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The Numbers Game: Exploring Everyday Math Applications

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A B S T R A C T

Mathematics is essential in everyday life and the modern world, yet its theoretical study in classrooms often needs more practical application, creating a gap in understanding. This study aims to bridge the gap between theoretical mathematics and real-world problem-solving by exploring how mathematical concepts can be applied in everyday life by everyday people. The study used a phenomenological research design and purposive sampling to explore the everyday applications of mathematics, interviewing 11 individuals from diverse backgrounds in Malaybalay City. The study reveals that mathematics is deeply embedded in everyday and professional activities and learned through authentic engagement. The result underscores the importance of contextualizing mathematical concepts to make them relevant and meaningful. Furthermore, the result emphasizes the need for an inclusive approach to mathematics education that integrates universal, practical, and culturally specific dimensions

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INTRODUCTION

Background of the Study

Mathematics, a cornerstone of human civilization, permeates countless facets of contemporary life. From the fundamental arithmetic operations that underpin daily transactions to the complex algorithms driving technological advancements, mathematics serves as an indispensable tool for comprehending and engaging with the world (Skovsmose, 2021). Mathematics provides a structured framework for problem-solving, decision-making, and innovation, empowering individuals and communities to address challenges and seize opportunities (Ucang, 2022). Its role in driving scientific discovery, economic growth, and technological progress is undeniable, making it a catalyst for human advancement (Verdeflor & Pacadaljen, 2021).

However, mathematics is often studied in the classroom in a way that emphasizes theoretical understanding over practical application. Many students encounter mathematical concepts through abstract exercises and theoretical discussions rather than seeing how these concepts play out in real-world scenarios (Posthuma-Coelho, 2016; Carandang et al., 2024). This disconnect can hinder their appreciation of the subject's relevance and utility. The course *Mathematics in the Modern World* aims to illustrate the practical applications of mathematics, yet many examples presented are not contextualized to everyday experiences and instead focus on specialized fields, leaving a gap in understanding for learners (Gravemeijer et al., 2017; Österman & Bråting, 2019; Cipriano, 2023).

A continued challenge in mathematics education is the disconnect between abstract concepts and their practical applications (Roebber, 2005; Berry, 2022). An overemphasis on procedural fluency and algorithmic problem-solving, while neglecting the contextual relevance of mathematical concepts, has hindered students' ability to apply their knowledge effectively. A noticeable gap exists between the mathematical knowledge acquired in classrooms and its utilization in real-world scenarios. This gap, often characterized by the divide of conceptual understanding and practical proficiency, has far-reaching implications for students' ability to perceive the relevance and utility of mathematics in their lives and future endeavors (Riddell, 2024). Exploring real-world applications of mathematical concepts is crucial to benefiting students' engagement and understanding (Uyen et al., 2021).

The research addresses the practical-knowledge gap in mathematics education. The study aims to explore how mathematical concepts can be applied in routine activities and everyday decision-making processes by everyday people.

LITERATURE REVIEW

The study anchors on Sociocultural Theory and Situated Learning Theory, with an additional exploration through the lens of ethnomathematics. Sociocultural Theory, developed by Lev Vygotsky (1978), highlights the influence of social interactions and cultural factors on cognitive development. This theory highlights how mathematical understanding is not merely an individual cognitive process but is influenced by social and cultural practices. Recognizing the role of culture in shaping mathematical understanding, the research can explore how diverse individuals utilize mathematical tools, making the subject more relevant and engaging for learners.

Situated Learning Theory, proposed by Lave and Wenger (1991), posits that learning occurs most effectively when embedded within authentic activities and real-life contexts. Students can better understand and retain mathematical knowledge by situating learning in everyday activities and seeing its relevance to their daily lives. Additionally, the study incorporates ethnomathematics (Borba, 1990), which examines the relationship between mathematics and culture. Ethnomathematics is particularly relevant as it acknowledges the diverse ways mathematical ideas are developed and applied across different cultures. The study can provide a more comprehensive and inclusive understanding of mathematics by exploring mathematical practices within various cultural contexts. These theories collectively provide a robust framework for the study, ensuring that the focus remains on practical and relevant applications of mathematics.

Statement of the Problem

The study seeks to provide insights into the practical applications of mathematical knowledge in contemporary society. Specifically, it sought to answer: What mathematical applications are commonly employed by the general public in everyday contexts?

METHODOLOGY

Research Design and Locale of the Study

The study employed a phenomenological research design (Wilson, 2015) to explore the lived experiences of individuals regarding the use of mathematics in their daily lives. This design allows for a deep understanding of the participants' perceptions and experiences with mathematics, providing rich, detailed insights essential for understanding how mathematical concepts are applied in real-world contexts. Conducted within the Poblacion of Malaybalay City, Bukidnon, the study uses this design to capture the insights and experiences of participants' everyday application of mathematics.

Sampling and Sampling Technique

The study used purposive sampling (Rahman, 2023) to gather data from individuals in the community. This technique ensured that participants had relevant experiences and insights into the practical applications of mathematics in their daily lives. The study gathered diverse and pertinent perspectives by selecting individuals directly involved in various community activities and occupations.

Table 1. Demographic Profile of the Participants of the Study

Name	Sex	Line of Work
LP-1	Female	School Teacher
LP-2	Male	Artist
LP-3	Female	Religious Sister
LP-4	Female	House Wife
LP-5	Male	Security Guard
LP-6	Female	Vendor
LP-7	Male	Gardener
LP-8	Male	Motorcycle Driver
LP-9	Male	Tailor
LP-10	Male	Gasoline Boy
LP-11	Female	Street Cleaner

As presented in Table 1, the sample consisted of eleven (11) individuals who were interviewed, including six (6) males and five (5) females from different lines of work within the community. This diverse group of participants, including participants from various occupational backgrounds, provided various experiences and insights into how mathematics is used in everyday activities, ensuring that the study captured a comprehensive view of the practical applications of mathematics in the community.

Research Instrument and Data Gathering

The research instrument used in the study was a researcher-developed questionnaire validated by two (2) experts in mathematics education and one (1) expert in sociology. This instrument was designed to elicit detailed responses about the participants' experiences with mathematics in their daily lives. The validation process ensured that the questions were clear, relevant, and capable of capturing the necessary data to meet the study's objectives.

Data was gathered through semi-structured interviews (Adeoye-Olatunde & Olenik, 2021) within the participants' everyday settings. The approach was selected to ensure that participants felt comfortable and could provide authentic responses about their everyday use of mathematics. Interviewing participants in their familiar surroundings gave researchers valuable insights into the contextual use of mathematics, enhancing data depth. The interviews were conducted within the población of Malaybalay City, and the 11th participant achieved data saturation (Chitac, 2022). Each interview lasted fifteen to twenty-five minutes and was audio-recorded with the participant's consent, ensuring accurate and comprehensive capture of their responses.

Data Analysis

The data analysis process began with transcribing the interviews verbatim, ensuring that every detail of the participant's responses was captured accurately. An expert translated the original Bisaya transcriptions into English, preserving the essential meaning and context of the participants' responses. The researchers employed narrative analysis (Oppermann & Spences, 2022) to interpret the data, focusing on understanding the statements and experiences shared by the participants. This method allowed the researchers to identify

themes and patterns in how mathematics is applied in everyday life, providing a comprehensive view of the participants' perspectives.

To thoroughly analyze the data, the researchers immersed themselves in the material for seven (7) weeks. This extended immersion period enabled the researchers to delve deeply into the narratives and comprehensively understand the participants' experiences. By examining the data closely, the researchers were able to construct detailed and insightful narratives that accurately reflected the participants' use of mathematics in their daily lives.

Ethical Consideration

The researchers adhered strictly to ethical guidelines throughout the study. The study ensured voluntary participation by obtaining informed consent from all participants and fully informing them about the study's purpose, procedures, and rights. To protect participant identities, the researchers rigorously maintained data privacy by anonymizing and storing all responses securely. Participants were also assured of their right to withdraw from the study without consequence. These measures upheld participants' autonomy, privacy, and well-being (Pietilä et al., 2020).

RESULTS

Mathematics in the General Public

Figure 1 presents the overview of the thematic chart on the perceptions of the general public regarding the use of mathematics. Four (4) significant themes were generated: mathematics in daily life, mathematics in professional and creative fields, conceptual views of mathematics, and educational impact of mathematics. Per themes, sub-themes were also generated and recorded.

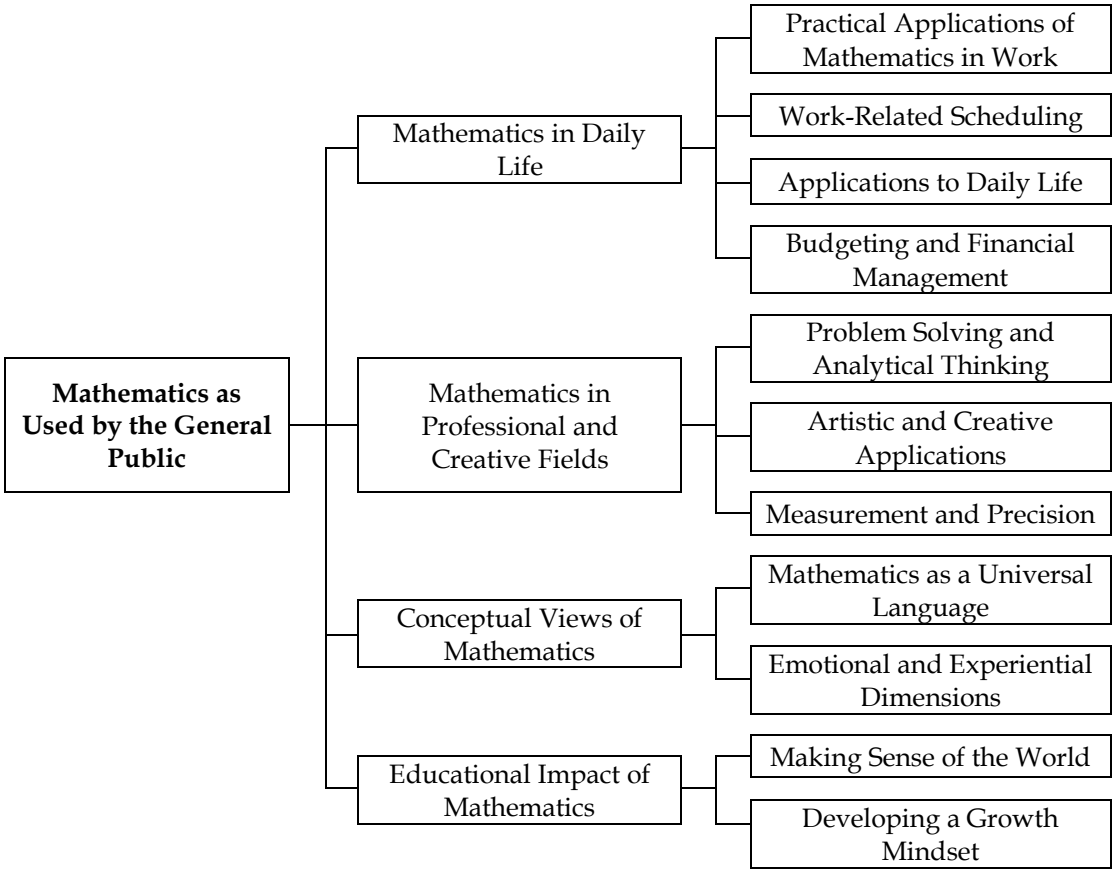

Figure 1. Overview of the Thematic Chart on the Participants Perception Towards the Use of Mathematics in Their Daily Lives

Figure 1 presents an insightful overview of the thematic chart detailing the general public's perceptions regarding the use of mathematics. Four significant themes emerge from the analysis: mathematics in daily life, mathematics in professional and creative fields, conceptual views of mathematics, and the educational impact of mathematics. Each of these themes is further broken down into sub-themes, providing a comprehensive understanding of the multifaceted role of mathematics in contemporary society.

The first theme highlights the indispensable role of mathematics in everyday activities. The consistent use of mathematical skills in these areas reinforces the perception that mathematics is integral to daily survival and efficiency. The second theme explores the application of mathematics in professional and creative fields. Mathematical principles underpin design and aesthetics in creative fields, illustrating its versatility and broad applicability.

The third theme delves into the conceptual views of mathematics. The recognition of mathematics' aesthetic and intellectual appeal suggests that the public values it for its utility and ability to stimulate critical thinking and foster a deeper understanding of the world. The fourth and final theme addresses the educational impact of mathematics. The emphasis on mathematics in education reflects its perceived role in shaping well-rounded individuals equipped to navigate complex problems and adapt to various life situations.

The thematic chart illustrates a broad spectrum of public perceptions regarding the use of mathematics. From its practical applications in daily life and professional fields to its conceptual beauty and educational significance, mathematics is viewed as a multifaceted discipline that profoundly impacts various aspects of human life.

DISCUSSION

Mathematics in Daily Life

The sub-theme of *Practical Applications of Mathematics in Work* showcases how mathematics is intricately woven into the daily professional tasks of individuals. Participants stated:

> "*…I use it by measuring the exact amount of the ingredients I cook in a viand. I sell different kinds of biscuit, junk food, drinks, sandwich, and many more these products have its own standard retail price (SRP)…*" (LP-6)
>
> "*…in my work I use mathematics by applying the exact amount of synthetic fertilizer to the plants I planted…*" (LP-7)
>
> "*…I use mathematics to measure my materials and also considering the body measurements of my clients…*" (LP-9)
>
> "*…many customers will buy gasoline and I use numbers to measure to fill up the tank of every car or motorcycle…*" (LP-10)

Each instance demonstrates how mathematical practices are deeply embedded in specific cultural and social settings. Learning mathematics in these contexts occurs through engagement in authentic activities (Mendiola & Estonanto, 2022), which are integral to the participants' work environments. Participants use mathematics in real-time, practical applications, these activities demonstrate that mathematical knowledge is not abstract but is learned and applied in specific, meaningful situations (Caraan et al., 2023). Different professions adopt and adapt mathematical concepts relevant to their contexts (Galman & Del Rosario, 2021).

The sub-theme on *Work-Related Scheduling* involves mathematics in managing time and finances, as illustrated by the verbatim response:

> "*…I need to set a time to wake up early and budget the salaries I received from the school in order to sustain our basic necessities…*" (LP-5)

The response demonstrates the practical use of mathematical concepts in organizing daily life and work responsibilities (Reyes et al., 2019). Mathematical learning occurs through engaging in real-world tasks like scheduling and budgeting. Mathematics is applied in the context of everyday activities, reinforcing that mathematical knowledge is acquired and utilized through practical application rather than abstract instruction (Chavez & Lapinid, 2019). Moreover, mathematical practices are adapted to meet specific needs and circumstances (Roman & Villanueva, 2019).

The sub-theme on *Applications to Daily Life* emphasizes how individuals use mathematics to manage household finances, highlighting the everyday relevance of mathematical concepts. Participants stated:

> "…*I use mathematics to budget the essential needs in our family. The basic necessities like food for groceries water and electric bills internet connection the clothes for my children and their needs and wants…*" (LP-4)
> "…*I can't be able to count the money I earn from each passenger additionally the price of gasoline is also important to consider especially the price hike that may affect my overall income…*" (LP-8)
> "…*I can divide my salary equally to my children and our household needs. I also use mathematics to help me with my finances and in order not to be scammed…*" (LP-11)

The participants' responses reflect common societal expectations regarding managing family finances, underscoring the role of social context in shaping mathematical practices (Indefenso & Yazon, 2020). These mathematical applications are learned and applied in daily activities. The participants' use of mathematics for budgeting and managing finances illustrates how mathematical knowledge is embedded in routine tasks, reinforcing that learning occurs through engagement in real-world activities (Reyes et al., 2019). Moreover, different individuals develop and utilize mathematical concepts relevant to their context.

The sub-theme on *Budgeting and Financial Management* explores how participants use mathematics to manage finances, save money, and avoid financial scams. Participants noted:

> "…*it is important for me to know all of these as a wife so that we can save and the extra money will go for our savings account…*" (LP-4)
> "…*the use of mathematics is really helpful for me to make business flourish and wisely manage my finance especially the inflation rate of the Philippines increase I need to budget…*" (LP-6)
> "…*I also use mathematics to help be with my finances and in order not to be scammed…*" (LP-11)

Responses highlight the practical use of mathematics in ensuring financial stability and making informed decisions. The participants' emphasis on saving, budgeting, and financial security reflects broader societal values and expectations, illustrating how social context influences mathematical practices (Indefenso & Yazon, 2020; Villamar et al., 2020). Mathematical knowledge is acquired and applied through engagement in real-world financial activities. The participants' use of mathematics for budgeting and financial management demonstrates that mathematical learning occurs through practical application in meaningful contexts (Balaza et al., 2021).

The central theme, *Mathematics in Daily Life*, encapsulates how individuals apply mathematical concepts in their everyday activities. From practical applications in work and scheduling to managing household finances, mathematics is deeply embedded in the participants' daily routines. Moreover, mathematical knowledge is shaped by and shapes the social context, highlighting that mathematical learning occurs through engagement in authentic activities. This demonstrates that mathematics is learned and applied in real-world

situations. Furthermore, different individuals adapt and utilize mathematical concepts in meaningful and relevant ways to their context.

Mathematics in Professional and Creative Fields

The sub-theme on *Problem Solving and Analytical Thinking* highlights how mathematics fosters critical thinking and problem-solving skills among students, as reflected in the responses:

> "*…mathematics is a subject that inspires students to look beyond the pages of the textbook to become problem solvers…*" (LP-1)
> "*…mathematic is discovery there are many patterns in mathematics in the modern world that enable us to comprehend its nature through many justifications…*" (LP-3)

Mathematics is a tool that equips individuals to navigate and solve real-world problems influenced by social interactions and norms (Pascual & San Pedro, 2018). Mathematics inspires students to become problem solvers, underscoring the social and educational contexts that shape how mathematical skills are perceived and applied (Caraan et al., 2023). Moreover, mathematical problem-solving is not just a personal skill but is cultivated through social learning environments (Carandang et al., 2024). The hands-on approach to learning mathematics helps students see the relevance of mathematical concepts beyond the textbook, enhancing their analytical thinking (Antao et al., 2024).

The sub-theme on *Artistic and Creative Applications* explores how mathematics intersects with artistic and creative fields, as demonstrated by the responses:

> "*…mathematics can be seen everywhere every detail of a certain arts has a different scale to follow. Every form and shape can be beneficial to the art itself…*" (LP-2)
> "*…even designing I use patterns to create jerseys and shirt prints…*" (LP-9)

The integration of mathematics in art highlights how cultural practices and social contexts influence the application of mathematical concepts (Galman & Del Rosario, 2021). Moreover, details in art have a different scale, illustrating how mathematical principles are embedded in expressions of creativity (Asahid & Lomibao, 2020). Mathematical concepts are learned and applied through engagement in real-world, creative activities and learning in practical, authentic contexts (Reyes et al., 2019). By applying mathematical concepts to create art, individuals develop a more in-depth learning of these concepts through hands-on experiences (Antao et al., 2024).

The sub-theme on *Measurement and Precision* emphasizes the importance of accuracy in professional tasks, as highlighted by the responses:

> "*…I use mathematics to measure my materials and also considering the body measurements of my clients…*" (LP-9)
> "*…I use numbers to measure to fill up the tank of every car or motorcycle…*" (LP-10)

Mathematical knowledge about measurement and precision is acquired through participation in authentic, practical activities (Carandang et al., 2024). Moreover, learning occurs through engaging in real-world tasks requiring precision (Chavez & Lapinid, 2019). This hands-on application of mathematical concepts reinforces learning and highlights the relevance of mathematics in professional settings (Antao et al., 2024).

The central theme, *Mathematics in Professional and Creative Fields*, demonstrates how mathematical concepts are applied in various professional and creative contexts. Mathematics is a tool for problem-solving and analytical thinking and a critical component in artistic creativity and professional precision. Moreover, mathematical knowledge is acquired through engagement in real-world, practical activities, making learning more relevant and effective. The relevance of these applications shows how mathematical practices are adjusted to satisfy the distinctive needs of different individuals and professions

Conceptual Views of Mathematics

The sub-theme on *Mathematics as a Universal Language* highlights that mathematics transcends cultural and linguistic boundaries, serving as a common framework for understanding the world. A participant stated:

> "*…mathematics is discovery there are many patterns in mathematics in the modern world that enable us to comprehend its nature through many justifications…*" (LP-3)

This view underscores how mathematical principles are universally recognized and applied, facilitating communication and problem-solving across diverse cultures (Carandang et al., 2024). The patterns and justifications in mathematics serve as a universal language that transcends individual cultural contexts, promoting a shared understanding and collaboration (Roman & Villanueva, 2019). Mathematical concepts are learned through real-world activities that reveal these universal patterns (Chavez & Lapinid, 2019). Moreover, discovering patterns in mathematics through justifications illustrates how individuals learn and internalize mathematical principles through practical application and observation (Allica & Lunarb, 2024).

The sub-theme on *Emotional and Experiential Dimensions* reveals that mathematics extends beyond abstract concepts and numbers to include emotional and experiential aspects of daily life. A participant stated:

> "*…therefore, mathematics does not only focus on numbers but also in our feelings emotions and daily experience mathematics is present…*" (LP-3)

The response indicates that mathematics intertwines feelings, emotions, and daily experiences, illustrating its pervasive presence in human life (Antao et al., 2024). Mathematical practices are influenced by social interactions and norms, highlighting the emotional and experiential dimensions as integral to the human experience of mathematics (Carandang et al., 2024). Additionally, mathematical understanding is deeply connected to lived experiences where mathematics is present in daily experiences, suggesting that learning mathematics is not confined to formal education but occurs through engagement with everyday activities (Reyes et al., 2019). This practical application of mathematics in daily

life allows individuals to develop a more profound and personal connection to mathematical concepts (Torrejos, 2024).

The central theme, *Conceptual Views of Mathematics*, encapsulates diverse perspectives on the nature and role of mathematics in everyday life. The results reveal that mathematics is perceived not only as a set of abstract principles but also as a practical, emotional, and culturally embedded aspect of human life. Moreover, these conceptual views are shaped by social interactions and cultural norms, illustrating that mathematics is both a universal framework and a culturally specific practice. Furthermore, mathematical understanding is developed through real-world engagement, integrating mathematical principles into daily activities and emotional experiences.

Educational Impact of Mathematics

The sub-theme on *Making Sense of the World* describes mathematics as life and emphasizes its pervasive presence in daily activities. A participant stated:

> "*…mathematics is life because it makes so much sense once you understand the concepts of it and you'll truly realize how much it is used in daily life…*" (LP-1)

Understanding mathematical concepts can illuminate their utility in daily life, as mathematics is deeply embedded in social practices and traditions (Luzano, 2024). Moreover, mathematics's omnipresence in life underscores how cultural norms and social interactions shape and contextualize mathematical knowledge. Additionally, knowledge is constructed through active participation in authentic activities (Chavez & Lapinid, 2019; Reyes et al., 2019). Furthermore, with mathematical concepts in real-world situations, individuals can see the applicability and relevance of mathematics, making it more meaningful and accessible to comprehend (Pascual & San Pedro, 2018).

The sub-theme on *Developing a Growth Mindset* highlighted that mathematics inspires students to become problem solvers. A participant stated:

> "*…mathematics is a subject that inspires students to look beyond the pages of the textbook to become problem solvers…*" (LP-1)

Mathematics inspires problem-solving, suggesting that the social and cultural emphasis on the importance of analytical thinking and perseverance influences students (Pascual & San Pedro, 2018). This inspiration can be attributed to the encouragement and support provided by educators, peers, and the broader community, which cultivates a growth mindset (Caraan et al., 2023; Carandang et al., 2024). Furthermore, learning occurs through active engagement in meaningful tasks. Mathematics challenges students to solve problems, fostering a mindset that embraces challenges and seeks solutions (Torrejos, 2024). This experiential approach to learning mathematics helps students develop resilience and adaptability, critical components of a growth mindset (Antao et al., 2024).

The central theme, *Educational Impact of Mathematics*, encompasses the transformative influence of mathematics on individuals' understanding of the world and their personal development. The sub-themes illustrate how mathematics is a tool for comprehending daily life and a catalyst for fostering problem-solving skills and resilience. These impacts are achieved through engagement in real-world, meaningful tasks, making mathematical concepts relevant and accessible. Moreover, different individuals integrate mathematics into their daily lives and problem-solving approaches.

CONCLUSIONS AND RECOMMENDATIONS

The results reveal that mathematics is deeply integrated into everyday and professional activities. The study highlights the vital role of mathematics in practical applications such as work, scheduling, daily life, financial management, problem-solving, creative arts, and professional precision. Moreover, social and cultural contexts shape mathematical knowledge and must be contextualized to be meaningful and relevant to the general public. The study underscores the importance of bridging the gap between theoretical knowledge and practical application. Furthermore, the result advocates for an inclusive approach to mathematics education that acknowledges and integrates its universal, practical, and culturally specific dimensions.

Based on the study's results, it is recommended that mathematics education incorporate practical and culturally relevant examples to bridge the gap between theoretical knowledge and real-world application. Educators could contextualize mathematical concepts by integrating everyday activities and culturally specific practices into their teaching methods. This approach would make mathematics more accessible and meaningful to students, helping them understand its relevance in their daily lives and professional activities.

Additionally, there could be a focus on developing a growth mindset among students by emphasizing problem-solving skills and resilience through mathematical tasks. By engaging students in authentic, situated learning experiences, educators could foster a deeper understanding of mathematical principles and their practical applications. Collaboration with communities to understand and integrate local mathematical practices can further enrich the curriculum, making mathematics education more inclusive and reflective of diverse cultural contexts. This approach would ensure that mathematical education is relevant and impactful, preparing students to apply mathematical knowledge effectively in their everyday lives and careers.

FURTHER STUDY

The study has several limitations that should be acknowledged. Firstly, it is geographically limited to Población, Malaybalay City in Bukidnon, which may not capture the diversity of experiences and cultural practices related to mathematics in other regions. This localized focus might limit the generalizability of the findings to broader populations. Secondly, the study sample consists of only eleven (11) participants, which may not comprehensively represent the community's mathematical practices and perspectives. The small sample size restricts the study's ability to draw broad conclusions and may introduce biases based on the specific experiences of these participants. Future research could consider including a more extensive and diverse sample from multiple locations to enhance the reliability and applicability of the findings.

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REFERENCES

Adeoye-Olatunde, O. A., & Olenik, N. L. (2021). Research and scholarly methods: Semi-structured interviews. *Journal of the American College of Clinical Pharmacy*, *4*(10), 1358-1367. https://doi.org/10.1002/jac5.1441

Allica, C., & Lunarb, B. (2024) Understanding patterns, quantifying relationships, and predicting the future with mathematics in the modern world: inputs to pedagogical innovation. *Education & Learning Developing Nations*, *2*(1). http://doi.org/10.26480/eldn.01.2024.01.03

Antao, M. A., Morales, R. S., Ting, V. B., Abdurahman, J. T., Jalaidi, S. M., Kadil, H. L. S., ... & Verdeflor, R. N. (2024). Behavior shift through Non-Traditional math teaching strategies integrating Real-Life transactions for Non-Math enthusiasts. *Environment and Social Psychology*, *9*(7). https://doi.org/10.59429/esp.v9i7.2642

Asahid, R. L., & Lomibao, L. S. (2020). Embedding proof-writing in phenomenon-based learning to promote students' mathematical creativity. *American Journal of Educational Research*, *8*(9), 676-684. https://doi.org/10.12691/education-8-9-9

Balaza, E. J. M., Diama, K. C., Torrenueva, J. L. A., Alicaya, A., Ortiz, M. N., & Inocian, R. B. (2021). Financial literacy integration in the K to 12 social studies curricula in the Philippines: Basis for a Contextualized COVID-19 Teaching Model. *Psychology and Education Journal*, *58*(3), 802-813.

Berry, M. (2022) *Narrowing the Gap Between Real-World Mathematics and the Didactic Approaches Used in Schools*. TeachingTimes. https://www.teachingtimes.com/narrowing-the-gap-between-real-world-mathematics-and-the-didactic-approaches-used-in-schools/

Borba, M. C. (1990). Ethnomathematics and education. *For the learning of mathematics*, *10*(1), 39-43. FLM Publishing Association. http://www.jstor.org/stable/40247974

Caraan, D. R., Dinglasan, J. K., & Ching, D. (2023). Effectiveness of realistic mathematics education approach on problem-solving skills of students. *International Journal of Educational Management and Development Studies*, *4*(2), 64-87.

Carandang, E. S. P., Caguete, R. R., & Balmes, J. M. R. (2024). Attitude and Challenges in Learning Mathematics in the Modern World (MMW): Basis for Intervention Program. *International Journal of Material and Mathematical Sciences*, *6*(3), 85-99. https://doi.org/10.34104/ijmms.024.085099

Chavez, M. B. B., & Lapinid, M. R. C. (2019). Improving Students' Motivation, Engagement and Performance in Mathematics through Real-Life Applications. *Intersection*, *13*(1), 5-10.

Chitac, I. M. (2022). The rationale for saturation in qualitative research: When practice informs theory. *Cross-Cultural Management Journal*, *24*(1), 29-35.

Cipriano, N.P. (2023). Revisiting Mathematics in the Modern World: Implications for Research and Practice. *Journal for Educators, Teachers and Trainers*, *14*(3). 781-787, https://doi.org/10.47750/jett.2023.14.03.089

Galman, S. M. A., & Del Rosario, J. C. (2021). Linking Real-Life Situations with Classroom Assessment: Development of Real-Life Performance-Based Tasks in Business Mathematics. *Journal of Applied Mathematics and Physics*, *9*(3), 485-502. https://doi.org/10.4236/jamp.2021.93034

Gravemeijer, K., Stephan, M., Julie, C., Lin, F.-L., & Ohtani, M. (2017). What Mathematics Education May Prepare Students for the Society of the Future? *International Journal of Science and Mathematics Education*, *15*(S1), 105–123. https://doi.org/10.1007/s10763-017-9814-6

Indefenso, E. E., & Yazon, A. D. (2020). Numeracy level, mathematics problem skills, and financial literacy. *Universal Journal of Educational Research*, *8*(10), 4393-4399. https://doi.org/10.13189/ujer.2020.081005

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge university press.

Luzano, J. F. (2024). Multifaceted structures of mathematics education in the Philippines: a case analysis. *Diversitas Journal*, *9*(3). https://doi.org/10.48017/dj.v9i3.3062

Mendiola, A. C., & Estonanto, A. J. J. (2022). Utilization of Instructional Materials Developed by the Mathematics Teachers in the Province of Sorsogon, Philippines. *Asian Journal of Education and e-Learning*, *10*(3), 30-41.

Oppermann, K., & Spencer, A. (2022). Narrative Analysis. In *Routledge handbook of foreign policy analysis methods* (pp. 117-132). Routledge.

Österman, T., & Bråting, K. (2019). Dewey and mathematical practice: revisiting the distinction between procedural and conceptual knowledge. *Journal of Curriculum Studies*, *51*(4), 457–470. https://doi.org/10.1080/00220272.2019.1594388

Pascual, L. E., & San Pedro, A. B. (2018). Post secondary students' level of proficiency in solving real world problems in mathematics. *Journal of Applied Mathematics and Physics*, *6*(1), 198-214. https://doi.org/10.4236/jamp.2018.61019

Pietilä, A. M., Nurmi, S. M., Halkoaho, A., & Kyngäs, H. (2020). Qualitative research: Ethical considerations. In: Kyngäs, H., Mikkonen, K., Kääriäinen, M. (eds) *The Application of Content Analysis in Nursing Science Research*, (pp. 49-69). Springer, Cham. https://doi.org/10.1007/978-3-030-30199-6_6

Posthuma-Coelho, A. (2016*). Theoretical vs Practical Knowledge*. Medium. https://medium.com/@amandaposthuma/theoretical-vs-practical-knowledge-86cab1113abd

Rahman, M. M. (2023). Sample size determination for survey research and non-probability sampling techniques: A review and set of recommendations. *Journal of Entrepreneurship, Business and Economics*, *11*(1), 42-62.

Reyes, J., Insorio, A. O., Ingreso, M. L. V., Hilario, F. F., & Gutierrez, C. R. (2019). Conception and application of contextualization in mathematics education. *International Journal of Educational Studies in Mathematics*, *6*(1), 1-18.

Riddell, R. (2024) *Why don't students like math? Here are 3 reasons*. K-12 Dive. https://www.k12dive.com/news/why-dont-students-like-math-3-reasons/705357/

Roebber, P. J. (2005). Bridging the Gap Between Theory and Applications: An Inquiry into Atmospheric Science Teaching. *Bulletin of the American Meteorological Society*, *86*(4), 507–518. https://doi.org/10.1175/bams-86-4-507

Roman, A. G., & Villanueva, R. U. (2019). Competency Acquisition, Difficulty and Performance of First Year College Students in Mathematics in the Modern World (MITMW). *International Journal on Emerging Mathematics Education*, *8*(12), 2731-2736.

Skovsmose, O. (2021). Mathematics and crises. *Educational studies in mathematics*, *108*(1), 369-383. https://doi.org/10.1007/s10649-021-10037-0

Torrejos, R. L. (2024). College Students' Engagement in Mathematics in the Modern World: The Influential Role of Perceived Teaching Performance of Instructors and Critical Thinking Skills in a Blended Learning Environment. *European Journal of Contemporary Education and E-Learning*, *2*(3), 74-89. https://doi.org/10.59324/ejceel.2024.2(3).07

Ucang, J. T. (2022). Practices of the Twenty-first Century Mathematics Teachers. *International Journal of Applied Science and Research*, *5*(3), 225-230.

Uyen, B. P., Tong, D. H., Loc, N. P., & Thanh, L. N. P. (2021). The Effectiveness of Applying Realistic Mathematics Education Approach in Teaching Statistics in Grade 7 to Students' Mathematical Skills. *Journal of Education and E-Learning Research*, *8*(2), 185-197. https://doi.org/10.20448/journal.509.2021.82.185.197

Verdeflor, R. N., & Pacadaljen, L. M. (2021). Outcomes of the Course Mathematics in the Modern World. *Annals of the Romanian Society for Cell Biology*, *25*(1), 2044-2061.

Villamar, A. J., Gayagoy, M., Matalang, F., & Catacutan, K. J. (2020). Usefulness of mathematics subjects in the accounting courses in baccalaureate education. *Mathematics and Statistics*, *8*(1), 27-31. https://doi.org/10.13189/ms.2020.080103

Vygotsky, L. S. (1978). Socio-cultural theory. *Mind in society*, *6*(3), 23-43.

Wilson, A. (2015). A guide to phenomenological research. *Nursing Standard (2014+)*, *29*(34), 38-43. https://doi.org/10.7748/ns.29.34.38.e8821