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Learning Styles and Numeracy Skills of Intermediate Learners

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ABSTRACT

Learning Styles and Numeracy Skills of Intermediate Learners

This study determined the influence of the learning styles on the numeracy skills of intermediate learners of Del Rosario Elementary School, Pamplona District, Division of Camarines Sur, for school year school year 2024-2025. In particular, this study looked into (1) the learning styles and (2) level of numeracy skills of learners; (3) the relationship between learning styles and numeracy skills of learners; (4) the extent of influence of the learning styles in the numeracy skills of learners; and (5) the learning intervention developed to further improve the numeracy skills of learners.

This study employed the descriptive-correlational research methods involving one hundred sixty intermediate learners of Del Rosario Elementary School, Pamplona, Camarines Sur, for the school year 2024-2025. The data gathering tools used were VARK questionnaire and the teacher-made test. Statistical analysis involved Frequency Count, Mean, Standard Deviation, Proficiency Level, Pearson Product-Moment correlation coefficient, and coefficient of determination.

This study mainly revealed that (1) among 160 intermediate learners, 67 learners preferred reading/writing as their learning style and (2) the overall proficiency level of numeracy skills of the intermediate learners was 62.86. Findings on (3) the relationship between learners' learning styles and numeracy skills obtained an r-value of 0.50 with a corresponding 0.00 p-value. Thus, it was revealed that (4) the learning styles' extent of influence on the learners' numeracy skills obtained a 0.25 r^2-value. Moreover, (5) the proposed learning intervention was entitled Competency-based Learning Enhancement and Remediation (Project CLEAR).

In conclusion, (1) the dominant learning style of intermediate learners was reading/writing and (2) their numeracy skills were at an approaching proficiency level. Likewise, it was concluded that (3) there was a moderately strong - significant relationship and a (4) moderately low extent of influence between the intermediate learners' learning styles and numeracy skills. Furthermore, (5) the learning intervention was developed and proposed to the school for further numeracy skills enhancement of the intermediate learners.

INTRODUCTION

Learning styles often imply that learners have fixed ways of absorbing and processing information, which can limit their flexibility in learning. Relying heavily on learning styles may lead to the misconception that a single approach is most effective for each learner, ignoring the diverse and dynamic nature of understanding. This perspective can cause educators to focus too narrowly on catering to individual preferences rather than employing varied teaching methods that benefit all learners. Additionally, emphasizing learning styles might discourage learners from developing adaptable learning skills necessary for different contexts. Recognizing these issues can help educators adopt more inclusive and effective teaching strategies that support diverse learning needs.

On the other hand, numeracy skills are essential for learners to effectively navigate everyday life and achieve their full potential. Poor numeracy skills can lead to difficulties in managing finances, such as budgeting or handling correct change, which can cause financial misunderstandings or dependence on others. Learners with weak numeracy may struggle with problem-solving tasks, affecting their confidence and performance in academics and real-world situations. These challenges can result in lower motivation to learn and limited opportunities for personal and professional growth. Teachers play a crucial role in addressing these issues by implementing engaging and adaptable strategies that meet diverse learning needs. Strengthening numeracy skills enables learners to become more independent, confident, and capable of handling practical life challenges.

According to the study by Whitman (2023) where she highlighted significant concerns regarding the lack of research-based evidence supporting the effectiveness of learning styles in education. She revealed that recent trends show that many educators adopt learning style theories without sufficient empirical validation, which can lead to ineffective teaching practices. Thus, issues arise as learners are often categorized into fixed styles, potentially limiting their exposure to diverse instructional methods and hindering their development. This underscores the need for educators to rely on evidence-based strategies rather than unverified labels to support learners' academic growth.

Additionally, aligning with Sustainable Development Goal (SDG) 4, which aims to ensure inclusive and equitable quality education, it is essential to recognize the diverse learning styles of learners. By 2030, the goal is for all learners to acquire foundational literacy and numeracy skills, enabling them to participate fully in society (UNESCO, 2020). Tailoring educational approaches to accommodate visual, auditory, kinesthetic, and other learning preferences can enhance engagement and comprehension. This personalized approach supports learners in developing critical thinking and problem-solving skills necessary for lifelong learning. Implementing diverse teaching strategies ensures that education is accessible and effective for all learners, regardless of their individual differences.

Consequently, ongoing participation in international assessments like Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS) is essential to evaluate the effectiveness of the current education curriculum in developing learners' numeracy skills (UNIDO, 2024). These assessments provide valuable benchmark data that compares learners' mathematical abilities against global standards, highlighting areas needing improvement. The results help identify specific gaps in numeracy understanding and inform targeted strategies to enhance teaching methods. Additionally, the data from these assessments support policymakers in

designing evidence-based interventions and curriculum adjustments. Regular engagement with these evaluations ensures continuous progress in strengthening learners' numeracy competencies.

In this regard, Bruin and Slovic (2021) highlight that low numeracy skills are a widespread issue globally, with a higher prevalence in low-income countries. Their research indicates that being in a low-income country has a strong connection to lower numeracy levels among learners. The World Bank classifies the Philippines as a lower middle-income country, which may explain the challenges learners face in developing strong numeracy skills. Limited access to quality educational resources and support systems in such economies can hinder learners' ability to improve their numerical understanding. Addressing these economic disparities is essential for enhancing numeracy development among learners in these regions.

Moreover, the department is committed to improving learners' numeracy skills through various targeted programs. According to Briones (2020), no learner should be left behind in the pursuit of quality education, highlighting the urgency of addressing this issue. The Sulong Edukalidad initiative emphasizes four pillars designed to help learners reach their full potential, including enhancing numeracy competencies. The 2015 Early Language Literacy and Numeracy Program (ELLN) aimed to strengthen teachers' ability to teach and assess numeracy skills effectively. These efforts have improved instructional practices, school management, and professional development systems to support learners' numeracy development.

In the same vein, Bernardo (2020) study highlights that learners in the Philippines rank last among fifty-eight countries in fourth-grade Mathematics and Science. This low ranking indicates significant challenges in developing basic numeracy skills among Filipino learners. Many learners struggle with fundamental concepts such as addition, subtraction, and understanding scientific principles. Addressing these gaps is essential to improve learners' confidence and competence in core subjects.

The Republic Act 10533, known as the Enhanced Basic Education Act of 2013, emphasizes the importance of providing a more learner-centered approach to education that recognizes diverse learning styles. The law advocates for a curriculum that caters to the unique needs and strengths of each learner, promoting differentiated instruction to enhance understanding and engagement. Concerning numeracy skills, RA 10533 encourages the integration of various teaching strategies that accommodate different learning preferences, thereby improving learners' grasp of mathematical concepts. The act also underscores the significance of developing competencies that enable learners to apply their skills in real-world situations, fostering critical thinking and problem-solving. Through these measures, the law aims to ensure that all learners develop strong numeracy skills while being supported by instructional methods suited to their learning styles. Reflected in section 2a:

> *…the State to provide a quality, accessible, and relevant basic education program that prepares learners for higher education, employment, or entrepreneurship… the importance of a holistic and developmental approach to education, ensuring that curricula are learner-centered, inclusive, and responsive to the needs of society.*

The Department of Education has established a learning recovery plan framework to help schools address current educational challenges. In Pamplona District, compliance with this framework led to the development of a three-year learning recovery and catch-up project, known as the Recovering for Academic Achievement by Improving Instruction through Sustainable Evidence-Based Learning Program Convergence of Accountable Mentors for Sustained Unprecedented Results in Literacy and

Numeracy (RAISE CAMSUR LN) Program 2022. The participating schools created tailored plans focusing on literacy and numeracy to ensure continuous learning. Camarines Sur Schools Division Superintendent Nidea emphasized that the program responds to the two years without face-to-face classes, aiming to strengthen foundational skills. Department of Education (DepEd) Bicol Director Sadsad highlighted that the program's main goal is to implement effective remedial learning, support learner well-being, train teachers, bridge digital gaps, and equip learners with essential skills.

Despite various programs and teachers' efforts, the Post-test Numeracy Assessment at Del Rosario Elementary School for the 2022-2023 school year showed that 145 out of 169 learners in grades one to three, or 85.79%, require significant support, while all 164 learners in grades four to six also need major assistance. These results highlight a serious issue with numeracy skills that must be addressed promptly. Learners are experiencing difficulties in understanding mathematical concepts, visualizing ideas, communicating results, and solving equations. The shift to remote learning during the 2020 health crisis has further worsened these challenges by affecting learners' readiness in numeracy. To improve numeracy skills, teachers need to develop targeted teaching strategies that consider learners' preferred learning styles, enabling more effective instruction.

Learning Styles

The concept of learning style plays a significant role in shaping effective instructional strategies within the academe. It is recognized that learners have different preferences and approaches to acquiring knowledge, which can influence their engagement and understanding. Educational methods are often tailored to accommodate these diverse learning styles to enhance academic performance. For intermediate learners in grades 4, 5, and 6, understanding individual learning preferences is considered essential for fostering a positive and productive learning environment. As a result, teaching practices are designed to address these differences, supporting learners' growth and development across various subjects.

Learning styles are characterized by the preferred methods of learners for absorbing, processing, understanding, and retaining information. These preferences indicate how the most effective learning occurs. VARK, an acronym representing Visual (V), Auditory (A), Read/Write (R), and Kinesthetic (K), refers to the sensory modalities utilized for information acquisition (Cherry, 2023). Visual learners are often inclined toward perceiving information through pictures, videos, drawings, and graphs. Auditory learning is favored when information is delivered via verbal explanations. For those who prefer reading and writing, information is best displayed in textual form. It was revealed in the study that movement-based activities are enjoyed and processed by kinesthetic learners, who benefit from hands-on tasks, practice, and experiential learning.

A model of learners' learning styles at elementary schools in West Jakarta, Indonesia, was examined by Fahrurrozi et al. (2019). It is suggested that learners' learning styles can be predicted by visual, auditory, and kinesthetic modalities. The study found that learners who prefer to remember what they see rather than what they hear, show interest in symbols, pictures, and colors, and enjoy reading are associated with a visual learning style. Those who learn by listening, reading aloud, and judging others based on the sound of their voices are linked to an auditory learning style. Learners who express emotions physically, enjoy using body language, and remember actions are associated with a kinesthetic learning style.

In the study conducted by Akhlaghi et al. (2018), multimodal learning styles were identified as the most preferred. Different learning preferences among learners emphasize the need for educators to employ multi-sensory, engaged learning strategies to accommodate all types of learning styles. Among single-mode learning styles, the auditory style was found to be the most common. It was also observed that academic performance was higher for individuals with a reading/writing learning style preference compared to those without such a preference.

Additionally, Bosman and Schulze (2018) highlighted the importance of mathematics for economic development, especially in developing nations, yet learners often struggle with this subject. The study found that learning style preferences are shaped by contextual factors, such as environment and educational setting. High performers tended to favor reading/writing and group learning methods in classroom contexts, indicating these approaches align with their preferred learning styles. Recognizing and accommodating learners' learning styles could enhance engagement and improve mathematical achievement.

Research by Promethean (2023) indicates that reading/writing learning style learners demonstrate a strong preference for engaging with material through reading and writing activities. These learners tend to retain information more effectively when they utilize summaries, repetition, and rewriting to reinforce concepts. Their approach is characterized by a focus on details, along with analytical and reflective tendencies that support independent processing of information. Such learners often find that physically noting down key points enhances their understanding and memory. The findings suggest that tailoring instructional methods to support reading and writing preferences can enhance learning outcomes for these learners.

On the other hand, Solidum (2022) emphasizes the significance of understanding learning styles to enhance educational practices for learners. Her findings reveal that grade six learners from both private and public schools in Manila exhibit a range of learning styles with differing prominence. Visual learning style emerged as the most dominant among learners, highlighting the preference for visual aids and imagery in the learning process. In contrast, tactile and kinesthetic styles ranked lowest, indicating a lesser inclination toward hands-on activities and physical engagement. These insights suggest that tailoring instructional strategies to accommodate visual preferences may improve learning outcomes for learners.

Furthermore, Chikendu (2022) highlighted that visual learning style significantly enhances learners' academic performance. The study indicates that learners tend to excel when engaging with visual aids and demonstrations. Findings suggest that incorporating visual materials can improve learning outcomes for diverse learners. The research emphasizes the importance of tailoring instructional methods to support visual learning preferences. These conclusions point toward the value of integrating visual strategies into educational practices to foster better learner achievement.

Additionally, Sultana and Kubra (2015) investigated the impact of visual style-based instruction on learners' academic achievement. Their analysis demonstrated that learners exposed to visual learning strategies showed significant improvement in their academic performance. The study emphasizes the importance of incorporating visual learning styles into teaching practices to enhance learning outcomes. Findings suggest that tailoring instruction to visual preferences can facilitate better understanding and retention among learners. The research highlights the value of recognizing diverse learning styles to optimize educational effectiveness.

Moreover, the study of Herdianto et al. (2023) examined the learning style profiles of learners in fifth grade. The study found that visual learning style was most prevalent among the learners, suggesting a preference for processing information through sight. This implies that instructional methods incorporating visual aids, such as diagrams, videos, and images, may enhance understanding for most learners. The findings highlight the importance of tailoring teaching strategies to accommodate dominant learning styles. These insights can guide educators in designing more effective learning experiences that align with learners' preferences.

In the same vein, Olson (2023) highlights that visual learners demonstrate a marked preference for processing information through visual means such as diagrams, infographics, and videos. Findings suggest that employing visual aids aligns well with their natural learning tendencies, leading to improved comprehension and memory retention. The study emphasizes the importance of incorporating diverse visual materials within instructional methods to support these learners effectively. Moreover, Olson indicates that recognizing individual learning styles, especially visual preferences, can help educators tailor their approaches for better engagement. This focus on visual learning styles underscores the potential for more personalized and impactful educational experiences.

Subsequently, Hasani and Xhomara (2022) examined how verbal and mathematical intelligences relate to visual and auditory learning styles among learners. Their findings indicated that an auditory learning style serves as a significant predictor of learners' academic achievements. This suggests that learners who prefer auditory methods tend to perform better academically. The study highlights the importance of considering learning styles when supporting learners' educational development.

Meanwhile, Reyes (2021) conducted a study on learning styles among grade V learners in an urban elementary school in Cavite. The findings indicate that these learners predominantly favor auditory learning methods. Such results suggest that instructional approaches aligning with auditory preferences may enhance engagement and comprehension. These insights highlight the importance of considering learning styles when designing effective educational strategies for learners.

On the same tone, the study of Alkooheji and Al Hattami (2018) concluded that learning styles are significantly influenced by situational factors rather than fixed individual preferences. Their findings highlight that auditory learning style did not dominate in any context, despite lecture-based instruction commonly used in educational settings. This suggests a potential mismatch between teaching methods and learners' preferred styles, which may impact engagement and comprehension. The study emphasizes the importance of considering environmental factors when designing instructional strategies to enhance learning outcomes.

According to Bay Atlantic University (2024), auditory learners demonstrate a preference for processing information through listening and speaking activities. The study highlights that learners who favor auditory styles tend to retain details better when they hear explanations or discussions rather than through visual or tactile methods. Findings suggest that incorporating listening-based strategies can enhance learning experiences for auditory learners. These conclusions emphasize the importance of diversifying instructional approaches to accommodate different learning styles effectively.

However, the study of Leasa et al. (2018) found that elementary school learners predominantly exhibit unimodal learning styles, with kinesthetic being the most common preference among them. The study indicates that a significant portion of learners favor kinesthetic methods, suggesting their preference for hands-on and movement-based activities. Auditory and reading/writing styles follow in popularity,

though they are less frequently preferred. These findings suggest the importance of incorporating diverse teaching strategies to accommodate different learning preferences. The research highlights the need for educators to recognize and adapt to learners' preferred styles to enhance engagement and comprehension.

In the study of Ezema et al. (2022) examined how different learning styles impact mathematics achievement among primary school learners. The study revealed that visual, auditory, and kinesthetic learning styles each contribute positively to learners' success in mathematics. Findings suggest that recognizing and supporting learners' preferred styles can enhance their academic performance. The authors emphasize that tailoring instructional strategies to individual learning preferences can lead to better learning outcomes. Their conclusions highlight the importance of understanding learning styles as a factor influencing learners' achievement.

Meanwhile, Ozerem and Akkoyunlu (2015) found that tailoring learning environments to learners' individual learning styles positively influences mathematics achievement. Their research highlights that even when learners share similar age and developmental stages, varied behaviors and academic outcomes can be observed based on the learning environment. The study concludes that creating specialized settings for visual, auditory, and kinesthetic learners enhances motivation and provides opportunities for learners to progress at their own pace. These findings suggest that recognizing and accommodating learning styles can lead to improved academic performance among learners. The authors emphasize the importance of personalized learning environments in fostering better educational outcomes.

Furthermore, Sfrisi et al. (2017) explored how learning style preferences influence academic performance among learners with attention-deficit/hyperactivity disorder (ADHD). Findings indicate that when teachers tailor instruction to match learners' preferred styles, there is a notable enhancement in learning outcomes. A three-month follow-up demonstrated sustained improvement in learners' academic achievements, emphasizing the positive impact of customized teaching strategies. The study underscores that understanding and applying individual learning styles can help learners with disabilities better engage with lessons. These results highlight the importance of integrating learning style considerations into teaching practices to support diverse learning needs.

Although many claim that learning style is of great help in the improvement of numerical or mathematical competence of learners, there can still be problems that may arise. Cabual (2021) found that understanding learners' styles of learning plays a significant role in enhancing their engagement with material. The study demonstrated a strong connection between individual learning preferences and the modalities learners favor. Findings suggest that aligning teaching methods with learners' styles can help overcome barriers such as mismatched approaches, ultimately facilitating better learning outcomes. Recognizing and catering to differing learning styles can help address delays in the learning process caused by ineffective strategies. The research concludes that effective learning experiences depend on the ability to identify and adapt to learners' preferred modalities.

According to UWS London (2024), research indicates that awareness of individual learning styles enhances the learning process by helping learners identify their strengths and limitations. Findings suggest that personalized approaches to studying enable learners to process information more effectively, resulting in better retention and skill development. The study concludes that recognizing diverse learning styles can boost confidence and motivation among learners, as they feel more in control of their educational journey. It was observed that adapting learning strategies to suit personal

preferences does not limit potential but encourages more efficient learning. These insights emphasize the importance of understanding learning styles as a tool for empowering learners to reach their full potential.

Accordingly, SimpleK12 (2025) stressed that kinesthetic learners show a strong preference for physical engagement during the learning process. Findings indicate that these learners retain information more effectively when they participate in hands-on activities rather than through passive listening or watching. The study highlights that kinesthetic learners often benefit from tactile experiences such as building or crafting, which help solidify their understanding. It also notes that incorporating movement and physical tasks can enhance motivation and focus among kinesthetic learners. These conclusions emphasize the importance of active involvement in fostering meaningful learning experiences for this group.

Numeracy Skills

Strong numeracy skills lay the foundation to succeed at school, at work, and daily life. It is one of the fundamental skills one must develop in order to reach their full potential. Numeracy skills are crucial for accessing the broader curriculum because they are used in many aspects of our lives. However, low numeracy rates of learners have been a worldwide issue (Villamor & Arante, 2022).

As reported by Villegas (2021) highlighted concerning signs of a developing education crisis within the Philippines, especially in the area of numeracy skills among learners. The article revealed persistent gaps in mathematical understanding and performance that existed before the onset of the pandemic. These findings suggest that foundational numeracy development faced challenges that could impact future academic success. The article underscores the need for targeted interventions to strengthen numeracy competencies among learners.

In connection with the previous report, San Juan (2019) highlights that learners in the Philippines demonstrate significant challenges in developing numeracy skills, as reflected in Programme for International Student Assessment 2018 results. It was reported in his article that these learners struggle with fundamental mathematical concepts compared to peers in other countries. Such findings suggest a need for targeted interventions to enhance numeracy instruction and support for learners. Improving these skills is essential for fostering confidence and success in more advanced mathematical tasks.

The same result was revealed by Bernardo (2020) highlights that the Philippines scored 297 in Mathematics during the Trend in International Mathematics and Science Study 2019 assessment, placing it at the bottom among 58 participating countries. The findings suggest significant challenges in numeracy skills development among learners in the country. These results emphasize the need for targeted interventions to improve mathematical understanding and competency. Such data underscores the importance of strengthening numeracy instruction to support learners' academic progress.

Consequently, Tanghal and Tanghal (2022) found that a significant proportion of learners demonstrated low numeracy skills, with most scoring within the 0-49 range. This indicates that many learners struggle with fundamental numerical concepts and require additional support. The study emphasizes the importance of targeted interventions to enhance numeracy proficiency among learners. Their findings highlight the necessity for educational programs focused on strengthening basic numerical understanding.

In addition, Virgana (2019) investigated how cooperative learning models and learning styles impact numeracy skills among learners. The study revealed that both approaches significantly enhance learners' understanding of mathematical concepts. Findings suggest that incorporating cooperative learning strategies can improve learners' ability to grasp complex numerical ideas. The conclusions emphasize the importance of tailoring instructional methods to support diverse learning styles to strengthen numeracy development.

In the article of Johnson (2017) it highlights that enhancing numeracy skills among learners is crucial for their academic achievement and future opportunities. The study finds that proficiency in mathematics depends on the development of conceptual understanding, procedural fluency, and the ability to adapt procedures across different contexts. Employing learning strategies like comparing, explaining, and exploring facilitates the acquisition of multiple facets of math knowledge. These findings suggest that diverse instructional approaches are essential for fostering comprehensive numeracy development among learners.

On the other hand, decades of research have shown that spatial reasoning and mathematics performance are highly correlated. Spatial visualization in particular has been found to predict mathematics performance in primary and middle school children. As Lowrie et al. (2019) found that the spatial visualization intervention significantly enhanced learners' numeracy skills, particularly in spatial reasoning and mathematics performance. The study demonstrated that learners exposed to the intervention showed marked improvements in these areas compared to those who did not participate. These findings suggest that targeted spatial visualization activities can effectively support the development of numeracy abilities. The research highlights the importance of incorporating visual strategies into mathematics education to foster better understanding among learners.

Additionally, Abate (2022) highlighted the importance of learners' attitudes in influencing mathematics learning outcomes. The study found that both visualization techniques and problem-based learning approaches positively impacted learners' perceptions and motivation toward mathematics. These approaches fostered greater engagement and confidence among learners in their mathematical abilities. The findings suggest that incorporating these methods can significantly improve learners' attitudes, which are essential for successful numeracy development.

In the study of Aunio et al. (2016) found that learners in South African schools exhibit significant challenges in developing numeracy skills. The study highlights variability in early numeracy performance, influenced by factors such as home language, school type, and individual differences among learners. These findings suggest that disparities in numeracy development are linked to contextual and personal factors that affect learning outcomes. The research emphasizes the importance of targeted interventions to support learners' numeracy growth across diverse backgrounds.

While in the study of Capuyan et al. (2019) highlights that many learners demonstrate limited achievement in numeracy skills. The study emphasizes variability among learners in terms of intellectual abilities, dispositions, and interests, which influences their learning progress. Some learners grasp concepts quickly and demonstrate strong understanding, whereas others require additional review and re-teaching efforts. The findings suggest that effective instruction must consider not only the content to be learned but also the most suitable methods to support diverse learning

needs. These insights underscore the importance of tailored teaching approaches to enhance numeracy skills development among learners.

Similarly, Fadiana et al. (2022) examined how problem-based learning influences the numeracy skills of learners in Tuban, Indonesia. The study revealed that learners exhibited limited proficiency in applying numeracy concepts to real-world problems. Observations and interviews with teachers indicated that learners struggle with problem-solving tasks that require mathematical literacy. The findings suggest that traditional teaching methods may not sufficiently develop learners' ability to interpret and solve mathematical problems. These conclusions highlight the need for instructional approaches that enhance learners' practical numeracy competencies.

In the same context as Torio (2015) highlights the struggles of learners in problem-solving tasks, indicating a significant gap in numeracy skills among grade V learners. The study reveals that many learners find it challenging to apply mathematical concepts effectively, reflecting a need for improved instructional strategies. Torio emphasizes that mastery in mathematics depends on practice rather than memorization, suggesting that increased practice can lead to better numeracy proficiency. The findings point to the importance of focusing on skill development through hands-on activities and problem-solving exercises. These insights call for educators to implement more targeted interventions aimed at strengthening learners' mathematical reasoning and computation abilities.

Also supported by the study of Santos et al. (2015) highlighted that some learners struggle with organizing their thoughts, which negatively impacts their problem-solving abilities. The study found that difficulties in understanding and applying foundational numeracy skills contribute to these challenges. These findings suggest that improving early numeracy instruction could enhance learners' overall problem-solving performance. The research emphasizes the importance of targeted interventions to support learners in developing stronger numeracy competencies.

Additionally, Phonapichat (2015) highlighted that learners often struggle to interpret keywords in problems, which hampers their ability to translate information into mathematical symbols. When learners fail to grasp the problem's context, they tend to guess rather than employ logical reasoning, indicating gaps in their numeracy skills. The study emphasizes that difficulty in understanding problem statements directly impacts learners' capacity to select relevant information and apply appropriate mathematical operations. These findings suggest that strengthening comprehension of problem language is crucial for improving learners' overall numeracy proficiency.

Moreover, Belleza (2022) found that learners achieving higher grades in elementary school struggle with mathematics due to incomplete mastery of the four fundamental operations. His research highlights that the use of an enhanced mathematics learning kit, which features exercises arranged from simple to complex and is interactive, significantly boosts numeracy skills. The study emphasizes the importance of structured and engaging instructional materials in developing learners' mathematical abilities. Belleza's findings suggest that targeted and well-designed learning tools can address gaps in fundamental skills among learners.

The article by Pisaras (2020) emphasizes that learners encounter numerous learning opportunities in daily life that contribute to foundational numeracy skills. The study highlights that core number concepts and abilities develop before formal schooling, underscoring the importance of early experiences. It was then concluded that fostering these skills through targeted approaches can significantly influence future academic success. The findings suggest that early promotion of numeracy competencies is crucial for supporting learners' long-term educational trajectories.

Moreover, Pedersen et al. (2022) highlighted the critical role of numeracy skills and early mathematical development as foundational for future learning. The study found that learners with limited numeracy abilities are more likely to encounter challenges in acquiring advanced mathematical concepts. Such early difficulties can influence their confidence and motivation in mathematical tasks. The research underscores the importance of early intervention to support learners in developing strong numeracy skills. Pedersen and colleagues conclude that fostering these skills from an early age can significantly impact future academic success in mathematics.

According to Nasamu (2021) highlights that the teaching approach significantly impacts learners' numeracy skills. His findings reveal that reliance on teacher-centered learning limits learners' active participation, which can hinder the development of strong numeracy abilities. The study suggests that when learners are not encouraged to engage interactively, their understanding and application of numerical concepts suffer. These conclusions emphasize the importance of adopting more learner-centered strategies to enhance numeracy competence. Nasamu's work underscores the need for educational practices that foster active involvement among learners to improve their numeracy performance.

Thus, it is supported by the study of Alcantara (2022) highlights that the development of numeracy skills among learners requires intentional and well-structured instructional practices. The study emphasizes that effective numeracy learning outcomes depend on deliberate planning and purposeful teaching strategies. Poor numeracy performance may stem from educators' application of ineffective or unsuitable teaching methods. The findings suggest that targeted interventions and carefully designed instructional approaches are essential to enhance learners' numeracy abilities. These conclusions underscore the importance of intentional efforts in teaching to foster strong numeracy skills among learners.

METHODOLOGY

The study employed descriptive-correlational research methods to facilitate a systematic and orderly procedure of establishing the relationship between the two variables involved in the study. The descriptive method was used to determine the learning styles of the intermediate learners along visual, auditory, reading/writing, and kinesthetic, and in determining the level of numeracy skills along knowing and understanding, visualizing and modeling, representing and communicating, and computing and solving. The same method was applied in proposing a learning intervention. On the other hand, correlational methods were used to determine if there was a significant relationship between learning styles and numeracy skills of the learners. Likewise, it was also used to determine the extent of influence of the learning styles on the numeracy skills of the intermediate learners.

RESULTS AND DISCUSSION

Respondents of the Study

One hundred sixty intermediate learners were the respondents of this study. Thus, these intermediate learners of Del Rosario Elementary School, Pamplona, Camarines Sur, during the School Year 2024-2025 were the total enumeration of the population and served as the main sources of data for this research. Hence, no sampling technique was applied as reflected in Table 1, as the respondents of the study. In particular, the distribution of the respondents was as follows: Grade IV

with 51 learners accounted for 31.9% of the total respondents, Grade V with 54 learners accounted for 33.8%, and with most populated respondents was at Grade VI with 55 learners, accounted for 34.3% with a total of 160 learners.

Table 1

Respondents of the Study

Grade Level	Respondents	Percentage
IV	51	31.9
V	54	33.8
VI	55	34.3
Total	**160**	**100**

Learning Styles of Learners

Learning styles refer to the different ways individuals prefer to learn and process information. Identifying these styles before delivering training allows for customization that enhances understanding and retention. A study assessed 160 intermediate learners using the VARK Questionnaire, which identifies preferences such as visual, aural, reading/writing, or kinesthetic. The results, shown in Table 2, detail the distribution of learners across these learning styles.

Table 2

Learning Style of Learners

Learning Styles	Grade Level			Total
	IV	V	VI	
Visual	8	2	15	25
Auditory	14	23	11	48
Reading/Writing	25	21	21	67
Kinesthetic	4	8	8	20
N- Pupils	**51**	**54**	**55**	**160**

The data reveals that the Visual learning style is most prevalent at Grade VI, with 15 learners exhibiting this preference, compared to only 2 at Grade V and 8 at Grade IV. This suggests a significant increase in the inclination toward visual methods as learners advance to higher grade levels. The higher concentration of Visual learners in Grade VI may indicate that as learners progress, they tend to favor visual aids such as diagrams, charts, and images to facilitate understanding. In contrast, the lower numbers at Grade V and IV imply that visual learning is less dominant at earlier stages, where auditory and reading/writing styles are more common. This shift highlights the importance of incorporating diverse visual teaching strategies particularly at the upper grade levels to cater to the preferences of a larger portion of learners.

The auditory learning style shows notable variation across the different grade levels. In Grade IV, there are 14 learners identified with an auditory preference, which slightly increases to 23 in Grade V, then decreases to 11 in Grade VI. This suggests that the auditory learning preference peaks during Grade V, indicating a higher reliance on listening and oral communication at

this stage. The fluctuations may reflect developmental changes or shifts in teaching methods that cater to auditory learners. The significant number of learners with an auditory preference across all grades highlights the importance of incorporating auditory-based activities into the curriculum to facilitate effective learning experiences throughout these levels.

The data reveals that the Reading/Writing learning style is the most prevalent across all grade levels, with a total of 67 learners exhibiting this preference. In Grade IV, 25 learners favor Reading/Writing, which is slightly higher compared to Grades V and VI, each with 21 learners. This consistency suggests that a significant portion of learners across all levels prefer learning through reading and writing activities. The prominence of this style highlights the importance of incorporating reading and writing-based methods into instructional strategies to effectively engage the majority of learners. Additionally, the distribution indicates that while other learning styles, such as Auditory and Visual, are also present, they do not surpass the popularity of Reading/Writing, emphasizing its central role in the learning process across grade levels.

The data indicates that the kinesthetic learning style is relatively less prevalent across all grade levels, with the highest number observed in Grade VI at eight learners. In Grade IV, only four learners are identified as kinesthetic learners, while Grade V and VI each have eight learners exhibiting this style. Compared to other learning styles, kinesthetic learners constitute a smaller proportion within the total population of learners, suggesting that tactile and movement-based learning preferences are less dominant. The consistent presence of kinesthetic learners across the three grades highlights some degree of variation, yet it remains significantly lower than the auditory and reading/writing styles. This pattern implies a potential need to incorporate more kinesthetic activities into the learning environment to better engage this particular group of learners across all grade levels.

Level of Numeracy Skills of Learners

Table 3 presents numeracy skills across different grade levels, including grades IV, V, and VI, with data categorized into key skill areas such as Knowing and Understanding, Visualizing and Modeling, Representing and Communicating, and Computing and Solving. Each skill area displays the mean scores, standard deviations, and proficiency levels for the respective grades. The table also summarizes the overall test results, providing average scores and proficiency classifications for each grade. The data is organized to facilitate performance comparison across skill areas and grade levels. A legend accompanies the table to clarify the abbreviations, scoring ranges, and proficiency descriptors used throughout.

In knowing and understanding numeracy skills, the Grade IV learners achieved the highest proficiency with a mean of 7.20, a standard deviation of 1.88, and a corresponding proficiency level of 71.96, interpreted as approaching proficiency. This result suggested that the Grade IV learners scored more than half

Table 3

Learners' Numeracy Skill Level

Numeracy Skills		Grade Level			Overall
		IV	V	VI	
Knowledge and Understanding	Mn	7.20	6.87	6.15	6.73
	SD	1.88	2.02	2.09	2.05
	PL	71.96	68.70	61.46	67.25
	Int	**AP**	**AP**	**AP**	**AP**
Visualizing and Modeling	Mn	6.65	7.09	5.84	6.52
	SD	2.02	1.75	2.49	2.18
	PL	66.47	70.93	58.36	65.19
	Int	**AP**	**AP**	**AP**	**AP**
Representation and Communicating	Mn	4.94	6.89	7.15	6.36
	SD	2.26	1.76	1.78	2.17
	PL	49.41	68.89	71.46	63.56
	Int	**D**	**AP**	**AP**	**AP**
Computing and Solving	Mn	5.98	5.82	4.87	5.54
	SD	2.45	2.43	2.59	2.54
	PL	59.80	58.15	48.73	55.44
	Int	**AP**	**AP**	**D**	**AP**
Test Result	Mn	24.77	26.67	24.01	**25.15**
	SD	8.61	7.96	8.95	**8.94**
	PL	61.91	66.67	60.00	**62.86**
	Int	Approaching Proficiency	Approaching Proficiency	Approaching Proficiency	**Approaching Proficiency**

Legends:

Proficiency Level (PL) Interpretation (Int)

Range	Verbal Descriptor
75.0 to 100	Proficient (P)
50.0 to 74.9	Approaching Proficiency (AP)
25.0 to 49.9	Developing (D)
0.00 to 24.9	Beginning (B)

of the items on the 10-question test, with nearly similar scores. It also indicated that the Grade IV learners had developed a strong foundation and could build upon it to attain greater mastery; with continued practice and exposure to new information, they could eventually reach advanced levels of mastery. The Grade V learners obtained a mean of 6.87, a standard deviation of 2.02, and a proficiency level of 68.70, also interpreted as approaching proficiency. Conversely, the Grade VI learners ranked the lowest in this skill, with a mean of 6.15, a standard deviation of 2.09, and a proficiency level of 61.46, still interpreted as approaching proficiency.

In visualizing and modeling numeracy skills, the Grade V learners achieved the highest proficiency with a mean of 7.09, a standard deviation of 1.75, and a corresponding proficiency level of 70.93, interpreted as approaching proficiency. This result indicated that the Grade V learners obtained above-average, less scattered scores in the 10-item questions intended for visualizing and modeling. It can be deduced that the Grade V learners demonstrated their numeracy skills by creating mental images to represent complex concepts, ideas, and information, as well as illustrating basic concepts through flowcharts and diagrams. The Grade IV learners ranked next, with a mean of 6.65, a standard deviation of 2.02, and a proficiency level of 66.47, also interpreted as approaching proficiency. Conversely, the Grade VI learners obtained a mean of 5.84, a standard deviation of 2.49, and a proficiency level of 58.36, which was likewise interpreted as approaching proficiency.

In representing and communicating numeracy skills, the Grade VI learners achieved the highest proficiency with a mean of 7.15, a standard deviation of 1.78, and a proficiency level of 71.46, interpreted as approaching proficiency. It can be inferred from these results that the Grade VI learners correctly answered more than half of the 10-item questions and demonstrated their numeracy skills by effectively conveying and expressing knowledge, ideas, and concepts through various means. The Grade V learners ranked next, with a mean of 6.89, a standard deviation of 1.76, and a proficiency level of 68.89, also interpreted as approaching proficiency. Conversely, the Grade IV learners obtained a mean of 4.94, a standard deviation of 2.26, and a proficiency level of 49.41, interpreted as developing.

In computing and solving numeracy skills, Grade IV learners achieved the highest proficiency with a mean of 5.98, a standard deviation of 2.45, and a proficiency level of 59.80, interpreted as approaching proficiency. It can be inferred from these results that Grade IV learners answered at least half of the 10-item questions correctly, with scores that were nearly the same. Grade V learners ranked next, with a mean of 5.82, a standard deviation of 2.43, and a proficiency level of 58.15, also interpreted as approaching proficiency. Grade VI learners, on the other hand, obtained the lowest proficiency, with a mean of 4.87, a standard deviation of 2.59, and a proficiency level of 48.73, which was interpreted as developing.

Relationship between the Learning Styles and Numeracy Skills of Learners

The data indicated that there was a moderate relationship between learners' learning styles and their numeracy skills. The correlation coefficient suggested that this relationship was of moderate strength, implying a meaningful connection between how learners preferred to learn and their proficiency in numeracy. The analysis showed that this relationship was statistically significant, with a p-value indicating that the connection was unlikely to have occurred by chance. The interpretation of the findings revealed that learning styles could influence the development of numeracy skills to some extent. These results suggested that considering individual learning preferences might be beneficial in designing instructional strategies aimed at improving numeracy competencies.

Table 4

Relationship between Learning Styles and Numeracy Skills of Learners

Aspects	r-value	Int	p-value	Int
Learning Styles and Numeracy Skills	0.50	Moderate	0.00	Significant

Significant when p-value > 0.05 .

Legends:

Int : Interpretation

r-Value Interpretation

Scale	Strength of Correlation
0.81 to 0.99	Very Strong
0.51 to 0.80	Strong
0.31 to 0.50	Moderate
0.01 to 0.30	Weak

The table indicates that there is a moderate positive correlation with an r-value of 0.50 between learning styles and numeracy skills, suggesting that learners' preferred ways of learning are reasonably associated with their numerical abilities. The p-value of 0.00 signifies that this relationship is statistically significant at the 0.05 level, confirming that the correlation observed is unlikely due to chance. Since the strength of this relationship is considered moderate, implying that while learning styles influence numeracy skills, other factors might also play a role. The significant p-value underscores the importance of considering individual learning preferences when developing strategies to enhance numerical competencies. These findings reveal that tailoring learning approaches to individual styles could potentially improve numeracy skill development.

Extent of Influence of Learning Styles in the Numeracy Skills of Learners

Table 5 presented the extent of influence between learners' learning styles and numeracy skills, emphasizing the correlation coefficient and effect size. The r-value indicated a moderate level of association, suggesting a relationship of some degree between the two variables. The r-squared value provided insight into the proportion of variance explained, which was relatively modest. The interpretation of these statistical measures was based on established guidelines, helping to contextualize the strength of the correlation. This table served as a foundation for understanding how different learning preferences might relate to numerical proficiency within the studied group.

Table 5
Extent of Influence between the Learners' Learning Styles and Numeracy Skills

Aspects	r-value	r^2 - value	Interpretation
Learning Styles and Numeracy Skills	0.50	0.25	Moderately Low

Legends:

Scale	Extent of Influence
91% and above	Very High
71% to 90%	Moderately High
51% to 70%	Moderate
21% to 50%	Moderately Low
20% and below	Very Low

The correlation coefficient of 0.50 indicates a moderately low relationship between learners' learning styles and their numeracy skills. The coefficient of determination, r^2-value of 0.25, suggests that the variability in numeracy skills can be explained by differences in learning styles, leaving the majority influenced by other factors. The strength of this correlation falls into the moderately low extent of correlation based on the provided scale, implying that while learning styles do have some impact, they are not the primary determinant of numeracy proficiency. These findings highlight the importance of considering multiple factors when addressing numeracy development, as learning styles alone account for only a quarter of the observed variance.

Further, these results may suggest that the influence of learning styles on numeracy skills among intermediate learners is moderate to low. While learning style preferences can affect how individuals approach and process mathematical information, the relationship between learning style and numeracy skills is not strongly correlated. Intermediate learners may exhibit some consistency in their learning style preferences, but these preferences do not have a significant impact on their ability to perform numerical operations or understand numerical concepts. This may be because numeracy skills are largely dependent on cognitive abilities, such as working memory, attention, and processing speed, rather than solely on learning style. As a result, intermediate learners may benefit from a combination of teaching methods and approaches that cater to different learning styles, but the relationship between learning style and numeracy skills is not strong enough to predict significant differences in performance.

CONCLUSIONS

In conclusion, (1) the dominant learning style of intermediate learners was reading/writing and (2) their numeracy skills were at an approaching proficiency level. Likewise, it was concluded that (3) there was a moderately strong - significant relationship and a (4) moderately low extent of influence between the intermediate learners' learning styles and numeracy skills. Furthermore, (5) the learning intervention was developed and proposed to the school for further numeracy skills enhancement of the intermediate learners.

RECOMMENDATIONS

For problem 1, it is recommended to design a comprehensive numeracy intervention that addresses various learning preferences. Incorporating hands-on activities and movement-based exercises will engage kinesthetic learners effectively, while visual aids like charts and videos support visual learners. Using discussions and verbal instructions can enhance understanding for auditory learners, and providing written materials benefits reading/writing learners. A diverse range of instructional strategies ensures that individual strengths are met, fostering improved numeracy development for all learners.

For problem 2, it is recommended to design targeted interventions that focus on core numeracy skills like calculation, problem-solving, and reasoning. Employing diverse teaching methods such as visual tools, hands-on activities, and verbal explanations can better address varied learning preferences and improve understanding. Providing frequent practice and real-world applications of math concepts will strengthen confidence and skill retention. These strategies are crucial for closing gaps and fostering a deeper, more meaningful grasp of numeracy.

For problem 3, it is advisable to create a focused learning intervention that addresses the varied learning preferences of individuals to enhance numeracy development. Employing a diverse set of instructional techniques—such as hands-on activities for kinesthetic learners, visual tools like charts and diagrams, auditory exercises including discussions and chants, and reading/writing tasks—can effectively meet different learning styles. Tailoring teaching methods in this manner is expected to boost engagement, motivation, and understanding of essential numeracy concepts. Consistent assessment of progress and feedback collection will enable timely modifications to the intervention, ensuring it remains responsive to individual requirements and promotes inclusive learning.

For problem 5, it is advised to design a specialized learning intervention that utilizes a variety of instructional strategies tailored to different learning styles, emphasizing reading/writing, auditory, visual, and kinesthetic methods. Recognizing that learning styles have a moderate impact on numeracy skills highlights the importance of employing multiple approaches to foster better comprehension and motivation. Incorporating hands-on activities such as manipulatives for kinesthetic learners, visual tools like charts and diagrams, and spoken explanations for auditory learners can address individual preferences and promote skill development. Regular monitoring of progress and flexible adjustments to teaching methods will ensure that numeracy skills are effectively cultivated across diverse learning preferences. This targeted approach aims to create an inclusive learning environment that maximizes engagement and enhances numeracy proficiency.

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