NEXUS
International Journal of Science and Education

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024

Engagement to Numeracy: Enhancing Problem-Solving Skills of Grade One Pupils

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Abstract. This study revealed the teaching strategies of teachers engaging their pupils in numeracy. It aimed to draw significant information on the strategies, challenges, coping mechanisms, and insights of teachers in enhancing their pupils' problem-solving skills. There were eight (8) teachers of Sirawan Elementary School, Binugao District, Division of Davao City, who participated in the study. This study made use of a phenomenological approach to extract the ideas of the participants. The in-depth interview was employed to gather information with regard to their respective experiences. Using the thematic analysis, the following themes emerged: the strategies of teachers engaging their pupils in numeracy to enhance problem-solving skills delved into real-life applications, collaborative learning, and scaffolded learning. The coping mechanisms of teachers in addressing challenges captured the themes: cultivating a growth mindset culture, understanding individual learning styles, and offering constructive feedback. The insights drawn from the findings of the study focused on tailoring instructional approaches, empowering professional development, and monitoring and assessment strategies. Educators should integrate numeracy concepts into the early curriculum, fostering a strong foundation for future mathematical learning. Early exposure to numeracy paved the way for improved problem-solving abilities, enabling students to approach complex mathematical problems with confidence. To make this study meaningful, publication in a reputable journal is essential.

KEY WORDS

1. engagement to numeracy 2. problem-solving skills 3. grade one pupils

Date Received: May 25, 2024 — Date Reviewed: June 01, 2024 — Date Published: July 1, 2024

1. Introduction

Numeracy is an essential skill that everyone needs to navigate their daily lives effectively. Children need to develop strong numeracy skills, as these skills are foundational to many other academic areas, including science, technology, engineering, and mathematics (STEM) subjects. Recently, there has been an increasing focus on the importance of problem-solving skills, with many educators recognizing the value of developing these skills from an early age. In bilingual regions like Canada, language barriers can hinder the development of numeracy skills. Lambert and Walker (2020) examined how students whose first language is not English or French often struggle with mathematical vocabulary, which is essential for problem-solving. In multilingual classrooms like Kenya, Mwangi and Nyambura (2021) reported that using the national language as the medium of instruction can be a barrier for chil-

dren who speak different mother tongues at home, affecting their understanding and engagement in numeracy. While Singapore is often lauded for its educational outcomes, Tan et al. (2022) noted that integrating technology into numeracy education poses challenges, particularly in ensuring that all students have equal access to digital tools and resources. In the Philippines, there are several issues related to numeracy development among Grade One pupils. Many teachers, especially in rural areas, feel unprepared to teach problem-solving in numeracy due to insufficient training. Bautista and Ocampo (2021) noted that professional development programs are often not accessible to teachers in remote regions. Ongoing professional development is crucial for equipping teachers with the necessary skills and knowledge to effectively teach problem-solving in numeracy (Dela Cruz, 2022). Schools in low-income areas face significant challenges in providing adequate resources for effective numeracy instruction. Villanueva (2019) reports that lack of teaching materials, textbooks, and manipulatives hampers the development of problem-solving skills. Socioeconomic factors also influence students' access to extracurricular activities and supplementary learning resources that could enhance their numeracy skills. The K to 12 curriculum emphasizes numeracy, but De Guzman and Alonzo (2020) noted that schools in Davao City face challenges in fully integrating these standards due to varying levels of teacher readiness and resource availability. Traditional lecture-based methods still dominate classrooms, with limited use of interactive and student-centered approaches that foster problem-solving skills. Reyes and Santos (2019) highlighted the need for professional development that focuses on modern pedagogical techniques. Many teachers in Davao City lack access to continuous professional development opportunities. Luna and Gonzales (2021) reported that professional development programs are often centralized in Manila, making it difficult for teachers in Davao City to participate. Furthermore, it is essential to involve parents and caregivers in the learning process to enhance student engagement and achievement. Teachers can communicate with parents regularly to provide updates on students' progress and provide resources and activities that parents can do at home to support their children's learning.

1.1. Purpose of the Study—The study was on the phenomenological inquiry where it explored on the engagement to numeracy through enhancing problem-solving skills of Grade One pupils. This enabled pupils to apply their numeracy skills to real-world situations, making learning more meaningful and engaging. To address these issues, there are several strategies that can be implemented to enhance problem-solving skills among Grade One pupils in Davao City. The study also dealt on the collaboration of different stakeholders. The government, schools, teachers, and parents may work together to provide resources, adequate training, and a suitable curriculum that engage students in numeracy. With these solutions, pupils can develop their problem-solving skills, which benefit them throughout their lives. At the outset, this research considered also that teachers should be trained to use different teaching strategies that cater to the needs of their pupils. They should also be equipped with the skills to use technology to enhance learning. This enables them to create engaging and interactive lessons that promote the engagement of pupils in numeracy. Moreover, this study endeavored to develop insights from the findings of the information data gathered. The insights drawn for this study are useful contribution to the existing body of knowledge to know the reality regarding on the engagement to numeracy through enhancing problem-solving skills of Grade One pupils. Further, this study enriched the effort to

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024

obtain information and to help in developing numeracy skills as essential for success in today's society.

1.2. Research Questions—Researchers can gain insights into the potential benefits guided with the purpose of exploring the lived-experiences of engagement to numeracy through enhancing problem-solving skills of Grade One pupils, this study sought answers to the following research questions:

(1) What are the strategies of teachers in enhancing problem-solving skills of Grade One pupils?
(2) What are the coping mechanisms with the challenges in enhancing problem-solving skills of Grade One pupils?
(3) What educational management insights can be drawn from the findings of the study?

1.3. Definition of Terms—To fully understand the terms used in this study, the following are the defined operationally: Engagement to Numeracy. Engagement with numeracy involves developing an interest and enthusiasm for understanding and using numbers and mathematical concepts in daily life. It involves being able to apply basic mathematical skills to solve problems, make decisions, and communicate effectively in a variety of contexts. Enhancing Problem-Solving Skills. Improving problem-solving skills is an essential aspect of personal and professional development. This refers to the process of developing and improving the ability to identify, analyze, and find effective solutions for complex or challenging situations. Structured workshops or courses that teach specific problem-solving techniques and methodologies, such as critical thinking exercises, brainstorming sessions, and decision-making frameworks.

1.4. Significant of the Study—Engaging grade one pupils in problem-solving activities that focus on real-world scenarios and global issues can enhance their problem-solving skills and improve their numeracy abilities. This study may find significance to the following: Department of Education. The Department of Education plays a critical role in enhancing the problem-solving skills of grade one pupils by promoting engagement in numeracy. DepEd has launched various professional development programs to equip teachers with the necessary skills to teach problem-solving in numeracy. School administrators. This study may help the school head create an environment that supports numeracy development and problem-solving skills by providing resources, support, and guidance for teachers and students. Administrators cultivate a positive culture of numeracy within the school community. Teachers. Ensure the significance and relevance for designing and delivering developmentally appropriate numeracy instruction that promotes engagement and supports the development of problem-solving skills. Teachers must cater to diverse learning needs through differentiated instruction. Parents. Support their child's development by providing opportunities for numeracy engagement outside of the classroom and by creating a supportive home environment. Parents can create an environment at home that is conducive to numeracy learning. Pupils. As recipients of this study, Grade One pupils also have an important role to play in enhancing problem-solving skills through the engagement of numeracy. Pupils' engagement in interactive and hands-on activities is essential for developing problem-solving skills.

1.5. Theoretical Lens—

ISSN 3028-1261
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This study is anchored on Constructivist Theory of Jean Piaget (1952). The concept revolved on learning as an active, constructive process where learners build new ideas based on their current/past knowledge. In numeracy, students solve problems by exploring, questioning, and connecting new information with existing cognitive structures. Constructivist theory in numeracy problem-solving emphasizes the active role of the learner in constructing their understanding of mathematical concepts. Learners actively engage with mathematical problems, exploring different strategies to solve them. They don't just passively receive information but actively construct their own understanding through hands-on activities and exploration. Constructivism recognizes that learners come to the table with pre-existing knowledge and experiences. In numeracy, this means that students will build on what they already know about numbers, operations, and patterns to make sense of new concepts. Further, collaboration and discussion are essential in constructivist learning. Students learn from their peers, share their strategies, and engage in discourse to deepen their understanding. In numeracy, this might involve explaining how they arrived at a solution, listening to others' approaches, and collectively building a deeper understanding of mathematical concepts. Constructivist approaches encourage the use of multiple representations of mathematical concepts. This could include visual models, manipulatives, diagrams, and real-life examples. For numeracy, learners might use physical objects, drawings, number lines, or even digital simulations to explore and understand mathematical concepts. Problem-solving is not just about finding the right answer; it's about making sense of the problem and the mathematical concepts involved. Furthermore, constructivist approaches focus on helping learners understand the underlying principles behind mathematical procedures rather than just memorizing algorithms. In numeracy, this means encouraging students to think critically about why certain strategies work and how they can apply those strategies in different contexts. Constructivist theory emphasizes reflection on one's learning process. Learners are encouraged to think about their thinking (metacognition), evaluate their strategies, and consider how they might approach similar problems differently in the future. In numeracy, this might involve reflecting on the effectiveness of different problem-solving strategies and identifying areas for improvement. Overall, constructivist theory in numeracy problem-solving shifts the focus from rote memorization of procedures to active engagement, critical thinking, and the construction of deep conceptual understanding through meaningful mathematical experiences (Piaget, 1952). This is also supported by Lev Vygotsky's sociocultural theory (1978). Cognitive development is heavily influenced by social interactions and cultural tools. Problem-solving in numeracy is enhanced through collaborative learning, dialogue, and guided interaction with more knowledgeable others (teachers, peers). Hence, Vygotsky emphasized the importance of social interaction and cultural context in learning. In numeracy, collaborative problem-solving activities can provide opportunities for students to engage in dialogue, share strategies, and collectively construct mathematical knowledge. Teachers serve as facilitators, scaffolding students' learning through guided questioning and peer interactions. In addition, this is related to Zone of Proximal Development (ZPD). Vygotsky introduced the concept of the ZPD, which refers to the range of tasks that a learner can perform with the support of a more knowledgeable other. Teachers can identify each student's ZPD in numeracy by assessing their current mathematical abilities and providing appropriate scaffolding to support their learning. For example, a teacher might provide guided instruction or peer collaboration to help students solve a math problem slightly beyond their cur-

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024

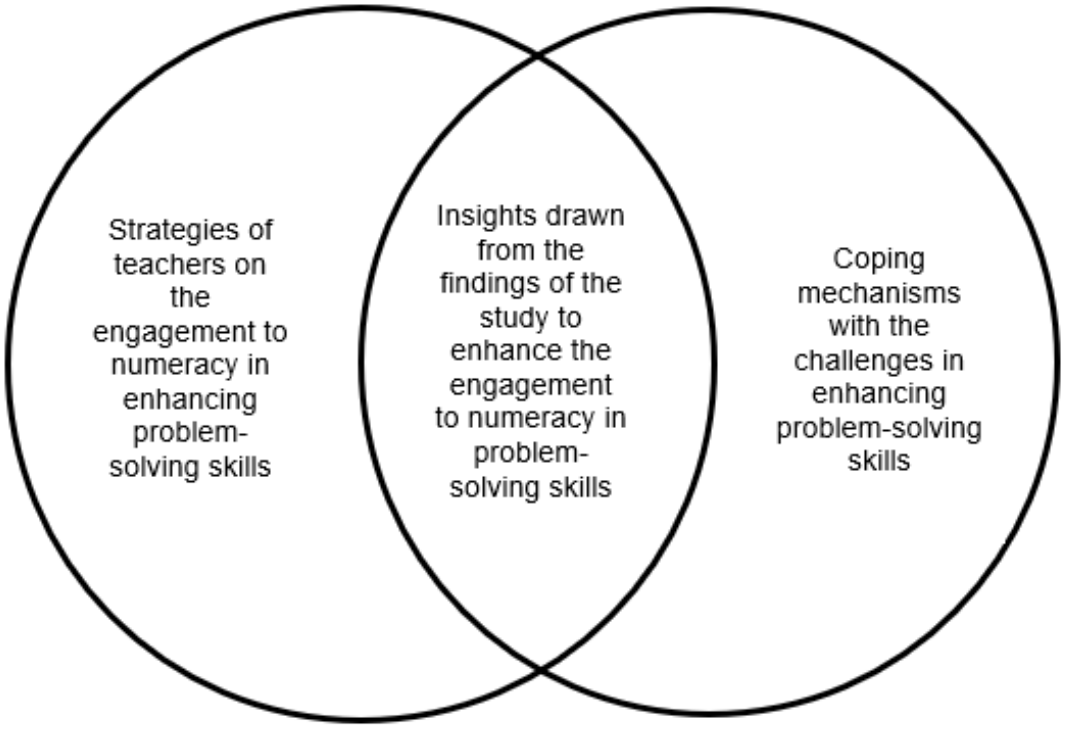

Fig. 1. The Conceptual Framework of the Study

rent skill level (Vygotsky, 1978). Attributes like patience, communication, team skills, and cognitive skills can all affect an individual's likelihood of solving a problem. Individuals will take different problem-solving approaches and experience varying degrees of success. Moreover, People with effective problem-solving abilities become innovative and independent by learning through their experiences. Also, they build confidence as it encourages them to believe in their abilities. It helps them make rational decisions and not depend on others for it. Figure 1 presents the conceptual framework of the study. It shows teachers' two Venn diagrams that interconnected strategies to engage in numeracy and enhance problem-solving skills and Coping mechanisms with the challenges in enhancing problem-solving skills with their connection of Insights drawn from the findings of the study to enhance the engagement to numeracy in problem-solving skills.

2. Methodology

This chapter presents the method, research participants, data collection, role of the researcher, data analysis, trustworthiness of the study, and ethical considerations. The explored facts and knowledge in this study necessitate the consequent design and implementation, as elaborated in this chapter. t's also crucial to acknowledge that the researcher employed artificial intelligence technology to meticulously proofread the article, demonstrating an exemplary commitment to

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024

ethical standards in today's rapidly advancing AI landscape.

2.1. Philosophical Assumptions—The philosophical assumption was a framework used to collect, analyze, and interpret the data collected in a specific field of study. It establishes the background used for the following conclusions and decisions. Typical philosophical assumptions have different types and are elaborated below. Ontology. This part of the research pertains to how the issue relates to the nature of reality. According to Creswell (2012), reality was subjective and multiple, as seen by the study participants. The ontological issue addresses the nature of reality for the qualitative researcher. The reality was constructed by individuals involved in the research situation. Thus, multiple realities exist, such as the realities of the researcher, those of individuals being investigated, and those of the reader or audiences interpreting the study. In this study, the researcher relied on the voices and interpretations of the participants through extensive quotes and themes that reflected their words and provided evidence of different perspectives. The participant's answers to the study were coded and analyzed to build and construct the commonality and discreteness of responses. The researcher ensured that the participants' responses were carefully coded to ensure the reliability of the result. The researcher upheld the authenticity of the responses and precluded from making personal bias as the study progressed. Epistemology. This refers to the awareness of how knowledge claims are justified by staying as close to the participants as possible during the study to obtain firsthand information. Guba and Lincoln, as cited by Creswell (2012), state that on the epistemological assumption, the researcher would attempt to lessen the distance between themself and the participants. It was suggested that being a researcher, it is expected that time was spent in the field with participants, and becomes an 'insider'. It was assured that the researcher established a close interaction with the participants to gain direct information that shed light on the knowledge behind the inquiry. Axiology refers to the role of values in research. Creswell (2012) states that the role of values in a study is significant. Axiology suggests that the researcher openly discuss values that shape the narrative and include their interpretation in conjunction with the interpretation of participants. The researcher upheld the dignity and value of every detail of information obtained from the participants. As a research researcher, I understood the personal and value-laden nature of the information gathered from the study. The researcher preserved the merit of the participants' answers and carefully understood the answers in the light of the participants' interpretation. Rhetoric meant reporting reality through the eyes of my research participants. The researcher used personal voice and qualitative terms such as credibility, transferability, dependability, and conformability instead of internal and external validity and objectivity. Patton (2000) defined phenomenology as an inquiry that asks," What is the structure and essence of the experience of his phenomenon for these people? The goal of this research study worked well with this definition in trying to understand the teachers' experiences in employing strategies to enhance learners' problem-solving skills. Guba (2007) pointed out that the researcher needs to prepare for an investigation greater in depth and breadth than the offered description implied. He suggested information be viewed as only" the tip of the iceberg." The researcher implemented the qualitative research method of phenomenology to explore the teachers' experiences, particularly in enhancing the problem-solving skills of learners. Burns and Grove (2003) stated that phenomenology is a philosophy, an approach or perspective to living, learning, and doing research. The goal of phenomenological re-

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search was to capture lived experiences, find meaning that may or may not be known to the person who experienced them, and describe the phenomenon through a composite narrative. For the qualitative researcher, the only reality is the reality of the participants involved in the research situations constructed.

2.2. Qualitative Assumptions—A phenomenological approach was chosen for this study, using qualitative methodology. This study used an in-depth interview. The researcher conducted the interview using an interview guide made by the researcher, which the participants answered based on their experiences and practices that were related to this study. An in-depth interview was a qualitative research technique that involves conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program, or situation (Boyce and Neale, 2006). Interviews are primarily done in qualitative research and occur when researchers ask one or more participants general, open-ended questions and record their answers. A phenomenological approach was used to gain a broader insight. Phenomenology was an approach to qualitative research that focused on the commonality of a lived experience within a particular group. The fundamental goal of the approach was to arrive at a description of the nature of the particular phenomenon for investigatory inquiry. (Creswell, 2013).

2.3. Design and Procedure—The study utilized a qualitative research method employing a phenomenological qualitative design. According to Lester, phenomenological research was concerned with studying experiences from the individual's perspective, "bracketing" taken-for-granted assumptions and usual ways of perceiving. The phenomenological approach was based on a paradigm of personal knowledge and subjectivity. It emphasized the importance of personal perspective and interpretation. Thus, it was powerful for understanding subjective experiences, gaining insights into participants' motivations and actions, and cutting through the clutter of taken-for-granted assumptions and conventional wisdom. Qualitative research was mainly associated with words, language, and experiences rather than measurements, statistics, and numerical figures. It refers to the inductive, holistic, epic, subjective, and process-oriented methods used to understand, interpret, describe, and develop a theory on phenomena or settings. It was a systematic, subjective approach to describing life experiences and giving them meaning (Burns Grove, 2003). The phenomenological research design selected in this study was used to collect data on the strategies and challenges of Grade One teachers in enhancing their problem-solving skills through engagement with numeracy. This research approach deepened the understanding of nature and the meaning of everyday experiences. According to Corbetta (2003), the phenomenological research design is a qualitative type of research for which interviews provide an in-depth method that can grant access to deep knowledge and explanations and help to grasp the subject's perspective. Bryman (2012) posited that through interviews or face-to-face discussions, personal and detailed personal stories could be told, focusing on how the interviewee understands and explains different phenomena. The researcher aimed to draw an in-depth study of the strategies and challenges of teaching to enhance problem-solving skills through engagement to numeracy. Qualitative research was

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interested in understanding how people interpret their experiences, how they construct their worlds, and what meaning they attribute to their experiences" (Merriam, 2009). This form of research would provide a deep understanding of the subject and results in enhanced explanatory power. The researcher becomes "a part of the world they study; the knower and the known are taken to be inseparable" (Hatch, 2002). Because of the researcher's involvement, however, "much qualitative research was subjective..." (Wrench, Thomas-Maddox, Richmond, and McCroskey, 2008) Bloomberg and Volpe (2008) described qualitative research as "idea generation." Its design was proposed upfront but was open and emergent rather than rigid and fixed to permit exploration. It uses small samples purposefully. It took place within natural contexts, and real-world situations were studied as they unfolded. Its framework allows for flexibility and creativity. The qualitative research explored and described teachers' strategies and challenges in enhancing pupils' problem-solving skills. The research technique used was a modified van Kaam method described by Moustakas (2000) based on recorded and transcribed interviews using semi-structured questions to capture the teachers' strategies and challenges. Specifically, phenomenology was the study of the subjective experiences of others. It researched the world through another person's eyes by discovering how they interpret their experiences. It describes the meaning of the lived experiences of several individuals about a concept or a phenomenon. Phenomenology explores the structures of consciousness in human experiences, as Polkinghorne (2000) noted. This involved procedures which the qualitative researchers should follow. First, the researcher wrote research questions that would explore the meaning of life experiences for individuals and asked individuals to describe these experiences. The researcher collected data from individuals who had experienced the phenomenon under investigation, typically via lengthy interviews. Next, the data analysis involved horizontalization, which extracted significant statements from transcribed interviews. The significant statements were transformed into clusters of meanings according to how each would fall under specific psychological and phenomenological concepts. Moreover, these transformations were tied together to make a general description of the experience – both the textual description of what was experienced and the structural description of how it was experienced. The researcher incorporated the meaning of the experience here. Finally, the report was written such that readers understand better the essential, invariant structure of the essence of the experience. Conversely, several challenges have been pointed out. The researcher required a solid grounding in the philosophical guidelines of phenomenology. The subjects selected in the study were individuals who had experienced the phenomenon. The researcher needed to bracket their own experiences and observations, which was difficult. The researcher also needed to decide how and when their observations were incorporated into the study. Accordingly, Hycner, (2008) phenomenology in business research studies ideas were generated from the abundant amount of data using induction and human interests, as well as stakeholder perspective may have their reflection on the study. A study that attempted to assess the impact of leadership style on employee motivation in an organization via in-depth interviews with employees is a relevant example for research with a phenomenology philosophy. Advantages associated with phenomenology include a better understanding of meanings attached by people and its contribution to developing new theories. Its disadvantages include difficulties with analysis and interpretation, usually lower levels of validity and reliability compared to positivism, and more time and other resources required for data collection (Hycner, 2008). Similarly,

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Schutz (2010) stressed that the purpose of the phenomenological approach is to illuminate the specific phenomena and identify them through how the actors perceive them in a situation. In the human sphere, this typically translates into gathering 'deep' information and perceptions through inductive, qualitative methods such as interviews, discussions, and participant observation and representing them from the perspective of the research participant(s). Phenomenology studies experience from the individual's perspective, 'bracketing' taken-for-granted assumptions, and usual ways of perceiving. Epistemologically, phenomenological approaches were based on the paradigm of personal knowledge and subjectivity and emphasized the importance of personal perspective and interpretation. As such, they were dominant for understanding the subjective experience, gaining insights into people's motivations and actions, and cutting through the clutter of taken-for-granted assumptions and conventional wisdom. The researcher's purpose was to employ the phenomenology type of qualitative method since the focal point of this study is to investigate and explore teachers' engagement with numeracy to enhance learners' problem-solving skills.

2.4. Research Participants—The key informants of this study were the selected elementary grade one teachers of Sirawan District, Division of Davao City. The researcher utilized eight (8) teachers for qualitative participants in an in-depth interview (IDI) who were purposely selected. The informants should have taught for 3 or more years at the Grade One level. The researcher utilized the purposive sampling design since the participants were chosen based on the criteria or purpose of the study. It was also known as judgmental, selective, or subjective sampling. The selection of the participants was purposefully done to ensure that the findings would be authentic (Marshall, 1996).

2.5. Ethical Considerations—Ethical considerations were of paramount importance in the design of this research study. The researcher needed to consider several ethical issues about the research participant groups addressed in this fieldwork. Ethical considerations can be specified as one of the most critical parts of the research. The researcher must also adhere to promoting the aims of the research, imparting factual knowledge, truth, and prevention of error. Social Value. Research was essential to society. In this study, the social value focuses on the strategies and challenges of teachers' engagement to numeracy to enhance learners' problem-solving skills. Thus, the social problem that pushed the interest of the researcher was the challenges the teacher encountered while employing strategies to enhance learners' problem-solving skills. This study could serve as a basis for the higher authorities to create more programs and resolutions from which learners could benefit. Informed Consent. Gaining the trust and support of research participants was critical to informed and ethical academic inquiry and phenomenological research (Walker, 2007 as cited by Pellerin, 2012). All participants were given an informed consent form before scheduling the interviews and participating in the phenomenological research process. Each participant was required to provide a signed personal acknowledgment, consent, and an indication of a willingness to participate in the study release. The purpose of the informed consent letter was to introduce the research effort, provide contact information, articulate the study's intent, request voluntary participation by the

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recipients, and identify the anticipated information that the informants are expected to provide. All participants were then required to sign and return the consent letter to the researcher before participating. In the conduct and practice of this study, the Treaty Principle of Participation, as cited by McLeod (2009), was adhered to. The invitation to participate ensured that participation in the research was entirely voluntary in nature and based on an understanding of adequate information. The participant recruitment and selection were lodged in the appendices of this study. The Vulnerability of Research Participants. The participants of this study were deemed capable of answering the research instrument because they served as the first-hand source of information. Thus, the researcher then assured the participants that they could easily be reached through their contact number and address in case there were any clarifications or questions about the study. Risks, Benefits, and Safety. The recruitment of the respondents was free of coercion, undue influence or inducement. Moreover, respondents were provided with the contact numbers of the panel chair or panel members if they had queries related to the study. This was done to answer the respondents' possible questions. Furthermore, if respondents experienced possible discomfort and inconvenience while answering the questions, they were not compelled to participate in any manner. Further, the researcher had to ensure that the respondents were safe during the survey and interview. Thus, the questionnaire was distributed in a safe venue and administered at a convenient time. The dominant concern of this study is the Treaty Principle of Protection, as reflected in the respect for the rights of privacy and confidentiality, as well as risk minimization. This was done by assigning pseudonyms for each informant so as not to disclose their identity. The possibility of a degree of risk inherent to this was minimized by taking all reasonable steps to guarantee participant confidentiality. Privacy and Confidentiality of Information. This study observed the Data Privacy Act of 2002 to ensure that the data could not be traced back to their real sources to protect participants' identities. Thus, utmost care was taken to ensure the anonymity of the data sources. Hence, any printed outputs that were carried out from this study were kept in anonymity. Furthermore, all the issues were considered so there would be no conflict of interest among the researcher and the respondents. Any type of misleading information and representation of primary data findings in a biased way were avoided. Justice. The respondents were informed of the researcher's role and their corresponding role during data gathering. They were then briefed that they had to give their full honesty in answering the survey questions and additionally, any type of communication about the research was done with honesty. Similarly, they were informed that they were the ones to benefit first from the results of the study. Transparency. The study's results can then be accessed by the respondents and heads of the participating schools because the information is available and placed on CD or other storage devices, which can be requested from the researcher. Also, by learning about the study's results, classroom teachers would be aware of the significance of the study and its contribution to their well-being. Further, each participant was advised that they had the right to withdraw their information at any time up to the completion of the data collection process and that they could request to be allowed to verify their transcript after the interview. The participants were allowed to amend or remove any information they felt might identify them. The researcher reserved the right to employ pseudonyms and change names or non-significant dates to protect the participant's identity in all subsequent data analysis and reporting. Qualification of the Researcher. The researcher ensured the possession of the needed qualifications to conduct the study. The researcher

ISSN 3028-1261
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had completed the academic requirements and passed the comprehensive examination before thesis writing, which was the last requirement to obtain the researcher's master's degree, and they are qualified to conduct the study physically, mentally, emotionally, and financially. Also, the advisee-adviser tandem ensured that the study would reach its completion. Adequacy of Facilities. The researcher strived that the study would be completed successfully on the specified time and that he/she was equipped with the necessary resources. Likewise, the technical committee would be of help in the enhancement of the paper by giving the needed suggestions and recommendations for the improvement of the study. The researcher also had to ensure that he/she had enough funds to continue and finish the research. Community Involvement. The researcher showed respect for the local traditions, culture, and views of the respondents in this study. Moreover, this study did not involve any use of deceit in any stage of its implementation, specifically in the recruitment of the participants or methods of data collection. Furthermore, the researcher deemed it necessary to express their great pleasure for their whole-hearted participation in this study. Plagiarism and Fabrication as the researcher. The researcher respected other works by adequately citing the author and rewriting what someone else had said in their own way. Understand the study context and avoid copying and pasting the text verbatim from the reference paper. Always use quotes to indicate that the text has been taken from another paper. Similarly, they would assure them of honesty in working on the manuscript and that there was no intentional misrepresentation in the study and making up of data and results or purposefully putting forward conclusions that were not accurate.

2.6. Role of the Researcher—The researcher wrote a letter asking permission from the Schools Division Superintendent. After this, another letter of permission was secured and submitted to the participants. Upon approval, I used the forms of data collection prescribed in the qualitative design. In this study, an in-depth interview was recorded. The researcher needs to get the subjective interaction between the study participants. The researcher relied heavily on naturalistic methods (interviewing and audio-recording), using the interpretivist paradigm. Interpretive approaches rely heavily on naturalistic methods like interviewing, observation, and analysis of existing texts. These methods ensure an adequate dialog between the researchers and those with whom they interact in order to construct a meaningful reality collaboratively. Yin, as cited by Aquilam (2014), suggested numerous forms of data collection, including documents, archival records, interviews, direct observation, participant observation, and physical artifacts. To obtain legitimate and trustworthy data on teachers' experiences, the researcher conducted an in-depth interview and focus group discussion. This interview aimed to explore the experiences of teachers in engaging their learners in numeracy to enhance problem-solving skills. The participants were encouraged to express their answers in their most comfortable manner. The interview with the teacher was transcribed word for word. Lastly, the researcher analyzed the data collected using discourse analysis and thematic analysis. Creswell (2007) suggested that succeeding in the conduct of the study; the data were stored so that they could easily be found and protected from damage and loss.

2.7. Data Collection—

ISSN 3028-1261
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The following were the step-by-step processes for gathering the data needed. Securing endorsement. On May 18, 2023, the researcher secured an ethics compliance certificate from the Dean of the Graduate School of the college where the researcher is studying to pursue the study. Asking permission from the Schools Division Superintendent. The researcher asked permission from the Schools Division Superintendent to conduct the study in the identified schools on June 5, 2023. The researcher sent a letter addressed to the Schools Division Superintendent with the attached Chapters 1 and 2 together with the research instrument, which explained the study's objectives and the participants' identification. The researcher waited for the response of the SDS before the conduct of it and received the approval on June 20, 2023. Asking permission from the school heads. After securing the approval of the SDS, the researcher sent letters to the principals of the schools explaining the study to be conducted in their schools on July 10, 2023. Obtaining consent from the participants. The researcher asked permission from the participants on July 15, 2023. They were formally oriented about the study and of the process they went through as participants. Conducting the interview. On July 15, 2023, the researcher conducted an in-depth interview using the interview questionnaire. The participants' profiles were taken, notes were jotted down, and conversations were recorded using a sound recorder for ease of transcription. The researcher carefully listened and responded actively during the interviews. Transcribing the responses of the interviewees. The researcher transcribed the responses of the interviewees precisely by recalling their answers from the sound recorder on July 25, 2023. Data Coding and Thematizing. After the transcription, the data were categorized and coded on July 30, 2023. Then, themes were extracted, and individual data within the participants were compared and contrasted to come up with patterns and trends.

2.8. Data Analysis—In this study, thematic analysis was utilized to analyze the gathered data. The researcher analyzed the answers of the participants from the conducted interviews using Creswell's Model, specifically the identifying of themes approach. According to Creswell (2012), themes in qualitative research are similar codes aggregated together to form a major idea in the database. Familiarization with the data was common to all forms of qualitative analysis. The researcher immersed herself in and became intimately familiar with their data, reading and re-reading it and noting any initial analytic observations. Coding was also a common element of many approaches to qualitative analysis and involves generating pithy labels for important features of the data of relevance to the (broad) research question guiding the analysis. Coding is not simply a method of data reduction; it was also an analytic process, so codes capture both a semantic and conceptual reading of the data. The researcher coded every data item and ended this phase by collating all their codes and relevant data extracts. Searching for themes was a coherent and meaningful pattern in the data relevant to the research question. The researcher ended this phase by collating all the coded data relevant to each theme. Reviewing themes, the researcher reflected on whether the themes tell a convincing and compelling story about the data and began to define the nature of each individual theme and the relationship between the themes. Defining and naming themes. The researcher prepared a detailed analysis of each theme, identifying its 'essence' and constructing a concise, punchy, and informative name for each theme. Writing up involves weaving together the analytic narrative and data extracts

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024

to tell the reader a coherent and persuasive story about the data and contextualizing it in relation to existing literature.

2.9. Framework of Analysis—This study employed a qualitative research method. Rigorous and systematic steps were observed in analyzing the information gathered from the teacher-participants. Data were analyzed following the steps outlined by O'connor and Gibson (2003) on qualitative data analysis: Organizing the Data. The data were organized in a way that was easy to look at and that allowed the researcher to go through each topic to pick out concepts and themes. Finding and Organizing Ideas and Concepts. If specific words or ideas keep coming up, organize them into codes or categories. Building Over-Arching Themes in the Data. Each of the response categories has one or more associated themes that give a deeper meaning to the data. Different categories can be collapsed under one main over-arching theme. Ensuring Reliability and Validity in the Data Analysis and in the Findings.

Findings are more dependable when they can be confirmed from several independent sources. Their validity was enhanced when they were confirmed by more than one "instrument" measuring the same thing. The researcher also completed the two other steps in this study: writing, which is drafting the output of the data analysis by weaving stories from narratives and literature, and presentation, which was the thematic and comprehensive presentation of output in artistic graphs and illustrations.

2.10. Trustworthiness of the Study—The concepts of validity and reliability would be relatively foreign to the field of qualitative research. Qualitative researchers substitute data trustworthiness instead of focusing on reliability and validity. Trustworthiness consists of the components such as credibility, transferability, dependability, and conformability (Harts, 2016). Credibility refers to the extent to which a research account was believable and appropriate, with particular reference to the level of agreement between participants and the researcher. The notion of credibility is most often associated with the framework presented by Yvonna Lincoln and Egon Guba. Transferability was the degree to which the results of qualitative research can be transferred to other contexts or settings with other respondents. The researcher facilitates the transferability judgment by a potential user through thick description. Dependability is the extent to which the study could be repeated by other researchers and that the findings would be consistent. In other words, if a person wanted to replicate your study, they should have enough information from your research report to do so and obtain similar findings as your study did. Conformability refers to the objectivity of research during data collection and data analysis. There needs to be congruency between two or more independent persons about the accuracy, relevance, or meaning of the data (Polit Beck, 2012). Conformability also indicates a means to demonstrate quality.

3. Results and Discussion

In this chapter, the results of the study are presented and discussed with reference to the aim of the study. The themes that emerged from the data gathered were discussed in this chapter. The results present the description and background of the participants who are assigned to pseudonyms to conceal their identity.

ISSN 3028-1261
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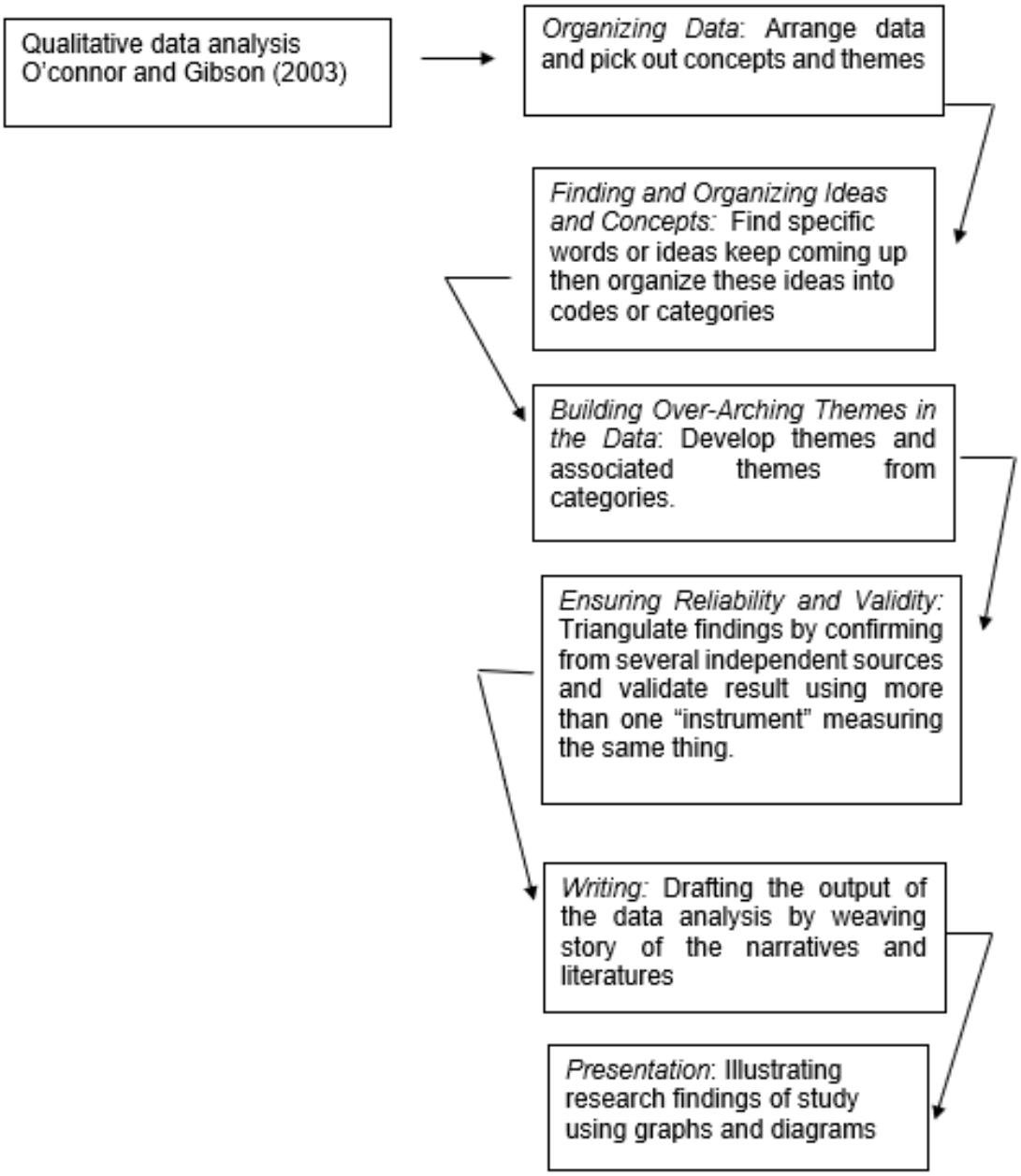

Fig. 2. Analytical Framework of the Study

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024

3.1. Strategies of Teachers in Enhancing Problem-Solving Skills—

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024

Integrate real-life problems and scenarios into the curriculum to demonstrate the relevance and importance of problem-solving skills. According to Harris Petersen (2019), early math and numeracy skills build on children's natural curiosity, inquiry, and exploration of the world around them. Math at all ages requires curiosity and inquiry. Young students are naturally curious and learn through experiencing their surroundings. They want to know how things work and ask questions about everything. This is what makes early childhood the best time to begin learning early math and numeracy skills. Along with math skills, teaching early math helps to support verbal, spatial and memory skills in young children which are crucial in all areas of life and academics. It is important to build the foundation for future math learning early by maximizing skills young students already possess.

3.1.1. Real-life Applications—The participants described that enhancing problem-solving skills in grade one pupils through real-life applications is crucial for their holistic development. These applications not only lay the groundwork for academic success but also nurture essential life skills. By incorporating these approaches, educators and parents can equip young learners with the problem-solving abilities necessary for a successful and fulfilling future. P1 suggested using real-life examples and hands-on activities like puzzles and building blocks to make math more engaging and tangible for students. Additionally, they advocate for cooperative learning strategies to enhance collaboration and peer-assisted learning. P3 emphasized the incorporation of math games into lessons to make learning numbers enjoyable and fun. This approach aims to motivate students and create a positive learning experience through playful interaction. Several studies (Smith et al., 2020 Johnson, 2022) highlighted the effectiveness of contextual problem scenarios in enhancing students' problem-solving skills. Incorporating real-life contexts in mathematical problems cultivates a deeper understanding and application of mathematical concepts (Brown, 2022). The application of math in daily life is a fundamental aspect of fostering problem-solving skills. By integrating real-world contexts into mathematical challenges, students grasp the practical relevance of problem-solving. Research demonstrates that this approach enhances engagement and motivation (Thompson Clark, 2018).

3.1.2. Collaborative Learning—This plays a pivotal role in enhancing problem-solving skills among students. By promoting teamwork, diverse perspectives, active participation, and effective communication, this approach equips individuals with the abilities required to tackle challenges in academia and the real world. Educators and learners should embrace collaborative learning as a powerful tool for developing well-rounded problem solvers and preparing them for a dynamic and interconnected future. Aubrey and Godfrey (2023), during their research on the development of early numeracy, found that early childhood education is at need of a conceptual curriculum. The curriculum needs to focus on deeper understanding of concepts and creating a collaborative better foundation of problem-solving skills. Children must be able to make their learning meaningful and be able to understand the reasoning behind the math skills beyond the surface, rote level. Without logical thinking, problem-solving, and reasoning skills, students will not only struggle in the classroom but also outside the classroom in daily life. P6 observed that students show great enthusiasm during brainstorming sessions, highlighting that this interactive method is effective for peer teaching. This approach

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024

fosters active participation and collaborative learning among students. Moreover, P7 noted that students enjoy and engage more when problem-solving is integrated into storytelling. By identifying problems and brainstorming solutions within narratives, students can explore the consequences of different choices, making the learning process both fun and educational. Studies by Webb, 2022; Roseth et al., (2022) demonstrated that peer teaching and mentoring effectively enhance problem-solving skills. Engaging students in teaching their peers not only reinforces their own understanding but also promotes collaborative problem-solving and communication skills). Peer teaching encourages active participation and collaborative learning, essential to effective problem-solving. Through teaching others, students solidify their grasp of mathematical concepts and gain diverse perspectives on problem-solving approaches in view of Crouch and Mazur (2022).

3.1.3. Scaffolded Learning—A pedagogical approach that provides structured support to learners as they build their problem-solving skills. This method involves gradually reducing the level of assistance as students gain proficiency. Scaffolded learning facilitates progressive skill development by breaking down complex problems into manageable tasks. It introduces students to foundational concepts before gradually moving towards more challenging problems. This gradual progression builds confidence and competence in problem-solving. Scaffolded learning allows students to express their points of view. It provides structured problem-solving experiences that gradually increase in complexity, allowing them to build their skills step by step. P8 believed that integrating imaginative and creative play into the learning environment motivates students by allowing them to solve problems in pretend scenarios. This approach fosters creativity and critical thinking skills as students navigate these imaginative situations. While P4 emphasizes the importance of aligning teaching methods with students' interests and observes that visual representations are particularly effective. By helping pupils visualize problems and solutions, visual aids enhance understanding and engagement in learning. This corroborates with the study of Aunio (2019), as student's ability to perform early math skills before formal schooling can predict their math achievement in the future. By teaching students these skills before first grade, students enter school with a foundation of skills to build on to do more advanced math. The Kindergarten Common Core skills, representing, relating, and operating on whole numbers and describing shapes and space, which are early math skills, are essential for the skills students will learn up to third grade, including operations, place value, and geometry. Figure 4 shows three themes from the participants' responses: real-life applications, collaborative learning, and scaffolded learning. These themes navigate the complexities of the modern world. Teachers play a fundamental role in developing these skills in students. This explores strategies that teachers employ to enhance problem-solving skills, focusing on real-life applications, collaborative learning, and scaffolded learning. One of the most effective ways to enhance problem-solving skills is by applying concepts to real-life scenarios. Teachers can incorporate practical examples and case studies into the curriculum to allow students to analyze, evaluate, and solve real-world problems. This approach helps students grasp the relevance and applicability of the knowledge they acquire in the classroom. For instance, in a mathematics class, teachers can present problems related to budgeting, calculating interest rates, or designing geometric structures. By addressing these real-life scenarios, students not only understand the math-

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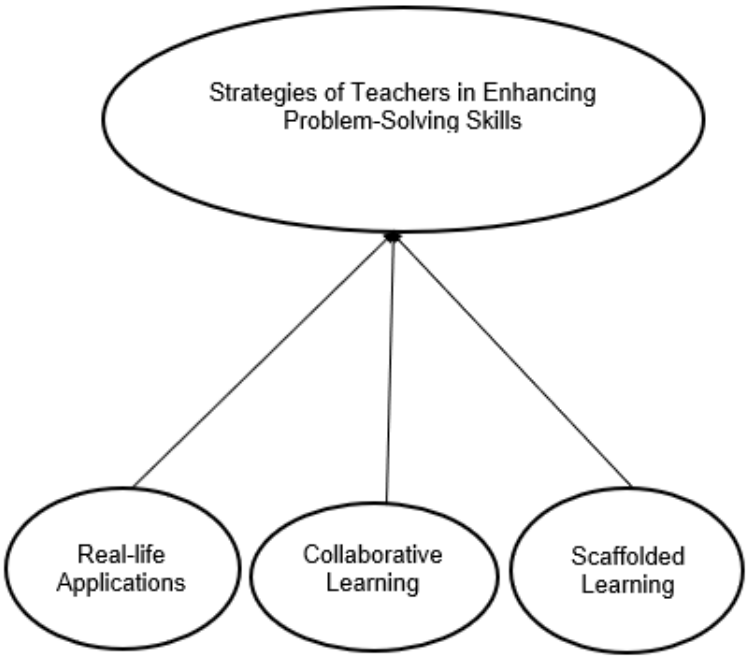

Fig. 3. Emerging themes on the strategies of teachers in enhancing problem-solving skills

ematical concepts better but also learn how to apply them in various situations, fostering critical thinking and problem-solving abilities.

3.2. Coping Mechanisms with the Challenges in enhancing problem-solving skills —In the realm of mathematics education, educators encounter multifaceted challenges in the pursuit of refining problem-solving skills among students. Addressing these challenges necessitates a systematic approach aimed at optimizing the learning experience and fostering adept problem solvers. A comprehensive understanding of these challenges is fundamental to devising effective coping mechanisms. This simple linguistic shift can significantly impact students' beliefs about their abilities to solve problems and foster resilience and perseverance in the face of challenges (Burnette et al., 2010).

3.2.1. Cultivating a Growth Mindset Culture—Establishing a growth mindset culture within the classroom encourages students to perceive challenges as opportunities for growth. Mathematics instructors employ motivational strategies to instill perseverance, resilience, and the belief that intelligence and problem-solving abilities can be nurtured through dedication and effort. Encourage a growth mindset in students by promoting the belief that intelligence and abilities can be developed through effort and perseverance. Emphasize the importance of learning from mistakes and setbacks in the problem-solving process. Studies (Yeager Dweck, 2018) have shown that emphasizing the word "yet" (e.g., "I have not solved it yet") encourages a growth mindset. P1 emphasized the importance of recognizing pupils' developmental readiness

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024

and short attention spans, suggesting that teachers should clearly outline and practice strategies to help students become independent writers. By encouraging practice and allowing students to use preferred strategies, they can develop writing skills more effectively. P4 focused on thoroughly teaching students who lack interest and patience in problem-solving, noting the need for supplementary materials to aid in practical learning. By guiding students through each phase of writing, P4 aimed to help them develop meaningful writing skills. Moreover, P5 advocated for providing cue terms to young students to support their early cognitive development, as their ability to think abstractly is limited. Tailoring activities to align with students' developmental readiness ensures that learning tasks are appropriate and engaging for their level. Research by Dweck (2022) underscored the importance of promoting a growth mindset by encouraging students to embrace challenges and value effort. When students perceive challenges as opportunities for growth and believe that their efforts lead to improvement, they are more likely to persist in problem-solving tasks (Blackwell et al., 2021).

3.2.2. Understanding Individual Learning Styles—Recognize that students have different learning styles and preferences. Tailor your teaching methods to accommodate visual, auditory, kinesthetic, and other learning styles to ensure all students can grasp problem-solving concepts effectively. Studies by Coffield et al. (2018) emphasize the use of varied instructional materials to cater to diverse learning styles. Providing a range of materials, such as visual aids, hands-on activities, and written instructions, ensures that students with different learning preferences can effectively engage with problem-solving content and techniques (Felder Silverman, 2021). Frequent and effective feedback increases students' productivity and creativity. P2 highlighted the challenge of language barriers, noting that some pupils have limited communication skills. This barrier can hinder their ability to engage in learning activities and express their understanding fully. Thus, P3 describes a gradual approach to teaching numeracy, starting with basic activities for students new to a particular type of problem-solving. By gradually increasing the complexity of activities, P3 aimed to develop students' numeracy abilities at a pace that suits their individual learning needs. Research conducted by Tomlinson (2021) supported the effectiveness of differentiated instruction based on learning styles. Adapting teaching methods to match individual learning preferences ensures that students can engage with problem-solving tasks in a way that best suits their strengths and learning styles (Hall et al., 2020).

3.2.3. Offering Constructive Feedback—Provide timely and constructive feedback on students' problem-solving attempts. Highlight both correct approaches and areas for improvement, helping students understand the thought process and refine their strategies. Offer a range of problems with varying levels of difficulty to cater to students at different skill levels. Encourage students to tackle challenging problems that require critical thinking and problem-solving strategies. Cultivating metacognitive skills is pivotal in the realm of problem-solving. Mathematics educators integrate metacognitive strategies within their pedagogical approach, encouraging students to reflect on their problem-solving processes, identify efficient strategies, and adapt their approaches accordingly. Moreover, timely feedback is necessary for the partic-

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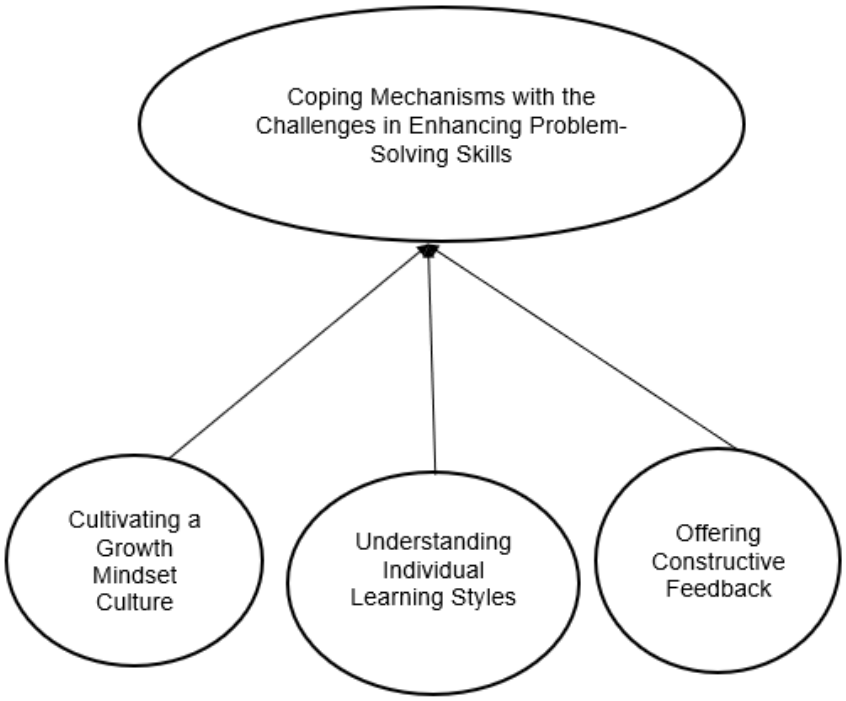

Fig. 4. Emerging themes on coping mechanisms with the challenges in enhancing problem-solving skills

ipant so that students would still have fresh associations and reflections on the feedback given. A study by Shute (2018) emphasized the value of feedback for growth. Feedback oriented towards promoting a growth mindset, encouraging effort, and strategy refinement helps students view feedback as a constructive tool for improvement, fostering a positive attitude towards problem-solving (Dinovitzer Wehling, 2024). P7 discussed the importance of effective communication and language comprehension, especially for young students who may struggle to express themselves or understand problems clearly. They suggest using simple language and visuals to aid understanding, facilitating rich conversations between students and teachers. Further, P8 emphasized the need to acknowledge and address students' varying skill levels, particularly in Grade One, where readiness and exposure to problem-solving differs. They advocate for differentiated instruction to cater to the diverse needs and abilities within the classroom, ensuring that all students receive appropriate support and challenges. Research by Hattie and Timperley (2019) highlighted the significance of timely and specific feedback. Providing clear, timely feedback that focuses on the process of problem-solving rather than just the final answer helps students understand their mistakes and areas for improvement, ultimately enhancing their problem-solving skills (Kluger DeNisi, 2018). Based on the figure above, three themes emerged from the responses of the participants, which were cultivating a growth mindset culture, understanding individual learning styles, and offering constructive feedback. By assimilating these coping mechanisms into their instructional approach, mathematics teachers navigate the intricate landscape of enhancing problem-solving skills. In doing so, they contribute substantively to the educational landscape, nurturing a generation of adept problem solvers poised to meet the challenges of an ever-evolving world.

3.3. Educational Management Insights Drawn from the Findings of the Study—

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024

The empirical investigation into the Strategies of Teachers in Enhancing Problem-Solving Skills yields pivotal insights pertinent to educational management. The study underscores the paramount role of pedagogical strategies in cultivating adept problem-solving skills among students.

3.3.1. Tailoring Instructional Approaches—Educational managers can use the findings to tailor instructional approaches and professional development for teachers. This could involve workshops, training, or seminars to equip teachers with the necessary skills and knowledge to effectively implement the identified strategies. Committing to practice is essential to become proficient in a new skill or behavior. Studies by Hmelo-Silver (2018) suggested that problem-based learning (PBL) effectively enhances problem-solving skills. PBL engages students in authentic, real-world problems, fostering critical thinking, collaboration, and problem-solving abilities (Barrows Tamblyn, 2019). P1 stressed the importance of practice in learning, particularly for pupils with diverse abilities, backgrounds, and learning styles. They advocated for considering individual differences to support each student's learning journey effectively. Meanwhile, P2 emphasized the significance of recognizing the developmental progression of learners and using this understanding to structure lessons effectively. By respecting each student's stage of development, teachers can tailor instruction to meet their needs more successfully. P6 highlighted the importance of fostering curiosity and inquiry among students, encouraging them to ask questions, explore ideas, and seek solutions independently. They advocate for making writing a habit and incorporating strategies to strengthen students' ability to present strong arguments. Research by Tomlinson (2018) highlighted the effectiveness of differentiated instruction in enhancing problem-solving skills. Differentiating content, process, and product allows teachers to meet diverse student needs, ensuring that each student is appropriately challenged and supported in their problem-solving endeavors (Frey et al., 2020).

3.3.2. Empowering Professional Development—Organizing professional development programs based on the study's findings can help teachers stay updated with effective strategies and continuously improve their instructional practices in developing students' problem-solving skills. Improving professional competence ensures that teachers acquire the knowledge and skills needed to perform efficiently an activity in a particular work context. The participants stressed the importance of educating the minds, particularly of the teachers. It helps the teachers to keep their professional knowledge and skills updated. The new generations have a different approach to learning than the previous generations. Professional development helps teachers to learn new techniques in teaching students of this generation, particularly in improving their numeracy performance. Action research, as highlighted by McNiff and Whitehead (2022), provided a powerful tool for empowering professional development. Engaging in action research and reflective practices allows teachers to refine their instructional strategies, adapt to student needs, and continuously enhance problem-solving instruction (Farrell, 2023). P3 emphasized the value of collaboration among colleagues as a means to share ideas, strategies, and experiences, which can in turn enhance learners' problem-solving skills.

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024

By pooling resources and expertise, educators can collectively support student development. On the same note, P4 highlighted the importance of teacher-parent cooperation in facilitating effective learning. When teachers and parents work together, they can provide consistent support and guidance to students, fostering a conducive learning environment both at school and at home. P7 advocated for an individualized approach to teaching problem-solving, recognizing that students have unique learning styles, abilities, and challenges. By tailoring problem-solving strategies to suit each student's individual needs, educators can ensure that all students have the opportunity to succeed and grow. Research by Ingersoll and Strong (2022) underscored the significance of collaborative learning communities in empowering professional development. Encouraging teachers to collaborate, share insights, and engage in professional discourse enhances their problem-solving pedagogy and efficacy (Little, 2023).

3.3.3. Monitoring and Assessment Strategies—Educational managers can develop monitoring and assessment strategies to evaluate the implementation and effectiveness of the identified problem-solving strategies. This feedback loop will enable adjustments and improvements over time. The participants also like to modify their instruction based on the skill level of their students. For example, when working with struggling students who are new to a particular strategy, they begin by presenting a basic version of a strategy like setting one goal for essay length. When students become more comfortable with it, they challenge them to extend the strategy further by setting additional or more challenging goals. A study by Andrade (2019) suggested that using rubrics for problem-solving tasks enhances assessment practices. Clearly defined rubrics help provide specific feedback, guide students toward effective problem-solving strategies, and foster a better understanding of assessment criteria (Brookhart, 2018). P6 revealed the key factor in fostering effective learning: recognizing learners' capacities. By acknowledging and building upon each student's unique strengths and abilities, educators can create personalized learning experiences that promote growth and success. Moreover, P8 advocated a holistic approach to skill development, understanding that problem-solving encompasses critical thinking, creativity, communication, collaboration, and resilience. By addressing these skills in tandem, educators can provide students with a comprehensive foundation for navigating challenges and achieving success in various aspects of their academic and personal lives. Research by Black and Wiliam (2024) emphasized the importance of formative assessment in enhancing problem-solving skills. Formative assessment practices, such as providing timely feedback and adjusting instruction based on student progress, are crucial for identifying areas of improvement and promoting a deeper understanding of problem-solving concepts (Sadler, 2023). Based on Figure 5, three themes emerged from the participants' responses: tailoring instructional approaches, empowering professional development, monitoring, and assessment strategies. These themes implied that teachers should improve not just their students' competence but also their own. By learning appropriate, relevant, and timely strategies for creative numeracy approaches, teachers can give appropriate guidance to better train their students in problem-solving. This theme suggested the importance of adapting teaching methods to suit students' individual needs, abilities, and learning styles. It recognizes that not all students learn in the same way and that effective teaching requires flexibility and differentiation. Tailoring instructional approaches may involve

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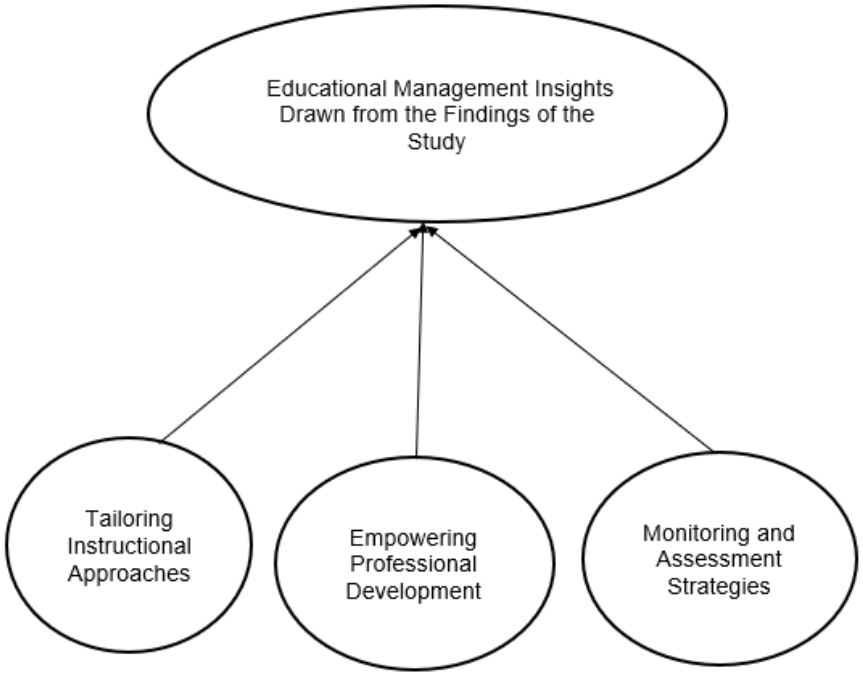

Fig. 5. Emerging Themes on the Educational Management Insights Drawn from the Study

using diverse teaching methods, incorporating various resources and materials, and providing personalized support to ensure that all students can effectively engage with and understand the content. In empowering professional development, this theme emphasized the continuous growth and improvement of educators through ongoing professional development opportunities. It involves providing teachers with the knowledge, skills, and resources they need to enhance their teaching practices and stay current with educational trends and research. Empowering professional development may include workshops, conferences, mentorship programs, collaborative learning communities, and access to relevant resources and literature. By investing in professional development, educators can strengthen their teaching abilities and ultimately improve student outcomes. In monitoring and assessment strategies, this theme underscored the importance of regularly assessing student progress and using data to inform instructional decisions. It involves implementing effective monitoring and assessment strategies to track student learning, identify areas for improvement, and provide targeted support. Monitoring and assessment strategies may include formative assessments, summative assessments, ongoing observations, student feedback, and data analysis. By monitoring student progress and assessing learning outcomes, teachers can adjust their instructional approaches to better meet the needs of their students and facilitate continuous improvement.

4. Implications and Future Directions

This chapter explores the implications and outlines future directions derived from the study focused on enhancing problem-solving skills in grade one pupils through engagement in numeracy. The aim was to provide actionable insights for educators, policymakers, and researchers to refine

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024

educational practices and promote optimal learning outcomes.

4.1. Findings—The results of my analysis revealed the following significant findings. Three themes emerged from the participants ' responses regarding strategies for teachers to enhance problem-solving skills: real-life applications, collaborative learning, and scaffolded learning. These themes navigate the complexities of the modern world, and teachers play a fundamental role in developing these skills in students. This article explores strategies teachers employ to enhance problem-solving skills, focusing on real-life applications, collaborative learning, and scaffolded learning.

4.2. Implications—One of the most effective ways to enhance problem-solving skills was by applying concepts to real-life scenarios. Teachers could incorporate practical examples and case studies into the curriculum to allow students to analyze, evaluate, and solve real-world problems. This approach helps students grasp the relevance and applicability of the knowledge they acquire in the classroom. For instance, in a mathematics class, teachers can present problems related to budgeting, calculating interest rates, or designing geometric structures. By addressing these real-life scenarios, students understand the mathematical concepts better and learn how to apply them in various situations, fostering critical thinking and problem-solving abilities. Collaborative learning was another powerful strategy for enhancing problem-solving skills. By encouraging students to work together in groups, teachers can stimulate discussions, exchange ideas, and challenge each other's thinking processes. Collaboration exposes students to perspectives and approaches, leading to more comprehensive problem-solving strategies. Teachers can design activities requiring group participation, such as group projects, debates, or problem-solving challenges. Each student can bring their unique strengths and perspectives to the table, fostering a collective effort toward finding solutions to problems. This collaborative approach mirrors real-life scenarios where teamwork and diverse perspectives are often essential for effective problem-solving. Scaffolded learning involves providing structured support to students as they tackle progressively challenging tasks. Teachers guide students through problem-solving, offering assistance and guidance until they can successfully solve problems independently. This gradual release of responsibility allows students to develop problem-solving skills in a supportive environment. Incorporating scaffolding techniques like modeling, cueing, and questioning helps students build their problem-solving competence. Teachers can begin with simple problems, demonstrate effective problem-solving strategies, and gradually increase the complexity of tasks as students become more proficient. This approach helps students gain confidence, improve their analytical skills, and become adept at independently solving various problems. Three themes emerged from the participants' responses regarding coping mechanisms for enhancing problem-solving skills: cultivate a growth mindset culture, understand individual learning styles, and offer constructive feedback. By assimilating these coping mechanisms into their instructional approach, mathematics teachers navigate the intricate landscape of enhancing problem-solving skills. In doing so, they contribute substantively to the educational landscape, nurturing a generation of adept problem solvers poised to meet the challenges of an ever-evolving world. Three themes emerged from the participants' responses on the educational management in-

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sights drawn from the study: tailoring instructional approaches, empowering professional development, and monitoring and assessment strategies. These themes implied that teachers should improve their students' and their own competence. By learning appropriate, relevant, and timely strategies for creative numeracy approaches, teachers can provide appropriate guidance to train their students in problem-solving. This theme suggested the importance of adapting teaching methods to suit students' needs, abilities, and learning styles. It recognizes that not all students learn in the same way and that effective teaching requires flexibility and differentiation. Tailoring instructional approaches may involve using diverse teaching methods, incorporating various resources and materials, and providing personalized support to ensure that all students can effectively engage with and understand the content. In empowering professional development, this theme emphasizes educators' continuous growth and improvement through ongoing professional development opportunities. It involves providing teachers with the knowledge, skills, and resources they need to enhance their teaching practices and stay current with educational trends and research. Empowering professional development may include workshops, conferences, mentorship programs, collaborative learning communities, and access to relevant resources and literature. By investing in professional development, educators can strengthen their teaching abilities and improve student outcomes. In monitoring and assessment strategies, this theme underscored the importance of regularly assessing student progress and using data to inform instructional decisions. It involves implementing effective monitoring and assessment strategies to track student learning, identify areas for improvement, and provide targeted support. Monitoring and assessment strategies may include formative assessments, summative assessments, ongoing observations, student feedback, and data analysis. By monitoring student progress and assessing learning outcomes, teachers can adjust their instructional approaches to meet the needs of their students better and facilitate continuous improvement.

4.3. Future Directions—This study was significant to principals. In it, principals could reveal their lived experiences in implementing educational policies in the school, especially in this new standard setting. They could also adopt the teachers' coping practices regarding their challenges. Policymakers may synergize better with school leaders and teacher trainers so that policies specifically enhance problem-solving skills. Long-term studies tracking the progress of grade one pupils over subsequent educational stages would shed light on the enduring impact of early numeracy engagement. Understanding how early numeracy influences long-term academic performance can guide curriculum development and intervention strategies. Additionally, the Department of Education could support engagement in numeracy by providing ongoing professional development opportunities for teachers. Teachers need the knowledge and skills to teach numeracy effectively and support problem-solving development in their pupils. Ongoing professional development can ensure that teachers are up-to-date with current research and best practices in numeracy instruction. For school administrators, they may evaluate student progress in numeracy development and problem-solving skills. The study's findings may enrich the monitoring of student progress, and administrators can identify areas of strength and weakness and provide support and resources to address any gaps in learning. Administrators may evaluate the applied strategies by investigating their effectiveness, such as technology-integrated numeracy programs in enhancing problem-solving skills, which could

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024

be a promising future research avenue. Assessing how digital tools and interactive platforms influence numeracy engagement and proficiency could provide insights into optimizing educational technologies for numeracy education. Teachers may provide feedback to students that is specific and timely and promotes problem-solving development. This could include feedback on their reasoning, strategies, and solutions to numeracy problems. Teachers can create a positive classroom environment that supports engagement and encourages problem-solving. This can include creating a classroom culture that values mistakes and encourages students to take risks and learn from their experiences. Also, it includes expanding their strategies in teaching, and exploring the influence of cultural and socioeconomic factors on numeracy engagement and problem-solving skills is essential. Understanding how diverse backgrounds impact numeracy acquisition can inform the development of inclusive and culturally sensitive educational approaches. For future researchers, this may highlight the immediate implications for educational practice and policy while presenting future research directions to continuously advance and refine the integration of numeracy in early education, ultimately enhancing problem-solving skills among grade one pupils.

5. References

Act, N. R. I. (2018). A. lb1081, 105th leg., 2d sess. §§ 79-2601 - 79-2607 [Retrieved from https://nebraskalegislature.gov/laws/display_html.php?begin_section=79-2601&end_section=79-2607].

Adewale, A., & Ajayi, K. (2023). Digital divide and numeracy education in nigeria. *Journal of Educational Technology*, *29*(1), 67–82.

Aubrey, C., & Godfrey, R. (2018). The development of children's early numeracy [Available at: https://doi.org/10.1016/j.sbspro.2009.01.085].

Aunio, P., Hautamäki, J., Sajaniemi, N., & Van Luit, J. (2019). Early numeracy in low-performing young children. *British Educational Research Journal*, *35*(1), 25–46.

Aunio, P., Heiskari, P., Van Luit, J., & Vuorio, J. (2019). The development of early numeracy skills in low-, average- and high-performance groups. *Journal of Early Childhood Research*, *13*(1), 3–16.

Bautista, A., & Ocampo, R. (2021). Teacher preparedness and professional development in rural areas. *Philippine Educational Review*, *59*(2), 89–104.

Blackwell et al. (2021). Grounded theory research: Teaching for mastery in writing ability as a skill. *Asian Journal of Contemporary Education*.

Brown & Chesloff, J. (2023, March). Stem education must start in early childhood [Retrieved February 27, 2022, from https://www.edweek.org/ew/articles/2013/03/06/23chesloff.h32.html].

Brown, P., & Taylor, R. (2020). Teacher preparedness in numeracy: Issues in the uk. *British Educational Research Journal*, *46*(3), 456–472.

Burnette & others, M. A. (2010). *The encyclopedia of teaching* (4th). Dar Al-Masirah.

Clerkin, A., & Gilligan, K. (2018). Numeracy play as a predictor of children's attitudes towards mathematics at age 10. *Journal of Early Childhood Research*, *16*(3), 319–334. https://doi.org/10.1177/1476718X18762238

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024

Coffiel & others, J. (2013). *The learner-centered classroom and school: Strategies for increasing student motivation and achievement*. Sam Bass Publishers.

Crouch & Mazur, S. (2002). Challenges of teaching english in the arab world: Why can't efl programs deliver as expected? *Procedia-Social*.

Cruz, R., & Hernandez, S. (2022). Technological integration in philippine schools. *Journal of Educational Technology*, *42*(2), 178–192.

Davidse, N., De Jong, M., & Bus, A. (2019). Explaining common variance shared by early numeracy and literacy. *Reading and Writing: An Interdisciplinary Journal*, *27*(4), 631–648.

Dela Cruz, M. (2022). Continuous professional development for teachers. *Journal of Teacher Education*, *47*(4), 210–225.

Dweck. (2018). Impact of the use of problem-solving and cooperative learning on the collection of secondary school students in social education.

Felder, J., & Schmidt, R. (2020). *Longman dictionary of language teaching and applied linguistics* (4th). Longman.

Fisher, P., Dobbs-Oates, J., Doctoroff, G., & Arnold, D. (2022). Early math interest and the development of math skills. *Journal of Educational Psychology*, *104*(3), 673–681.

Flores, J., & Castillo, D. (2020). Parental support and engagement in numeracy. *Philippine Journal of Family Education*, *14*(1), 45–59.

Fuson, K., Sarama, J., & Clements, D. (2019). Making early math education work for all children. *Phi Delta Kappan*, *97*(3), 63–68. https://doi.org/10.1177/0031721715614831

Garcia, R., & Reyes, M. (2020). Challenges in implementing the k to 12 curriculum in the philippines. *Philippine Journal of Education*, *45*(2), 132–145.

Godfrey. (2018). The effect of student centered instructional approaches on student success. *Procedia Social and Behavioral Sciences*, *1*(1), 469.

Hall, G., et al. (2020). Thinking styles and their relationship to problem solving. *Damascus University Journal of Educational Sciences*, *23*(1), 417.

Hanley, T., & Johnson. (2005). Commentary on early identification and interventions for students with mathematical difficulties: Make sense–do the math. *Journal of Learning Disabilities*, *38*(4), 346–349.

Harris, B., & Petersen, D. (2019). Developing math skills in early childhood [Retrieved from https://www.edimpactlab.com/downloadmedia?MediaItemId=%7B3360C48F-576D-44A8-AB63-EA259BABC359%7D].

Hattie & Timperley, D. (2018). Proposed program of how to use some mathematical problem solving strategies of middle school students.

Help your child develop early math skills [Retrieved June 6, 2019, from https://www.zerotothree.org/resources/299-help-your-child-develop-early-math-skills]. (n.d.).

Jones, A., & Martin, S. (2021). Numeracy skills and teacher confidence in australia. *Australian Journal of Education*, *65*(1), 89–104.

Jordan, N., Kaplan, D., Ramineni, C., & Locuniak, M. (2019). Early math matters: Kindergarten number competence and later mathematics outcomes. *Developmental Psychology*, *45*(3), 850–867. https://doi.org/10.1037/a0014939

Kluger & Denisi, H. H. (2018). Instructional design: A logical view [Cairo].

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024

Kroesbergen, E., Van Luit, J., Van Lieshout, E., Van Loosbroek, E., & Van de Rijt, B. (2019). Individual differences in early numeracy. *Journal of Psychoeducational Assessment*, *27*(3), 226–236.

Lambert, S., & Walker, T. (2020). Language barriers in numeracy education in canada. *Canadian Journal of Education*, *43*(1), 34–49.

Lopez, G., et al. (2023). Bridging the digital divide in numeracy education. *International Journal of Educational Technology*, *30*(1), 67–82.

Mahlangu, V. (2022). Professional development and numeracy teaching in south africa. *South African Journal of Education*, *42*(4), 567–580.

Mendoza, L. (2021). Curriculum updates and global standards in philippine education. *Journal of Educational Development*, *38*(3), 256–270.

Mwangi, G., & Nyambura, M. (2021). Multilingual classrooms and numeracy in kenya. *African Education Review*, *18*(3), 345–360.

of Education, N. S. B. (2015, September).

Pascual, E. (2023). Socioeconomic influences on numeracy skills development. *International Journal of Social Education*, *15*(2), 98–115.

Piaget, J. (1952). *The origins of intelligence in children*. International Universities Press.

Ramani, G., Eason, S., & Smith. (2019). It all adds up: Learning early math through play and games. *Phi Delta Kappan*, *96*(8), 27–32.

Ramirez, K. (2021). Local language instructional materials and training. *Journal of Multilingual Education*, *36*(2), 150–165.

Ribner, A., Willoughby, M., Blair, C., & Investigators, F. L. P. K. (2019). Executive function buffers the association between early math and later academic skills. *Frontiers in Psychology*, *8*, 869–869. https://doi.org/10.3389/fpsyg.2017.00869

Santos, P., et al. (2019). Innovative pedagogical approaches in numeracy education. *International Journal of Educational Research*, *32*(1), 112–125.

Sciences, B. (2010). Challenges of teaching english in the arab world: Why can't efl programs deliver as expected? [Available at: https://doi.org/10.1016/j.sbspro.2010.03.559].

Sharma, R., & Gupta, P. (2018). Socioeconomic impact on numeracy skills in india. *International Journal of Educational Development*, *62*, 201–215.

Silva, M., & Pereira, J. (2019). Educational inequality and numeracy in brazil. *Latin American Research Review*, *54*(2), 276–290.

Smith, J., et al. (2019). Challenges in implementing common core standards for numeracy in the us. *Journal of Education Policy*, *34*(2), 123–139.

Tan, C., et al. (2022). Technological integration in numeracy education in singapore. *Asia Pacific Journal of Education*, *42*(2), 178–192.

Toll, S., & Van Luit, J. (2018). Early numeracy intervention for low-performing kindergartners. *Journal of Early Intervention*, *34*(4), 243–264.

Toll, S., Van Luit, J., & Thompson. (2019). The developmental relationship between language and low early numeracy skills. *Exceptional Children*, *81*(1), 64–78. https://doi.org/10.1007/s11145-013-9465-0

Tomlinson, D. (2021). *La 1: Definitions, issues and problems* [Unpublished MA Thesis].

Torres, H. (2021). Educating parents on numeracy support. *Journal of Parental Involvement in Education*, *25*(2), 134–150.

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024

Villanueva, J. (2019). Resource availability and numeracy instruction in low-income areas. *Journal of Education and Society*, *29*(1), 34–49.

Vilorio, D. (2019). Stem 101: Intro to tomorrow's jobs [Retrieved from http://www.stemedcoalition.org/wp-content/uploads/2010/05/BLSSTEM-Jobs-report-spring-2014.pdf].

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Webb, M. (2022). The effect of using the problem-solving method on the academic achievement in history for secondary school students.

Weisberg, D. S., Kittredge, A. K., Hirsh-Pasek, K., Golinkoff, R. M., & Klahr, D. (2019). Making play work for education: Research demonstrates that guided play can help preschool children prepare for reading and math better than free play and direct instruction [Retrieved from Gale OneFile database]. *Phi Delta Kappan*, *96*(8).

Yeager & Dweck, R. (2018). Problem solving skills. *The Australian Educational Researcher*, *37*(1), 107–123.

ISSN 3028-1261
10.5281/zenodo.12711037/NIJSE.2024