VOICES from the Classroom: Understanding the Perspectives of Students as Regards Numerical Literacy APPLICATION

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ABSTRACT

This qualitative phenomenological study aimed to explore and understand the lived experiences of students as regards numerical literacy application. The participants of this study were the private elementary school students in District 1, Davao City, who were selected through purposive sampling. Utilizing in-depth interviews and focus-group discussion, the research explored into the challenges encountered, coping mechanisms utilized and insights offered to the academe and society. Thematic analysis revealed four key themes: practical numeracy, applying life skills Math, numerical cognition challenges, and numerical insecurity. Despite these struggles, students demonstrated resilience adopting five coping mechanisms: practicing repeatedly, seeking help and guidance, using different learning strategies, engaging in reflective learning, developing self-reliance and confidence. The study also identified four crucial insights for the academe and society. First, it highlighted emotional impact of overcoming math challenges. Second, it emphasized the effective strategies for teaching math. Next, it underscored the importance of numerical literacy in daily life. Lastly, it recognized the learning struggles. This research, contributes to a deeper understanding of how numerical literacy shapes students' academic performance and life readiness, informing future educational practices and support systems for both teachers and students.

KEYWORDS: *Education, numerical literacy, private elementary school students, phenomenological approach, Philippines.*

INTRODUCTION

Numerical literacy primarily involves an ability of individual to comprehend, apply, and communicate mathematical concepts and numbers relevant to daily life (Widhinyanti et al., 2023). These skills include

mathematical operations such as addition, subtraction, multiplication, and division, which are essential in making financial and data-driven decisions (Liediawati, 2023). However, many elementary students struggle to apply numerical literacy, particularly when mathematics instruction remains rooted in traditional teaching practices that emphasize lower-order thinking skills (Purwaningrum et al., 2022). Often, students memorize formulas without engaging in critical thinking (Novitasari et al., 2022), which hinders their ability to solve real-life mathematical problems. Numerical literacy can only be fully achieved when students are able to formulate, apply, and interpret mathematical reasoning effectively (Ekowati & Suwandayani, 2020). Moreover, a lack of interest in reading mathematical problems often leads to misinterpretation and miscalculation in problem-solving tasks (Putrihapsari et al., 2022).

Globally, several countries have reported declining numerical literacy. For instance, in Australia, the level of numeracy has declined since 2003, contributing to the country's lag in economic and innovation compared to the other first-world nations (Tout, 2020). In the 2022 Programme for International Student Assessment (PISA) conducted by the Organization for Economic Cooperation and Development (OECD), Indonesia ranked 69th out of 81 countries, revealing persistently low levels of student numeracy. This outcome is attributed to students being exposed predominantly to standard-level questions rather than to the higher-order thinking skill (HOTS) items featured in international assessments. However, initiatives such as the Minimum Competency Assessment have shown promise in encouraging Indonesian students to think critically and apply knowledge to real-world problems (Rohmah et al., 2022).

Similarly, in Cambodia, Harris-Van Keuren (2016) found that many students lacked foundational reading, writing, and mathematical skills, contributing to poor performance in numerical literacy. In the Philippines, an alarming statistic from Metro Manila reported that fewer than 25 percent of students passed the 2022 PISA assessment, with only one in five able to comprehend and apply mathematical concepts from word problems (Chi, 2023). A study in Samar by Santiago and Mustacisa (2024) documented that from school year 2020 to the present, 31 percent to 35 percent of students were classified as non-numerates due to difficulty understanding numerical tasks.

In Tugbok District, Davao City, student performance in mathematics has remained consistently low, affecting mastery of topics such as percentages,

geometry, measurement, and graph interpretation—areas critical to numerical literacy (Galabo et al., 2018). In the Davao Central District, Mozar (2024) reported that students experienced misconceptions and persistent failures in learning mathematics, which led to negative perceptions about their abilities (Baroja, 2019).

While there is a growing body of literature on numerical literacy, few studies have employed a qualitative phenomenological approach to examine the lived experiences of students. Given this gap, the present study seeks to understand the perspectives and challenges of private elementary school students in applying numerical literacy. By capturing their lived experiences, the study aims to uncover strategies they use to cope and propose interventions that support more effective mathematics instruction. Findings may also serve as a resource for educators and program implementers to design meaningful interventions and training, ensuring that numerical literacy is both taught and applied in a practical, student-centered manner.

Research Questions

1. What are the lived experiences of the participants as regards numerical literacy application?
2. What are the coping mechanisms of the participants as regards numerical literacy application?
3. What insights can be shared to the academe and the community?

METHODOLOGY

Research Design. This qualitative study employed a phenomenological research design. This is appropriate as it sought to explore the nature of a specific phenomenon—namely, the lived experiences of students in applying numerical literacy. Instead of focusing on quantifiable metrics, this research captures rich, descriptive data through language to understand personal encounters with numeracy. Therefore, this design was well-suited to uncover how students cope with and apply numerical literacy in their daily lives and educational settings.

Research Participants. The participants in this study were Grade 6 students from private elementary schools in District 1, Davao City. A total of 17 participants were selected using purposive sampling: 10 participated in in-depth interviews (IDI), and 7 joined a focus group discussion (FGD). Purposive

sampling was used to ensure that those chosen could meaningfully contribute to the research objectives (Ames et al., 2019).

Data Sources. The primary data sources were the Grade 6 private school students who shared their lived experiences of applying numerical literacy. A validated semi-structured interview guide, developed with the assistance of field experts, served as the foundation for both the IDI and FGD sessions. These were conducted face-to-face to facilitate natural and authentic conversations.

Data Collection. Before initiating data collection, the researcher obtained an endorsement letter from the Dean of the Graduate School of the University of the Immaculate Conception (UIC) and secured ethical clearance from the UIC Research Ethics Committee. Permission letters were sent to private school administrators in Davao City, followed by consent requests to school principals and heads. Since the participants were minors, their parents or guardians were required to sign an Informed Consent Form (ICF). The researcher conducted the interviews with a semi-structured guide and recorded them with participant consent. Interviews lasted between 30 to 45 minutes. A guidance counselor or designated staff member was present during the interviews to provide support if needed, especially in cases of emotional discomfort.

Data Analysis. The unit of analysis for this research was the narrative responses of the participants. After transcription, the researcher immersed in the data by reading and re-reading transcripts, identifying significant statements, and extracting key phrases relevant to numerical literacy. An exhaustive description of the phenomenon was developed, followed by the identification of its fundamental structure. To ensure accuracy and credibility, the researcher conducted member checking by returning the interpreted transcripts to participants for validation and additional input.

Ethical Considerations. This study was conducted in full compliance with the ethical standards set by the University of the Immaculate Conception's Research Ethics Committee (UIC-REC). Participation was strictly voluntary, and all respondents were treated with utmost dignity and respect. Any concerns raised were addressed promptly, and all personal information disclosed was kept strictly confidential. In accordance with Republic Act 10173, or the Data Privacy Act of 2012, the principles of privacy and data confidentiality were strictly

observed throughout the research process, assuring respondents that all gathered information would be used exclusively for academic and scholarly purposes.

RESULTS

This section presents the profile, lived experiences, challenges encountered, coping mechanisms, and insights shared by the participants. Thematic analysis was employed to interpret the data collected through in-depth interviews (IDIs) and focus group discussions (FGDs).

Lived Experiences of the Participants as regards Numerical Literacy Application

Shown in Table 1 are the four major themes: Practical Numeracy**,** Applying Life Skills Math**,** Numerical Cognition Challenges, and Numerical Insecurity from the thematic analysis of participants' responses.

Table 1

Lived Experiences of the Participants as Regards Numerical Literacy Application

Essential Themes	Core Ideas
Practical Numeracy	Managing finances and calculating change Measuring ingredients for cooking and baking Running small businesses and tracking profits Budgeting household expenses effectively Understanding discounts and sale prices Applying math in school and future careers
Applying Life Skills Math	Adding and subtracting for quick transactions Multiplying for bulk purchases and pricing Using percentages for discounts and savings Converting fractions in cooking measurements Applying basic algebra in problem-solving Dividing for fair distribution of resources
Numerical Cognition Challenges	Struggling with large-number calculations Forgetting formulas and multiplication tables Needing pen and paper for complex problems Feeling pressured during mental math Misapplying fractions in measurements Lacking confidence in real-time calculations
Numerical Insecurity	Feeling anxious when calculating under pressure Lacking confidence due to early math struggles Overcoming fear through practice and experience Preferring calculators for reassurance Avoiding math-heavy tasks due to nervousness Gaining confidence with repeated real-life use

Practical Numeracy. This theme emerged from the utterances of students in numerical literacy application in real-life contexts outside the classroom. Participants shared how numeracy was part of daily responsibilities such as managing finances, calculating change when shopping, measuring ingredients for cooking and baking, and handling small business activities like selling snacks or school supplies.

> We need to understand Math… so you'll know how to calculate the change when you open a store. (IDI 3)
> When we go grocery shopping, I need to add the prices of the things I buy. (IDI 4)

Applying Life Skills Math. This theme reflects the students' use of basic mathematical operations addition, subtraction, multiplication, division, percentages, and fractions in routine scenarios. These included buying snacks, budgeting pocket money, estimating sale discounts, and sharing resources equally.

> The example that I use most often, Ma'am, is when finding percentages calculate discounts, and also, most importantly, addition and subtraction. (FGD 1)
> Multiplication…They help calculate or solve problems at home or anywhere outside of school. (IDI 1, IDI 9)

Numerical Cognition Challenges. Students reported cognitive struggles with math, such as difficulty handling large numbers, forgetting formulas, and reliance on manual computation. These issues often resulted in reduced accuracy and confidence, particularly with fractions and mental math.

> Sometimes, when prices are large, it becomes difficult to calculate the answer. (FGD 1, IDI 1)
> I still need to use my fingers because I find it difficult to compute mentally when dealing with numbers. (IDI 4)

Numerical Insecurity. This theme emerged from students' emotional responses—such as math anxiety and low self-confidence, and reliance on calculators. Although some expressed avoidance of math-heavy tasks, others reported gradual improvement through practice and exposure.

> I find it difficult because I usually struggle to find the correct answer in time, so it becomes very challenging when I can't. (FGD 3)
> I've never really memorized the multiplication table, which makes it harder for me. (IDI 10)

Coping Mechanisms of the Participants as regards Numerical Literacy Application

Presented in Table 2 are the coping strategies adopted by the learners. Analysis revealed five coping strategies: Practicing Repeatedly**,** Seeking Help and Guidance**,** Using Different Learning Strategies**,** Engaging in Reflective Learning, and Developing Self-Reliance and Confidence

Table 2

Coping Mechanisms of the Participants as regards Numerical Literacy Application

Essential Themes	Core Ideas
Practicing Repeatedly	Practicing mathematical problems regularly Memorizing multiplication tables and formulas Reviewing past mistakes and correcting them Applying learned concepts to different problems Studying consistently to reinforce knowledge Using books and apps for additional exercises
Seeking Help and Guidance	Asking teachers for clarification Consulting parents, siblings, or peers for assistance Requesting step-by-step explanations Engaging in group discussions for better understanding Using online resources such as Google for guidance Seeking alternative explanations from multiple sources
Using Different Learning Strategies	Trying specific methods to simplify solutions Applying trial-and-error techniques for better comprehension Using hand multiplication or other visual aids Utilizing calculators or tools when necessary Searching for alternative ways to solve problems Exploring different problem-solving techniques
Engaging in Reflective Learning	Retracing steps when struggling with a solution Evaluating personal difficulties and finding ways to improve Reflecting on learning gaps Studying past lessons to strengthen foundation Adjusting strategies based on previous mistakes Innovating ways to think more critically in problem-solving
Developing Self-Reliance and Confidence	Trusting oneself in problem-solving Maintaining a positive mindset toward math challenges Persevering despite difficulties Avoiding panic and staying calm when solving problems Believing in one's ability to improve over time Taking initiative to study without external pressure

Practicing Repeatedly. Participants highlighted the role of consistent practice in developing numerical fluency. They spoke of memorizing multiplication tables, reviewing errors, and solving varied problems to reinforce understanding. Many used books and educational apps to support independent learning.

> By practicing time to time so that you will learn better… (IDI 2)
> I analyze the problem, by reviewing my answers… check whether they are correct or incorrect (FGD 1)
> I practice the equation in different forms…or ask questions to people who understand better. (IDI 6)

Seeking Help and Guidance. Students actively sought support from teachers, parents, siblings, and peers. They requested step-by-step explanations and engaged in collaborative learning. Some also used online resources to explore alternative solutions.

> My family and teacher helped me…by giving me the basics and methods that I can use. (FGD 4)
> My brother offers helpful advice. (IDI 10)
> They help me by explaining it to me step by step and in a slower way. (IDI 6)

Using Different Learning Strategies. This theme captures students' adaptability and willingness to experiment with various strategies in addressing numerical challenges. Learners described using trial-and-error methods, breaking tasks into manageable steps, and employing visual tools like hand multiplication or written guides to aid comprehension. The use of calculators for accuracy and confidence was also mentioned, as was seeking alternative solutions or multiple problem-solving methods—indicating a flexible and growth-oriented mindset.

> I'll just try new methods to help understand Math problems. (FGD 2, IDI 1)
> If I don't get the right answer, I ask the teacher to explain it to me step by step again. (IDI 6, IDI 8)

Engaging in Reflective Learning. This theme illustrates how learners engage in introspective and metacognitive strategies to improve their understanding of mathematical concepts. Participants described retracing problem-solving steps, reviewing previous lessons, and adjusting strategies based on prior mistakes. This reflective practice often led to deeper comprehension and more innovative thinking, enabling students to explore different angles when solving problems.

> I chop the problem into smaller parts to analyze it better.(FGD 2)
> I try to memorize formulas and apply them correctly. (IDI 9)

Developing Self-Reliance and Confidence. This theme signifies a shift in students' mindset as they develop greater confidence and independence in using mathematics. Many learners articulated the importance of trusting themselves, staying calm under pressure, and persevering through difficulties. Others shared how taking initiative—such as studying without being prompted—fostered a sense of responsibility and ownership over their learning journey.

> I overcame the problem by analyzing and understanding the problem. (FGD 2)
> I try to stay calm and take my time in solving the problem. (FGD 1)

Insights Shared by the Participants to the Academe and Society

Reflected in Table 3 are the insights shared by the participants with the academe and society regarding the application of numerical literacy. Through analysis, four essential themes emerged: emotional impact of overcoming math challenges, effective strategies for teaching math, importance of numerical literacy in daily life, and learning struggles.

Table 3
Insights that Can be Shared to the Academe and the Community

Essential Themes	Core Ideas
Emotional Impact of Overcoming Math Challenges	Experiencing happiness after solving problems Feeling relieved and stress-free Developing self-confidence and pride Strengthening perseverance and resilience Gaining motivation to tackle future challenges Enhancing problem-solving satisfaction
Effective Strategies for Teaching Math	Summarizing and reviewing key concepts Incorporating interactive learning tools (e.g., flashcards) Providing real-life applications of math concepts Offering additional tutoring and support Encouraging memorization of fundamental concepts Adjusting the pacing of lessons for better understanding
Importance of Numerical Literacy in Daily Life	Recognizing its necessity in everyday tasks Understanding its role in financial transactions Applying numerical literacy in career fields

Essential Themes	Core Ideas
	Enhancing logical thinking and problem-solving skills Promoting independence in decision-making Equating numerical literacy with other essential skills
Learning Struggles	Experiencing difficulty in grasping concepts Struggling with memorization and retention Feeling anxious and nervous about solving problems Facing challenges with fast-paced teaching methods Encountering difficulty in real-life applications Needing more engaging and simplified instruction

Emotional Impact of Overcoming Math Challenges. This theme reflects how overcoming difficult math problems positively impact students' emotions and motivation. They reported feelings of happiness, relief, reduced stress, and increased confidence. Success in problem-solving also boosted perseverance and fostered a more positive attitude toward learning math, motivating them to take on future challenges.

> When I finally get the answer, and understand the problem, I feel happy and light-hearted... finally able to get the problem. (FGD 1, IDI 1)
> I feel relieved and at ease because I now understand the questions and can apply the solutions in my daily life. (FGD 6)

Effective Strategies for Teaching Math. Participants shared various strategies that support their learning and enhance numerical literacy. These include summarizing key concepts, reviewing lessons before moving forward, and using interactive tools such as flashcards to reinforce memorization. Real-life applications of math were also noted as highly effective, helping students connect abstract concepts to everyday life. Students also stressed the importance of tutoring, clear instruction, slower pacing, and adaptable teaching methods to address learning gaps.

> They should provide more examples, speak clearly and loudly, and make it easier for us by summarizing the topic, rather than making the math subject too difficult. (FGD 5)
> Maybe if some students don't understand, they can attend tutoring classes, even if it's just on Fridays. This way, students can be able to help students who don't understand the lesson. (FGD 4, FGD 7)

Importance of Numerical Literacy in Daily Life. This theme highlights how students perceive numerical literacy as a crucial skill for daily life. They acknowledged its relevance in tasks such as managing money, making decisions,

and pursuing careers in fields like engineering and technology. Many equated its value with reading and writing, recognizing it as a foundational skill for independence and future success. Participants shared:

> I think they value it, Ma'am, because numerical literacy is essential in our daily lives, and there is not a day when we do not rely on it. (FGD 1, FGD 3)
> They should value numerical literacy because in the near future, it can be useful for fields such as engineering, technology, or even chemical things. (IDI 2)

Learning Struggles. This theme reveals students' emotional and cognitive challenges in developing numerical literacy. Participants described difficulties in understanding and retaining concepts, struggling with fast-paced lessons, and feeling anxious during problem-solving. Some noted the challenge of applying classroom lessons to real-life scenarios and emphasized the need for more engaging, simplified instruction. Students shared:

> I've realized that Math isn't easy, you have to practice and practice until you get it right. (FGD 5)
> What I've realized is that it's important to always learn numerical literacy because it is one of the most important lessons. You need to understand and memorize for you to become successful in life. (IDI 2)

DISCUSSION

This section discusses the findings presented in the preceding section in relation to existing literature. The themes generated from the in-depth interviews and focus group discussions are interpreted alongside prior studies on numerical literacy to establish points of convergence and to situate the lived experiences of the participants within the broader body of research.

Lived Experiences of the Participants as regards Numerical Literacy Application

Practical Numeracy. The participants' accounts of handling money, computing change, measuring ingredients, and running small business activities indicate that numerical literacy is exercised most visibly within the routines of everyday life. These findings are supported by Ferdianto et al. (2022), who emphasized that numerical literacy is grounded in practical life. Also, this result aligns with the findings of Tout (2020), who noted the importance of contextual, real-world problem-solving. Similar observations support the study made by

Rakhmawati and Mustadi (2022), who found that conceptual understanding improves with real-life applications.

Applying Life Skills Math. The learners' use of addition, subtraction, multiplication, division, percentages, and fractions in buying, budgeting, and sharing resources shows that school mathematics is carried into ordinary decision-making. The findings align with Harmini (2016), who argued that life skills math enhances functional decision-making. In addition, the result corroborates with the study of Mumcu (2016) and Kanellopoulou (2022) which emphasized the importance of real-life numerical literacy in enhancing problem-solving.

Numerical Cognition Challenges. The difficulties the participants reported with large numbers, forgotten formulas, and mental computation suggest that the barriers to numerical literacy are cognitive and not merely attitudinal. The result aligns with the findings of Bayaga and Nzuza (2022), which attributed that challenges are caused by gaps in cognitive attention and control. This result confirms the study made by Zuj et al. (2017) and Yayul et al. (2020) who found that distractions, rote memorization, and low comprehension negative affect performance. Similarly, Gray and Reeve (2016) and Rohmah et al. (2022) stressed the need for conceptual clarity to foster higher-order thinking and application.

Numerical Insecurity. The anxiety, diminished confidence, and dependence on calculators expressed by the participants reveal the affective dimension of numerical literacy. This result confirms with the findings by Utami et al. (2020) and Fauth et al. (2019), which highlight the affective domain's impact on numerical literacy. Further, this result corroborates with the findings of Jansen et al. (2016) emphasized that emotional scaffolding and positive reinforcement are vital for young learners.

Coping Mechanisms of the Participants as regards Numerical Literacy Application

Practicing Repeatedly. The learners' emphasis on regular drills, review of past errors, and the use of books and educational applications suggests that numerical fluency is built through sustained repetition. These findings support the study conducted by Zingerman (2021), Sayekti et al. (2021), and Kuswanti (2023), who emphasized the importance of repetition and digital tools. In

addition, Swope-Farr (2021) and Widhiyanti et al. (2023) further observed that regular practice helps reduce anxiety and builds persistence.

Seeking Help and Guidance. The participants' reliance on teachers, parents, siblings, peers, and online sources shows that numerical literacy develops within a network of support rather than in isolation. These findings affirm the study of Salminen et al. (2021), who stated that learning success extends beyond classroom instruction and is strengthened through home guidance. Similarly, this result aligns with the findings of Solomon et al. (2019) emphasized that teacher-facilitated discovery learning helps students work through complex problems. Likewise, this support the study by Susperrejuy et al. (2022) highlighted the value of home environments enriched with numeracy to support long-term understanding.

Using Different Learning Strategies. The learners' willingness to test alternative methods, use visual aids, and break problems into manageable steps reflects strategic flexibility in the face of difficulty. These results align with the findings of Sinaga (2023), who advocated for tailoring strategies to the learner's skill level to strengthen numeracy. Also, this result supports the study of Sayekti et al. (2022) that combining abstract and concrete strategies enhances understanding, Likewise, this coincides with the study of Laxman (2024) that emphasized the importance of student-centered approaches.

Engaging in Reflective Learning. The students' practice of retracing solutions, revisiting previous lessons, and adjusting approaches based on earlier mistakes demonstrates metacognitive regulation of their own learning. These findings support the study of Howell (2021) and Rohmah et al. (2022) that self-checks and inquiry-based learning enhance awareness and problem-solving. In addition, this result aligns with the findings of Sayekti et al. (2023) which highlighted reflection on errors improves problem-solving skills. Further, Serin (2023) emphasized that reflective activities help break down complex tasks into manageable units.

Developing Self-Reliance and Confidence. The participants' accounts of trusting themselves, remaining composed under pressure, and studying without prompting indicate a growing sense of ownership over their learning. This result aligns with the findings of Zingerman (2021), who emphasized that mastery of fundamental skills builds confidence and self-reliance in numerical literacy. Also, this result support the findings of Hwang (2020) which pointed out that

early development of numerical literacy is linked to long-term academic success. Similarly, this result corroborates with the findings of Widhiyanti et al. (2023) which found that fostering student independence strengthens resilience and promotes long-term retention of concepts. Further, Gilligan-Lee et al. (2023) noted that confidence in mathematics grows through home-based numerical activities and routine practice.

Insights Shared by the Participants to the Academe and Society

Emotional Impact of Overcoming Math Challenges. The relief, pride, and renewed motivation the participants felt after solving difficult problems illustrate how affective experience shapes engagement with mathematics. This result supports with the findings of Jansen et al. (2016) which emphasized that anxiety can hinder engagement with math. Also, this result aligns with the findings of Swope-Farr (2021) emotional impact are strongly tied to student engagement and discipline. This result corroborates with the findings of the study conducted by Howell (2021) that emotional reinforcement and praise can transform math from a perceived challenge into an achievable task.

Effective Strategies for Teaching Math. The learners' calls for summarizing, interactive tools, real-life examples, tutoring, and slower pacing offer a student-side account of what makes mathematics instruction effective. This result supports the findings of Sinaga et al. (2023), who found that problem-based learning combined with technology enhances numerical and digital literacy. Also, this result aligns with the findings of Vansdadiya et al. (2023) which noted numerical literacy of students in play-based environments improved over traditional settings. Further, this result corresponds with the study made by Muniasari et al. (2024) who emphasized the role of individualized tutoring in reinforcing classroom instruction.

Importance of Numerical Literacy in Daily Life. The participants' recognition of numeracy as essential to managing money, making decisions, and pursuing careers places it alongside reading and writing as a foundational competence. This result aligns with the findings of Reid and Andrews (2016), who noted that numerical literacy involves fundamental functions, value-based reasoning, and decision-making. Similarly, this result supports the findings of Kanellopoulou (2022) that emphasized numerical literacy helps students solve relevant real-life problems.

Learning Struggles. The difficulties the participants described in grasping and retaining concepts, coping with fast-paced lessons, and transferring classroom learning to real situations point to persistent gaps in mathematics instruction. These findings align with the study of Rohmah et al. (2022), who reported that many students struggle with basic math concepts, leading to disinterest. Further, this result supports the findings of Piper et al. (2018) which identified low learning outcomes in early grades as a global concern, often due to poor instruction and limited resources. Furthermore, this result corroborates the findings of Nelson and Powell (2018) which emphasized that early struggles with math often result in long-term academic setbacks.

This study offered an in-depth exploration of the lived experiences of private elementary students in applying numerical literacy both in academic and real-life contexts. The findings revealed that while students recognize the importance of mathematics beyond the classroom, they often struggle with confidence, conceptual understanding, and support systems. Despite these challenges, their narratives also demonstrated resilience, moments of discovery, and a growing appreciation for the practical value of math.

REFERENCES

Baroja, J. (2019). Effects of Singapore's model method on the mathematical problem-solving skills of select grade 3 students in Sico Elementary School, division of Lipa City, s.y. 2017-2018. Asecendens Asia Journal of Multidisciplinary Research Abstracts. https://ojs.aaresearchindex.com/index.php/AAJMRA/article/view/9472.

Bayaga, A., & Nzuza, P. (2022). Examining Challenges Associated with Numerical Cognition in Early Years Challenges Associated with Numerical Cognition in Early Years. *International Journal of Research in STEM Education*, *4*(1), 01-14.

Chi, C. (2023, December 6). Philippines still lags behind the world in math, reading and science-PISA 2022. *Philippine Star*. https://www.philstar.com/headlines/2023/12/06/2316732/philippines-still-lags-behind-world-math-reading-and-science-pisa-2022

Ekowati, D. W., & Suwandayani, B. I. (2020). Understanding the concept of π numbers for elementary school pre-service teachers on circle materials. *Jurnal Prima Edukasia*, *8*(1), 12–19. https://doi.org/10.21831/jpe.v8i1.30103

Fauth, B., Decristan. J., Decker, A. T., Buttner, G., Hardy, I., Klieme, E., & Kunter, M. (2019). Education: The Mediating Role of Teaching Quality.

Teaching and Teacher Education, 86.
https:// doi.org/10.1016/j.tate.2019.102882

Ferdianto, F., Sukestiyamo, Y.L., & Widowati, I. J. (2022). Mathematical Thinking Process on Numeracy Literacy Problems for Middle School Students. Journal of Positive School Psychology, *6*(8), 69096923. https://www.journalppw.com/index.php/jpsp/article/view/11007

Galabo, N. R., Abellanosa, G, G., Gempes, G, P., (2018). The Level of Readiness in Mathematics of First Year High School Students of Cluster 6 Tugbok Secondary Schools: Basis for Intervention Program. *International Journal of Humanities, Arts and Social Sciences. 4*(1) pp. 47-59.
doi: https://dx.doi.org/10.20469/ijhss.4.10005-1

Gilligan-Lee, K., Fink, E., Jerrom, L., Davies, M. P., Dempsey, C., Hughes, C., & Farran, E. K. (2023). Building Numeracy Skills: Associations between DUPLO Block Construction and Numeracy in Early Childhood. *Journal of Intelligence, 11*(8), 161. https://doi.org/10.3390/jintelligence11080161

Gray, S.A., & Reeve, R.A. (2016). Number-specific and general cognitive markers of preschoolers' math ability profiles. *Journal of Experimental Child Psychology*, 147, 1–21. https://doi.org/10.1016/j.jecp.2016.02.004

Harmini, S. (2016). Developing Life Skills Through Primary School Students Learning Project Based Math. *2nd Icet Theme:"Improving The Quality of Education and Training Through Strengthening Networking"*, 790.

Harris-Van Keuren, C. (2016). *Looking for Matthew: The Effects of Private Tutoring on the Educational Outcomes of Fourth Grade Public School Students in Cambodia* (Order No. 10036365). Available from ProQuest Central. (1775498991). https://www.proquest.com/dissertations-theses/looking-matthew-effects-private-tutoring-on/docview/1775498991/se-2

Howell, R. A. (2021). Engaging students in education for sustainable development: The benefits of active learning, reflective practices and flipped classroom pedagogies. *Journal of Cleaner Production*, *325*, 129318.

Hwang, S. (2020). Examining the Effect of Students' Early Numeracy Activities at Home on Later Mathematics Achievement via Early Numeracy Competencies and Self-Efficacy Beliefs. *International Electronic Journal of Elementary Education, 13*(1), 47-56. https://doi.org/10.26822/iejee.2020.172

Jansen, B. R., Schmitz, E. A., & Van der Maas, H. L. (2016). Affective and motivational factors mediate the relation between math skills and use of math in everyday life. *Frontiers in psychology*, *7*, 513.

Kanellopoulou, E. (2020). Learning Counting Skills through CRA: The Case of

Children with Intellectual Disability. *Open Access Library Journal*, *7*(3), 1- 14.

Kuswanti, H. (2023). Strategy to improve students'literacy and numeracy abilities. *Jurnal Scientia*, *12*(04), 2020-2025.

Laxman, R. (2024). Promoting Early Childhood Literacy and Numeracy: Effective Strategies for Foundational Learning. *Xperton International Journal of Interdisciplinary Research (XIJIR)*, *1*(2), 13-22.

Mozar, M. A., (2024). Empowering Basic numeracy Skills in Primary Grade: Teachers Instructional Intervention.

Muniasari, N., Lovelly, D. E., Anisah, A., & Asman, N. (2024). Strategies for Developing Numeracy Literacy in Junior High Schools in Indonesia: a Literature Review. *Literacy: International Scientific Journals of Social, Education, Humanities*, *3*(1), 01-09.

Mumcu, H. Y. (2016). Using Mathematics, Mathematical Applications, Mathematical Modelling, and Mathematical Literacy: A Theoretical Study. *Journal of Education and Practice*, *7*(36), 80-96.

Nelson, P. M., Van Norman, E. R., Parker, D. C., & Cormier, D. C. (2019). An examination of interventionist implementation fidelity and content knowledge as predictors of math Intervention effectiveness. *Journal of Applied School Psychology, 35*(3), 234–256. https://doi.org/10.1080/15377903.2019.1568334

Novitasari, M., Narimo, S., Fajri, D. N., & Raisia, A. (2022). Critical thinking skills through literacy and numeration-oriented mathematics student worksheet. *Jurnal Basicedu, 6*(4), 5775-5784. https://doi.org/10.31004/basicedu.v6i4.3173

Piper, B., Zuilkowski, S. S., Dubeck, M., Jepkemei, E., & King, S. J. (2018). *Identifying the essential ingredients to literacy and numeracy improvement: Teacher professional development and coaching, student textbooks, and structured teachers' guides.* World Development, 106, 324.https://www.proquest.com/scholarly-journals/identifying-essential ingredients-literacy/docview/2086366101/se-2

PISA 2022 Mathematics Framework. (2023). *PISA 2022 Assessment and Analytical Framework*. https://doi.org/10.1787/7ea9ee19-en

Purwaningrum, J. P., Ahyani, L. N., & Utomo, A. P. (2022). The Need for a Digital Module to Improve the Numerical Literacy of Dyscalculia Students. *Kalamatika Jurnal Pendidikan Matematika*, *7*(1), 99–110. https://doi.org/10.22236/kalamatika.vol7no1.2022 pp99-110

Putrihapsari, I., Victor Didik Saputro, T., & Damas Sadewo, Y. (2022). Mathematical Literacy Profile of Elementary School Students in Indonesia: A Scoping Review. *Journal of Educational Learning and Innovation (Ella), 2*(2), 279-295. https://doi.org/10.46229/elia.v2i2.513

Reid, K., & Andrews, N. (2016). Fostering understanding of early numeracy

development. Melbourne, Victoria, Australia: Australian Council for Educational Research

Rohmah, A. N., Sutama, S., Hidayati, Y. M., Fauziati, E., & Rahmawati, L. E. (2022). Planning for cultivation of numerical literacy in mathematics learning for minimum competency assessment (AKM) in elementary schools. *Mimbar Sekolah Dasra, 9*(3), 503-516. https://doi.org/10.53400/mimbar-sd.v9i3.51774

Santiago, E. t., & Mustacisa, M. L. (2024). Building the foundation: how literacy and numeracy skills in third grade impact overall academic achievement. *Ignatian International Journal for Multidisciplinary Research, 2*(7), 367-381. https://doi.org/10.5281/zenodo.12733229

Sayekti, I., Sukestiyarno, Y. L., Wardono, & Dwijanto. (2021). Perception and understanding of Madrasah Tsanawiyah teachers on numerical literacy in mathematics learning. *Journal of Physics: Conference Series, 1918*(4) https://doi.org/10.1088/1742-6596/1918/4/042029

Sayekti, I., Sukestiyarno, Y, L., Wardono, W., Zaenuri. (2022). Understanding and implementation of Numerical Literacy in Teachers of Madrasah Tsanawiyah in Pemalang Regency, Indonesia. *Journal of Positive School Psychology, 6*(5), 87-97. https://www.journalppw.com/index.php/jpsp/article/view/5727

Serin, H. (2023). Mathematics anxiety: Overcoming challenges and achieving success. *International Journal of Social Sciences & Educational Studies*, *10*(2).

Sinaga, S. J., Najamuddin, N., Dewi, D. A., Widodo, U., Siahaan, K. W. A., Misbah, M., &Mobo, F. D. (2023). Implementation of PBL model on strengthening students' numerical literacy and digital literacy skills. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, *7*(1), 575-586. .

Swope-Farr, T. (2021). Examining Virtual Mathematics Instruction: A Comparative Case Study of In-Service Elementary Teachers with Mathematics Anxiety and Mathematics Teaching Self-Efficacy (Order No. 28498977). Available from ProQuest Central (2544229370). https://www.proquest.com/dissertations-theses/examining-virtual-mathematics-instruction/docview/2544229370/se-2

Tout, D. (2020). Critical connections between numeracy and mathematics.

Utami, R. A. S., Widodo, J. S., Siagian, T. H., & Ragamustari, S. K. (2020). Numerical Literacy Among Senior High School Students at Alumni Course Institution in Jakarta Branch: Critical Literacy in Numerical Data Interpretation. Proceedings of the International University Symposium on Humanities and Arts 2020, 593(Inusharts 2020), 247–253. https://www.atlantis-press.com/article/125962581.pdf

Vansdadiya, R. P., Gondaliya, P. R., & Vasoya, N. H. (2023). Unleashing the power of STEM education: A comprehensive overview of its

significance in today's world. *International Journal of Early Childhood Special Education (INT-JECSE)*, *15*(4), 325-331.

Widhiyanti, S., Pujiati, I., Nurul, S., & Kurniasih, S. (2023, December). Application of The Project Based Learning Model in Improving Numeric Literacy in Early Children. In *International Conference of Humanities and Social Science (ICHSS)* (pp. 583-586).