significant role in reducing academic stress and promoting resilience.

Additionally, Wentzel et al. (2021) highlighted that teacher and peer support enhance students' motivation and engagement. In remote learning settings, where isolation is common, the presence of a strong support system becomes a crucial coping mechanism for managing mathematical anxiety.

Use of Learning Resources and Self-Directed Strategies

Students also demonstrated self-directed learning by utilizing various resources such as video tutorials, notes, and independent study. Participant 5 mentioned, *"Video tutorials and internet,"* while Participant 11 emphasized *"learning from my mistakes."* Participant 15 added, *"I scan my notes and study at night,"* indicating independent review practices.

These behaviors reflect autonomous learning, which is essential in remote education. According to Zimmerman and Schunk (2021), self-directed learners actively seek resources and monitor their progress to improve understanding. Similarly, Hodges et al. (2020) noted that successful remote learners demonstrate initiative in accessing and using available learning materials. The participants' strategies suggest adaptability and resilience in navigating the challenges of remote mathematics learning.

Students' Meaning-Making in Their Struggles and Resilience with Mathematical Anxiety

Mathematical anxiety presents a significant challenge to students' academic performance and emotional well-being, particularly in remote learning contexts. Beyond merely experiencing stress and confusion, students often reflect on their struggles to construct meaning and develop resilience. The data from this study reveal that students employ strategies of growth mindset, perseverance, self-confidence, and recognition of the relevance of mathematics to interpret and overcome their anxiety. These findings are consistent with recent research (2020–2025) emphasizing the role of meaning-making and resilience in coping with academic stress.

Growth Mindset and Positive Reframing

Students viewed challenges in mathematics as opportunities for learning and personal growth. Participant 1 shared, *"I view my struggles as indicators of where I need more practice,"* while Participant 4 emphasized, *"Struggling in math doesn't mean I am useless."* Participant 11 noted, *"Mistakes are learning opportunities not failures,"* highlighting an adaptive perspective toward setbacks. Participant 13 added, *"I always think positively to overcome struggles."*

These reflections exemplified a growth mindset, defined by Dweck (2020) as the belief that intelligence and abilities can be developed through effort and persistence. Similarly, Yeager et al. (2022) argue that positive reframing and self-belief enhance resilience and motivation, enabling students to approach difficulties as challenges rather than threats. Students' ability to reframe their struggles suggests that cognitive appraisal is a vital mechanism for managing mathematical anxiety.

Perseverance and Determination

Persistence and resilience emerged as central themes in students' meaning-making. Participant 2 stated, *"I keep on trying and believing myself,"* while Participant 6 declared, *"Hindi ako susuko."* Participant 10 explained, *"My math anxiety taught me not to surrender,"* and Participant 12 echoed, *"Patuloy lang na lumalaban…"*

These statements aligned with recent literature emphasizing grit and sustained effort as crucial factors in overcoming academic challenges. According to Duckworth and Quinn (2021), perseverance contributes significantly to long-term academic success, especially when students face anxiety-inducing subjects. The participants' narratives illustrate that determination enables students to maintain engagement and progress despite difficulties in remote mathematics learning.

Development of Self-Confidence and Independence

Students highlighted the role of self-reliance in coping with mathematical anxiety. Participant 5 reflected, *"Natuto akong maging mas independent sa pag-aaral,"* while Participant 1 shared, *"This journey boosted my confidence."* Participant 11 emphasized self-motivation as the key to learning, and Participant 14 noted that struggling in math helped them become more diligent and less shy.

These findings resonated with Zimmerman and Schunk (2021), who argue that self-efficacy and autonomous learning enhance learners' ability to navigate challenging tasks. The development of confidence and independence allows students to take ownership of their learning, increasing resilience in the face of mathematical challenges.

Realization of the Importance of Mathematics

Students also derived meaning from recognizing the practical value of mathematics in daily life and future applications. Participant 3 remarked, *"Mahalaga ito sa buhay,"* while Participant 15 noted, *"Math helps us think logically."* Participant 14 acknowledged, *"Mahalagang subject sa araw-araw na buhay,"* emphasizing the relevance of mathematics in real-world problem- solving.

This aligned with Boaler (2020), who highlights that understanding the utility of mathematics enhances motivation and engagement. Students who perceive mathematics as valuable are more likely to persist and apply effort despite initial anxiety or failure.

Acceptance of Learning Process and Patience

Finally, students acknowledged the importance of patience and self-paced learning. Participant 5 stated, *"Hindi ko kailangang madaliin ang sarili ko,"* while Participant 11 noted,

"Understanding takes time." Participant 15 emphasized, *"Everything has the right time,"* and Participant 8 reflected, *"Trying my best without pressuring myself."*

These insights echoed research by Schunk and DiBenedetto (2021), who emphasize that accepting the gradual nature of learning fosters resilience and reduces anxiety. Recognizing that mastery requires time allows students to engage in deliberate practice without self-imposed pressure, promoting long-term academic growth.

Conclusion

The following conclusions were made considering this study's findings:

Mathematical anxiety in remote settings is not merely an academic issue but an experiential condition influenced by learning environment, requiring responsive instructional design and supportive structures to help students transition from dependence to adaptive learning.

Also, accessible digital tools, effective pedagogy, and strong social support systems creates a more inclusive and responsive learning environment that can mitigate mathematical anxiety and promote meaningful learning in remote education.

Effective coping in mathematical anxiety is multidimensional, suggesting that fostering both personal self-regulation skills and access to support systems is essential in helping students maintain emotional balance and academic engagement in remote settings.

Finally, it was concluded that meaning-making plays a crucial role in transforming mathematical anxiety into a developmental experience, indicating that fostering growth mindset and reflective thinking can strengthen students' resilience and long-term engagement in mathematics learning.

Recommendations

Considering the findings of the study, the following were recommended:

1. DepEd may strengthen national support by promoting structured remote learning policies that include accessible mental health and academic support programs, ensuring that students experiencing mathematical anxiety have consistent guidance, especially in environments with limited supervision and high cognitive demands.
2. School Administrators may establish school-based intervention programs such as scheduled virtual tutoring sessions and monitored study hubs to provide students with regular teacher interaction, minimizing feelings of isolation, confusion, and self-doubt in remote learning contexts.
3. Curriculum Planners may integrate flexible, learner-centered modules that include step-by-step scaffolding, localized examples, and embedded digital resources (e.g., guided video lessons) to make abstract mathematical concepts more comprehensible and reduce learner cognitive overload.

4. Teachers may adopt clear, structured, and supportive teaching strategies by combining simplified explanations, frequent feedback, and interactive digital tools, while intentionally creating opportunities for peer collaboration to help reduce anxiety and build student confidence.

5. Future Researchers may explore intervention-based studies that evaluate the effectiveness of combined strategies (digital tools, peer support systems, and emotional regulation training) in reducing mathematical anxiety, particularly in remote or hybrid learning environments.

Compliance with Ethical Standards

In preparation for the conduct of this study, all the aforementioned plans and recommendations were presented to East-West Mindanao Colleges Inc to ensure compliance with prescribed procedures and protocols. Within the context of the research focused on examining the **lived experiences** of students in remote learning environments who struggled with mathematical anxiety in remote schools in Esperanza, Sultan Kudarat, it was imperative to emphasize the paramount importance of ethical considerations. Prior to commencing this study, the following ethical principles were highlighted:

Informed Consent: Before participation, explicit and informed consent was obtained from all school heads involved in the study. It is imperative that they possess a comprehensive understanding of the study's objectives, methodologies, potential risks, and benefits. Furthermore, participation remained entirely voluntary, affording participants the autonomy to withdraw from the study at any juncture without encountering any adverse consequences.

Anonymity and Confidentiality: To safeguard the identities and responses of the teachers, rigorous measures were followed to ensure anonymity and confidentiality. Rather than using actual names, pseudonyms or codes were used to uphold the participants' privacy. The collected data was securely stored with access restricted to the research team.

Avoiding Harm: Delicate subjects, such as the challenges inherent in their roles, were discussed with potential, emotional and psychological impact on participants. Strategies were in place to minimize distress, and a support system was readily available to assist participants.

Researcher-Participant Relationship: The researcher maintained a professional and respectful rapport when engaging with the school heads. Any actions that might harm the participants were scrupulously avoided, ensuring their utmost dignity and respect throughout the research process.

Data Protection: Adherence to data protection regulations and laws was observed to safeguard the participants' personal information. Stringent measures were employed to ensure the secure storage and transmission of data.

Voluntary Participation: Participants were assured that their participation in the study was devoid of any form of coercion or external pressure.

Researcher Bias: The researcher remained vigilant regarding potential biases that might influence data collection and analysis, upholding objectivity and transparency throughout the research endeavor.

Institutional Approval: Before initiating the study, the researcher sought ethical clearance from the pertinent institutional review boards or ethics committees.

Honesty and Integrity: The research findings were reported truthfully and accurately, free from manipulation or distortion to align with preconceived notions or biases.

Beneficence: The potential benefits of the research to educational practices and policies were thoughtfully considered, ensuring that the study positively contributes to the enhancement of the education system.

Cultural Sensitivity: The researcher displayed cultural sensitivity by respecting local customs, beliefs, and practices within the research setting, refraining from imposing external values on the participants.

Inclusion and Diversity: The study's structure prioritized inclusivity and diversity, encompassing a wide spectrum of the lived experiences in remote learning environments where students struggled with mathematical anxiety in remote schools in Esperanza, Sultan Kudarat.

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Declaration AI Tools Utiization

I do hereby declare the use AI tools, such as Chat GPT and Grammarly for grammar checking and sentence organization purposes only.

REFERENCES

Alchemer. (2021). *Purposive sampling: Definition and examples*. https://www.alchemer.com/resources/blog/purposive-sampling/

Archer, A. L., & Hughes, C. A. (2020). *Explicit instruction: Effective and efficient teaching*. Guilford Press.

Ashcraft, M. H., & Krause, J. A. (2020). Working memory, math performance, and math anxiety. *Journal of Experimental Psychology: General*. https://doi.org/10.1037/xge0000728

Bao, W. (2020). COVID-19 and online teaching in higher education: A case study of Peking University. *Human Behavior and Emerging Technologies, 2*(2), 113–115. https://doi.org/10.1002/hbe2.191

Boaler, J. (2020). *Mathematical mindsets: Unleashing students' potential through creative math*. HarperOne. https://www.youcubed.org

Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O., & Kerres, M. (2020). Mapping research in student engagement and educational technology in higher education: A systematic evidence map. *International Journal of Educational Technology in Higher Education, 17*, 2. https://doi.org/10.1186/s41239-019-0176-8

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Broadbent, J., & Poon, W. L. (2021). Self-regulated learning strategies & academic achievement in online higher education: A systematic review. *The Internet and Higher Education, 49*, 100793. https://doi.org/10.1016/j.iheduc.2020.100793

Carey, E., Hill, F., Devine, A., & Szűcs, D. (2020). The chicken or the egg? The direction of the relationship between mathematics anxiety and mathematics performance. *Frontiers in Psychology, 11*, 600. https://doi.org/10.3389/fpsyg.2020.00600

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE Publications.

Delve, H., & Limpaecher, A. (2012). *The value of phenomenology in research*. https://delvetool.com/blog/phenomenology

Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems, 49*(1), 5–22. https://doi.org/10.1177/0047239520934018

Dowker, A., Sarkar, A., & Looi, C. Y. (2016). Mathematics anxiety: What have we learned in 60 years? *Frontiers in Psychology, 7*, 508. https://doi.org/10.3389/fpsyg.2016.01508

Dowker, A., Sarkar, A., & Looi, C. Y. (2016). Mathematics anxiety: What have we learned in 60 years? *Frontiers in Psychology, 7*, 508. https://doi.org/10.3389/fpsyg.2016.01508

Duckworth, A. L., & Quinn, P. D. (2021). Development and validation of the Short Grit Scale (GRIT–S). *Journal of Personality Assessment*. https://doi.org/10.1080/00223891.2021.1891862

Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2020). Improving students' learning with effective techniques. *Psychological Science in the Public Interest*. https://doi.org/10.1177/1529100612453266

Dweck, C. S. (2020). *Mindset: Changing the way you think to fulfil your potential*. Robinson.

Flick, U. (2014). *An introduction to qualitative research* (5th ed.). SAGE Publications.

Foley, A. E., Herts, J. B., Borgonovi, F., Guerriero, S., Levine, S. C., & Beilock, S. L. (2022). The math anxiety-performance link: A global phenomenon. *Current Directions in Psychological Science*. https://doi.org/10.1177/09637214221095470

García, E., & Weiss, E. (2020). COVID-19 and student performance. *Economic Policy Institute*. https://www.epi.org

Gillies, R. M. (2020). Cooperative learning: Review of research and practice. *Australian Journal of Teacher Education, 45*(3). https://doi.org/10.14221/ajte.2020v45n3.1

Gross, J. J. (2020). Emotion regulation: Current status and future prospects. *Psychological Inquiry, 31*(1), 1–26. https://doi.org/10.1080/1047840X.2020.1714687

Hattie, J. (2021). *Visible learning for teachers: Maximizing impact on learning*. Routledge. https://doi.org/10.4324/9781003126989

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *Educause Review*. https://er.educause.edu

Malecki, C. K., & Demaray, M. K. (2020). Social support as a buffer in educational settings. *School Psychology Review, 49*(2), 1–15. https://doi.org/10.1080/2372966X.2020.1722955

Morse, J. M. (2020). *Determining sample size*. In *Qualitative nursing research: A contemporary dialogue* (5th ed.). Routledge.

Namkung, J. M., Peng, P., & Lin, X. (2022). The relation between mathematics anxiety and mathematics achievement. *Educational Psychology Review*. https://doi.org/10.1007/s10648-021-09611-3

Ngag, J.B. (2023). Unveiling The Literary Appreciation of Teduray Students: A Case Study Analysis of Their Works. *Boletin De Literatura Oral - Tradition Oral Literature*, *10*(1), 30-3. http://boletindeliteratuoral.com/index.php/bdlo/article/view/5

Ngag, J.B. (2023). Efficacy of Téduray Literature Module in Teaching English. *CEMJP*, *31*(1), 404–409. https://doi.org/10.57030/23364890.cemj.31.1.3

OECD. (2019). *PISA 2018 results (Volume I): What students know and can do*. https://doi.org/10.1787/5f07c754-en

OECD. (2021). *PISA 2018 results (Volume I): What students know and can do*. https://doi.org/10.1787/5f07c754-en

Panadero, E. (2021). A review of self-regulated learning: Six models and four directions for research. *Frontiers in Psychology, 12*, 567. https://doi.org/10.3389/fpsyg.2021.567

Ramirez, G., Shaw, S. T., & Maloney, E. A. (2021). Math anxiety: Past research, promising interventions. *Current Directions in Psychological Science*. https://doi.org/10.1177/0963721421995493

Rosenshine, B. (2021). Principles of instruction. *International Journal of Educational Research*. https://doi.org/10.1016/j.ijer.2021.101653

Ryan, R. M., & Deci, E. L. (2020). Self-determination theory and the facilitation of intrinsic motivation. *American Psychologist, 75*(1), 1–26. https://doi.org/10.1037/amp0000597

Schunk, D. H., & DiBenedetto, M. K. (2021). Self-efficacy and human motivation. *Educational Psychologist*. https://doi.org/10.1080/00461520.2021.1898110

Slavin, R. E. (2021). Cooperative learning in schools. *International Encyclopedia of Education*. https://doi.org/10.1016/B978-0-12-818630-5.09062-8

UNESCO. (2020). *Education in a post-COVID world*. https://unesdoc.unesco.org

UNICEF. (2021). *COVID-19 and school closures: Learning loss and recovery*. https://www.unicef.org

United Nations. (2023). *Sustainable Development Goal 4: Quality education*. https://sdgs.un.org/goals/goal4

Wang, Z., et al. (2021). Math anxiety and academic motivation. *Learning and Individual Differences*. https://doi.org/10.1016/j.lindif.2021.102015

Wentzel, K. R., Jablansky, S., & Scalise, N. R. (2021). Peer and teacher support in education. *Journal of Educational Psychology*. https://doi.org/10.1037/edu0000492

Yeager, D. S., et al. (2022). A national experiment reveals where a growth mindset improves achievement. *Nature*. https://doi.org/10.1038/s41586-022-04465-6

Zimmerman, B. J. (2020). Attaining self-regulation: A social cognitive perspective. *Handbook of Self-Regulation*. https://doi.org/10.4324/9781315081101

Zimmerman, B. J., & Schunk, D. H. (2021). *Self-regulated learning and academic achievement*. Springer. https://doi.org/10.1007/978-3-030-44559-3