

Home, School, Teachers and Personal Factors Affecting Numeracy Skills of Intermediate Grades at Buenasuerte Elementary School

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Abstract

This study examined the factors affecting the numeracy skills of intermediate grade learners at Buenasuerte Elementary School. Anchored on Vygotsky's Sociocultural Theory, Bruner's Constructivist Theory, Bandura's Social Cognitive Theory, and Gardner's Multiple Intelligences Theory, the study investigated the influence of home-related, school-related, teacher-related, and personal-related factors on learners' numeracy performance. A quantitative descriptive-correlational research design with a cross-sectional approach was employed. The respondents consisted of 64 Grade 4, Grade 5, and Grade 6 learners selected through purposive sampling from a population of 79 pupils. Data were collected using a researcher-adapted questionnaire and a researcher-developed numeracy test aligned with the Most Essential Learning Competencies (MELCs). Descriptive statistics and Pearson Product-Moment Correlation Coefficient were utilized to analyze the data. The findings revealed that the learners' numeracy skills were generally at the Beginning level, indicating low mastery of fundamental mathematical competencies. Home-related, school-related, teacher-related, and personal-related factors all influenced numeracy skills to a moderate extent. Correlation analysis showed that school-related, teacher-related, and personal-related factors had significant positive relationships with numeracy skills, whereas home-related factors did not demonstrate a significant relationship. The results suggest that school support systems, instructional practices, and learners' personal characteristics play important roles in numeracy development. The study concludes that strengthening school-based numeracy programs, effective instructional strategies, and learner motivation may contribute to improved numeracy outcomes. It recommends enhancing classroom practices, increasing access to learning resources, encouraging active learner participation, and sustaining parental support for mathematics learning. The study aligns with Sustainable Development Goal (SDG) 4: Quality Education by promoting improved foundational numeracy skills and educational outcomes. It also supports SDG 10: Reduced Inequalities through efforts to identify barriers to learning and inform equitable educational interventions. The sustainability impact of the study lies in its contribution to educational, community, and institutional sustainability by providing evidence that can support effective numeracy programs, learner development initiatives, and collaborative efforts among schools, teachers, parents, and other educational stakeholders.

Keywords: Bangui–Dumalneg District, Elementary Learners, Literacy Development, Qualitative Research, Reading Difficulties, Reading Proficiency, School Leadership, Stakeholder Perspectives, Thematic Analysis, Transactional Theory of Reading

1. Introduction

Numeracy is a fundamental competency that enables learners to understand, analyze, and apply mathematical concepts in academic and real-life contexts. It supports logical reasoning, problem-solving, and informed decision-making. Despite its importance, many learners continue to experience difficulties in numeracy, resulting in lower academic performance and limited educational opportunities. Evidence from international and local studies indicates that numeracy achievement is influenced by cognitive, environmental, instructional, and personal factors. Consequently, understanding the factors affecting numeracy skills is essential for designing effective interventions and improving mathematics learning among elementary pupils.

1.1 Background of Numeracy Skills among Intermediate Grade Learners at Buenasuerte Elementary School

Numeracy is more than the ability to perform calculations; it involves reasoning, understanding, and applying mathematical concepts in everyday situations. Numeracy is a way of thinking and reasoning that requires understanding rather than memorization. As a foundational skill, numeracy contributes significantly to learners' academic success and future learning. However, persistent challenges in numeracy performance continue to be reported. The Department of Education (2022) has emphasized the need to strengthen foundational literacy and numeracy skills through learning recovery initiatives. Numeracy difficulties may arise from the interaction of cognitive, environmental, and instructional factors. Gonser (2020) further highlighted the importance of integrating mathematical learning with broader literacy and real-life applications. Tamayo (2021) found that mathematics attitude significantly predicts mathematics performance, while Capuno et al. (2019) reported that Filipino learners continue to demonstrate low mathematics achievement. Given these

concerns, there is a need to examine the factors affecting the numeracy skills of intermediate grade learners at Buenasuerte Elementary School. Specifically, this study focuses on home-related, school-related, teacher-related, and personal factors that may influence numeracy performance.

1.2 Themes and Insights on Home, School, Teacher, and Personal Factors Affecting Numeracy Skills

Literature consistently identifies numeracy as a critical predictor of academic success and lifelong learning. OECD (2016) emphasized the importance of numeracy in enabling individuals to understand and critically evaluate information in society. Guhl (2019) found that early numeracy skills strongly predict future academic achievement, while Vithal and Bishop (2006) highlighted mathematical literacy as an essential educational goal that promotes equity and accessibility. Numeracy has also been recognized as a skill that extends across disciplines. According to Goos & O'Sullivan (2022), numeracy should be integrated across the curriculum because mathematical understanding is necessary for everyday decision-making and critical citizenship. Research further indicates that learners with weak foundational numeracy skills often experience continuing difficulties in mathematics. Studies have consistently shown that early numeracy competence serves as a strong predictor of later academic achievement and mathematical success (Adam, 2024; Aubrey & Godfrey, 2003; Chesloff, 2019; Harris & Petersen, 2019). Furthermore, numerical development progresses through identifiable stages of cognitive growth and mathematical reasoning (Piaget, 1952; Siegler & Lortie-Forgues, 2018). Jordan et al. (2009) demonstrated that early number competence significantly predicts later mathematics achievement. Studies also emphasize the effectiveness of intervention programs. De Chambrier et al. (2021) and Telada and Manóos-Pacia (2024) reported that targeted numeracy interventions improve learners' mathematical performance, particularly among struggling students.

1.3 Local, National, and Global Context of Numeracy Skills Development among Elementary Learners

Globally, numeracy is recognized as a crucial component of education and social participation. International studies emphasize that numeracy supports informed decision-making, workforce readiness, and lifelong learning (OECD, 2016; Goos & O'Sullivan (2022)). At the national level, the Department of Education has implemented reforms and intervention programs to strengthen foundational numeracy skills. The MATATAG Curriculum seeks to improve learners' foundational competencies, including numeracy (Uy et al., 2024). Furthermore, DepEd Order No. 034, s. 2022 prioritizes learning recovery programs, literacy and numeracy enhancement, and teacher professional development¹⁰. Despite these efforts, studies continue to report low mathematics proficiency among Filipino learners. Similar concerns have been documented in various educational settings where learners continue to struggle with basic mathematical concepts and problem-solving skills (Cantoria, 2009; Dablos, 2013; Gabriel, 2012; Wallit, 2016). Recent studies likewise reported persistent numeracy challenges among elementary learners (Ballaho, 2024; Perez, 2023; Pitogo & Oco, 2023). Cabral (2024) found that many Grade 4 learners demonstrated poor numeracy performance. Similarly, Dumangas (2012), Pactor (2012), Tallud & Caballes (2023), and Mendoza (2021) reported persistent challenges in mathematics achievement and numeracy development. Within the local context, Buenasuerte Elementary School serves intermediate grade learners whose numeracy performance may be influenced by home, school, teacher, and personal factors. Understanding these influences is necessary for designing effective and context-specific interventions.

1.4 Theoretical and Conceptual Foundations of Numeracy Skills and Influencing Factors

The study is anchored on several theories explaining learner development and academic performance. Vygotsky's (1978) Sociocultural Theory emphasizes that learning occurs through social interaction and guided instruction. Through the Zone of Proximal Development, learners develop higher-level skills when supported by teachers, parents, or more capable peers. Bruner (1966) posits that learners actively construct knowledge through engagement, exploration, and discovery. Effective teaching strategies facilitate meaningful understanding of mathematical concepts. Bandura's (1997) Social Cognitive Theory highlights self-efficacy as a significant determinant of academic performance. Learners who possess confidence in their abilities are more likely to persist in solving mathematical problems. The study also draws from Gardner's Multiple Intelligences Theory, which recognizes individual differences in learning and emphasizes varied instructional approaches to accommodate diverse learner abilities. Gardner (1986) further emphasized that learners possess varying intellectual strengths that influence how they acquire and apply mathematical concepts. Similarly, Piaget (1952) explained that cognitive development affects learners' readiness to understand mathematical relationships and abstract reasoning. Together, these theories support the investigation of home, school, teacher, and personal factors influencing numeracy skills.

1.5 Research Gaps and Rationale for Examining Factors Affecting Numeracy Skills of Intermediate Grade Learners

The reviewed literature demonstrates that numeracy skills are influenced by multiple variables, including home environment, school conditions, instructional practices, and learner characteristics. Research has also examined factors such as parental involvement (Magno, 2010), learning styles (Dunn & Dunn, 1987), classroom learning environments (Fraser, 2012), instructional differentiation (Tomlinson, 2013), and teacher instructional strategies (Uwerhiavwe, 2022; Machera, 2017). However, these factors have often been investigated independently rather than collectively. Existing studies have examined these factors individually, including parental support, school climate, teacher effectiveness, and learner motivation and self-efficacy (Bandura, 1997). However, most studies focus on isolated factors or are conducted in

different educational contexts. There remains limited research examining the combined influence of home-related, school-related, teacher-related, and personal-related factors on the numeracy skills of intermediate grade learners in local public elementary schools.

1.6 Alignment of the Study on Numeracy Skills with Relevant Sustainable Development Goals (SDGs)

This study aligns primarily with SDG 4 – Quality Education, which seeks to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. By examining factors affecting numeracy skills, the study contributes to efforts aimed at strengthening foundational learning competencies and improving educational outcomes. The study also supports SDG 8 – Decent Work and Economic Growth, as numeracy is a critical skill that enhances employability, productivity, and participation in economic activities. Strong numeracy competencies help learners develop the skills necessary for future educational and workforce success. Additionally, aspects of the study relate to SDG 10 – Reduced Inequalities, as understanding barriers to numeracy performance may inform interventions that support disadvantaged learners and promote equitable learning opportunities.

1.7 Importance of the Study on Numeracy Skills to Multidisciplinary Sustainability

The study contributes primarily to educational sustainability by generating evidence that can improve mathematics instruction, learner support systems, and educational interventions. Strengthening numeracy skills promotes continuous learning and supports long-term academic achievement. The study also contributes to socio-economic sustainability because numeracy competence is closely associated with educational attainment, employability, and informed decision-making. Improved numeracy skills may enhance learners' future opportunities and economic participation. Furthermore, the study supports community and institutional sustainability by providing schools, teachers, parents, and education stakeholders with data-driven insights for strengthening learner support mechanisms. Through improved collaboration among families, schools, and communities, sustainable strategies can be developed to enhance numeracy outcomes and overall educational quality.

2. Material and methods

2.1 Research Design

The study utilized a quantitative descriptive-correlational research design to determine the level of numeracy skills among intermediate grade learners and examine the relationship between numeracy skills and home-related, school-related, teacher-related, and personal-related factors. The descriptive approach was used to describe learners' numeracy performance and the extent of the identified factors, while the correlational approach was used to determine whether significant relationships existed among the variables. Descriptive research describes the characteristics of a population or phenomenon, while correlational research measures the degree of association among variables. A cross-sectional approach was employed, wherein data were collected at a single point in time to identify existing conditions and relationships among variables.

2.2 Locale of the Study

The study was conducted at Buenasuerte Elementary School. The school served as the research setting because it provided access to intermediate grade learners whose numeracy skills and influencing factors were examined. The locale was considered appropriate for investigating the home, school, teacher, and personal factors affecting numeracy performance.

2.3 Respondents of the Study

The respondents were intermediate grade learners enrolled in Grades 4, 5, and 6 at Buenasuerte Elementary School. These learners were selected because they had already acquired foundational numeracy skills necessary for assessing mathematical performance. Only learners who were present during the administration of the research instruments participated in the study. Participation was voluntary, and confidentiality and anonymity were strictly observed.

2.4 Sample and Sampling Procedure

The study involved 64 intermediate grade learners selected from a population of 79 pupils. The respondents consisted of Grade 4, Grade 5, and Grade 6 learners who were available during data collection. A purposive sampling technique, specifically availability sampling, was employed. Purposive sampling is appropriate when participants are selected based on relevant characteristics and availability. The selected learners were considered capable of providing reliable information regarding the home, school, teacher, and personal factors affecting their numeracy skills. Prior approval was obtained from the school administration before data collection.

2.5 Research Instrument

Two instruments were used to gather data: a structured questionnaire and a numeracy test. The questionnaire was researcher-adapted and designed to determine the extent to which home-related, school-related, teacher-related, and

personal-related factors influence numeracy skills. It consisted of demographic information and statements measured using a five-point Likert scale. The instrument was adapted from the Programme for International Student Assessment (PISA) 2018 Student Questionnaire developed by the Organisation for Economic Co-operation and Development (OECD, 2019) and the Trends in International Mathematics and Science Study (TIMSS) 2019 Context Questionnaires developed by the International Association for the Evaluation of Educational Achievement (IEA, 2019), with modifications suited to the respondents' level of understanding. The numeracy test was researcher-developed and patterned after the Rapid Mathematics Assessment for Grades 4 to 6. It was aligned with the Most Essential Learning Competencies (MELCs) of the Department of Education and covered number sense, basic operations, fractions, decimals, and word-problem solving. To ensure content validity, the instruments underwent expert evaluation and revision. A pilot test was also conducted to establish the clarity, reliability, and appropriateness of the instruments prior to their actual administration.

2.6 Data Gathering Procedure

The study began with a review of related literature and the development of the research framework. After the study was approved, permission to conduct the research was obtained from the Schools Division Superintendent, District Supervisor, and School Head. Coordination with class advisers was undertaken to schedule the administration of the instruments. The questionnaire and numeracy test were validated by experts and pilot-tested prior to implementation. Before data collection, respondents were informed of the purpose of the study and assured that participation was voluntary and that responses would remain confidential. The researcher personally administered the questionnaire followed by the numeracy test. Completed instruments were collected, checked for completeness, organized, tallied, encoded, and prepared for statistical analysis. The analyzed data served as the basis for the findings, conclusions, and recommendations of the study.

2.7 Data Analysis Techniques

Frequency count and percentage were used to describe the respondents' demographic profile in terms of age, gender, and grade level. Mean and standard deviation were employed to determine the level of numeracy skills and describe variations in performance. Weighted mean and standard deviation were used to determine the extent to which home-related, school-related, teacher-related, and personal-related factors affect numeracy skills based on respondents' perceptions. The Pearson Product-Moment Correlation Coefficient (Pearson r) was utilized. The level of significance was set at 0.05. These statistical measures provided the basis for analyzing and interpreting the data collected in the study.

3. Results and Discussion

3.1 Demographic Profile of the Respondents

3.1.1 Age of the Respondents

The respondents were predominantly 12 years old, comprising 67% of the total sample. Learners aged 9–10 years accounted for 20%, while those aged 13 years and above represented 13%. The distribution indicates that most respondents belonged to the typical age group of intermediate grade learners. This provides an appropriate representation of learners who are expected to have acquired foundational numeracy skills and are capable of participating in the assessment of numeracy performance.

3.1.2 Gender of the Respondents

Of the 64 respondents, 55% were female and 45% were male, indicating a slightly higher representation of female learners. The result suggests a relatively balanced gender distribution, although females constituted the majority. This distribution primarily reflects the composition of the respondents and does not necessarily imply differences in numeracy performance.

3.1.3 Grade Level of the Respondents

Grade 6 learners comprised the largest proportion of respondents at 40%, followed by Grade 5 learners at 33% and Grade 4 learners at 27%. The greater representation of Grade 6 learners indicates that a substantial portion of the data reflects the experiences of learners at the highest intermediate grade level. The result also provides a basis for examining numeracy performance across grade levels.

3.2 Level of Numeracy Skills of the Respondents

3.2.1 Numeracy Skills According to Grade Level

The findings revealed that all grade levels were classified at the Beginning level of numeracy performance. Grade 4 obtained the highest mean score ($M = 15.29$, $SD = 3.12$), followed by Grade 5 ($M = 13.67$, $SD = 3.81$) and Grade 6 ($M = 13.58$, $SD = 3.82$). The overall mean score was 14.06 ($SD = 3.66$), which also falls under the Beginning level. The results indicate low mastery of fundamental numeracy competencies, including number sense, basic operations, fractions and decimals, and word-problem solving. This finding supports the OECD (2019), which reported that many learners experience difficulties in applying mathematical concepts and solving problems. Similarly, the International Association for the Evaluation of Educational Achievement (2019) found persistent challenges in number concepts, operations, and

problem-solving. In the Philippine context, the Department of Education has emphasized continuing difficulties in foundational numeracy skills among elementary learners.

3.3 Factors Affecting the Numeracy Skills of the Respondents

3.3.1 Home-Related Factors

Home-related factors obtained a composite mean of 2.83, interpreted as Moderate Extent. Family encouragement received the highest rating, followed by having a quiet place to study and parental assistance. Access to learning materials and regular mathematics practice at home received the lowest ratings. The findings suggest that family support contributes positively to numeracy development, although limitations in learning resources and home-based practice reduce its overall influence. These results support Joan E. van de Walle (2013), who emphasized the importance of home support in mathematics learning. Douglas H. Clements and Julie Sarama (2014) likewise highlighted the value of continuous mathematical experiences at home. Mapp (2012) emphasized parental involvement as a contributor to academic success. Similar findings were reported by Allan B. I. Bernardo (2008) and Ernesto L. Pernia (2018), who recognized the importance of family support and adequate learning resources. These findings are further supported by studies showing that home learning environments and family engagement significantly contribute to numeracy development (Salminen et al., 2021; Waiswa et al., 2024).

3.3.2 School-Related Factors

School-related factors obtained a composite mean of 3.40, indicating a Moderate Extent of influence. Support for numeracy programs received the highest rating, followed by comfort in participating in mathematics activities and peer support. Availability of learning materials and classroom environment received comparatively lower ratings. The findings indicate that school programs, classroom participation, and peer interaction contribute substantially to numeracy development. The importance of school-based support is consistent with findings that instructional resources, textbooks, and learning environments contribute substantially to academic achievement (Westbury, 1990; Albach & Kelly, 1988). Mathematical literacy research likewise highlights the role of supportive school environments in promoting learner success (Haara et al., 2017). Robert J. Marzano (2003) emphasized the role of positive classroom environments and structured school programs in improving achievement. John Hattie (2009) similarly identified classroom climate, engagement, and peer interaction as important contributors to learning outcomes. Vygotsky (1978) further emphasized the importance of social interaction in learning. Local studies by Allan B. I. Bernardo (2008) and Ma. Lourdes Bautista (2010) likewise recognized the influence of school resources and supportive learning environments on academic performance.

3.3.3 Personal-Related Factors

Personal-related factors yielded a composite mean of 2.99, interpreted as Moderate Extent. Persistence in completing difficult mathematics tasks received the highest rating, followed by mathematics anxiety, interest in improving numeracy skills, and confidence in solving problems. Enjoyment of mathematics received the lowest rating. The findings indicate that learners' attitudes, motivation, confidence, and emotional responses affect numeracy performance. Positive attitudes toward mathematics have been associated with improved academic outcomes, whereas mathematics anxiety may hinder performance (Ancheta, 2012; Colgan, 2014; Boaler, 2016). Bandura (1997) emphasized the role of self-efficacy in academic achievement, while Mark H. Ashcraft (2002) highlighted the negative effects of mathematics anxiety on performance. Dweck (2006) further explained that persistence and effort are essential components of learning. Similar findings were reported by Allan B. I. Bernardo (2008) and Lilia A. De Jesus (2012), who identified motivation, confidence, and attitudes as important determinants of academic success.

3.3.4 Teacher-Related Factors

Teacher-related factors obtained a composite mean of 3.18, interpreted as Moderate Extent. Teacher feedback received the highest rating, followed by encouragement of classroom participation and clarity of lesson explanations. The use of varied teaching strategies and the ability to make lessons interesting received comparatively lower ratings. This finding highlights the importance of engaging instructional approaches in promoting learners' interest and participation in mathematics, consistent with the view that mathematics should be presented as an interesting and meaningful discipline to learners (Genio, 2012). The findings suggest that instructional support, feedback, and classroom interaction contribute to numeracy development. Effective instructional interventions, peer tutoring, differentiated teaching, and engaging classroom activities have been shown to strengthen learners' numeracy skills (Frazier, 2019; Hunter et al., 2016; Layug et al., 2021; Singh et al., 2021). Teachers who employ varied strategies and meaningful learning experiences can significantly improve mathematics achievement (Braza et al., 2014; Magtolis, 2023). Shulman (1987) emphasized the importance of effective instruction and meaningful feedback in improving learning outcomes. Black and Wiliam (1998) identified feedback as one of the strongest influences on student achievement. Jerome Bruner also emphasized active learner participation in the learning process. Similar conclusions were reported by Rosita L. Navarro (2015), who found that teacher support and instructional strategies significantly affect mathematics performance.

3.4 Relationship Between the Identified Factors and Numeracy Skills

3.4.1 Relationship of Home, School, Personal, and Teacher Factors with Numeracy Skills

The correlation analysis revealed that school-related factors ($r = 0.56$, $p = 0.000$), teacher-related factors ($r = 0.41$, $p = 0.001$), and personal-related factors ($r = 0.32$, $p = 0.01$) had significant positive relationships with numeracy skills. In contrast, home-related factors ($r = 0.21$, $p = 0.09$) showed no significant relationship with numeracy performance. The results indicate that improvements in school environment, instructional practices, and learners' personal characteristics are associated with higher numeracy performance. Similar findings were reported in intervention studies demonstrating that targeted mathematics support programs improve numeracy outcomes among struggling learners (Clarke et al., 2019; Lopez-Pedersen et al., 2023; Mononen et al., 2014). Other studies have likewise emphasized the effectiveness of contextualized numeracy interventions and literacy-integrated mathematics instruction (Elopre & Baggay; Cao Thi et al., 2023). The significant influence of school-related factors supports Hattie (2009), Marzano (2003), and Mendoza (2021), who emphasized the role of school environment and learning resources. The significant relationship between teacher-related factors and numeracy skills aligns with the findings of Black and Wiliam (1998), Linda Darling-Hammond (2010), and Navarro (2015), who highlighted the importance of instructional quality and feedback. The influence of personal-related factors is supported by Bandura (1997), Dweck (2006), and De Jesus (2012), who emphasized self-efficacy, motivation, and persistence in academic achievement. Conversely, home-related factors did not demonstrate a significant relationship with numeracy skills. Although this differs from the findings of Epstein (2001), Mapp (2012), and Bernardo (2008), the result suggests that learners in this setting may rely more heavily on school-based and teacher-related support than on home-based assistance. Overall, the findings emphasize the importance of strengthening school programs, instructional practices, and learner motivation to improve numeracy performance.

4. Conclusion & Recommendations

The study concluded that the respondents were primarily 12-year-old intermediate grade learners, with a slightly higher proportion of females and a majority from Grade 6. The learners' numeracy skills were generally at the Beginning level, indicating low mastery of fundamental mathematical concepts and skills. Home-related, school-related, personal-related, and teacher-related factors all influenced numeracy skills to a moderate extent; however, school-related, teacher-related, and personal-related factors showed significant relationships with numeracy performance, while home-related factors did not. These findings indicate that learners' numeracy development is strongly influenced by school support systems, instructional practices, and personal motivation, emphasizing the need to strengthen these areas to improve numeracy outcomes. The findings support previous research emphasizing that sustained instructional support, learner engagement, and appropriate interventions are essential for improving mathematics performance (Narayan, 2022; Sharma, 2012; Leavitt, 2010; Tolentino, 2012; Ureta, 2015).

Based on the findings, teachers should employ varied and engaging instructional strategies, provide clear explanations, regular feedback, and encourage active participation in mathematics learning. Schools should strengthen numeracy programs, improve the availability of learning materials, and maintain supportive classroom environments. Parents should continue encouraging mathematics practice at home and provide appropriate learning conditions. Learners should regularly practice solving mathematical problems, maintain positive attitudes toward mathematics, and remain motivated despite learning difficulties. Future researchers may conduct related studies using other variables, different research designs, or intervention programs to further enhance learners' numeracy skills.

The study was limited to intermediate grade learners of Buenasuerte Elementary School who were present during the conduct of the research. It focused only on home-related, school-related, teacher-related, and personal-related factors affecting numeracy skills and utilized a quantitative descriptive-correlational design with data collected at a single point in time. Therefore, the findings are confined to the respondents and variables included in the study and may not fully represent learners in other educational settings.

Compliance with ethical standards

The study was conducted in accordance with established research procedures and with the necessary permissions from the appropriate educational authorities and school administration. Participation was voluntary, and respondents were informed of the purpose of the study prior to data collection. Confidentiality, anonymity, and the responsible handling of data were maintained throughout the conduct of the research, and all information collected was used solely for academic and research purposes.

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