The Influence of Home Environment and Learning Activities on Kindergartners' Numeracy Skills

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ABSTRACT

Early numeracy serves as a critical foundation for lifelong learning, enabling young children to understand numbers, patterns, and quantities in everyday contexts. Despite its importance, limited local studies have examined the combined influence of the home environment and home-based learning activities on kindergartners' numeracy skills. This study investigated how these factors influence early numeracy development among kindergarten learners in a public elementary school during School Year 2025–2026. Using a descriptive–correlational design, 152 learners were selected through stratified random sampling. Data were collected using an adapted Home Learning Environment Questionnaire, a Learning Activities Checklist, and a standardized numeracy assessment aligned with the MATATAG Kindergarten Curriculum. Descriptive statistics and multiple linear regression were used for data analysis. Findings revealed that learners experienced a moderate level of home support and engagement in learning activities, while numeracy skills were at moderate level. Regression results showed that both home environment and learning activities significantly influenced numeracy skills, with learning activities emerging as the stronger predictor. The study highlights the importance of supportive home interactions and meaningful learning experiences in developing early numeracy skills. It is recommended that schools strengthen parental engagement programs and promote structured home-based learning activities to enhance children's foundational mathematical development.

Keywords: Home Environment, Learning Activities, Numeracy Skills, Kindergartners, Parental Support

INTRODUCTION

Early numeracy is a fundamental foundation for lifelong learning, enabling young children to understand numbers, patterns, and quantities while developing problem-solving and reasoning skills essential for formal education. The United Nations Educational, Scientific and Cultural Organization (2021) emphasizes that early childhood is a critical period for building these competencies, as children experience rapid cognitive, social, and emotional development. In the Philippine context, the Department of Education integrates early numeracy within the MATATAG Kindergarten Curriculum, focusing on number sense, early operations, and measurement as key learning domains. National policies further reinforce the importance of early education. The Republic Act No. 10157 ensures universal access to kindergarten, while the Republic Act No. 10533 highlights the role of early learning in lifelong development. These are supported by curriculum standards promoting play-based and experiential learning approaches that strengthen foundational numeracy skills.

Despite these efforts, challenges persist. Results from the Programme for International Student Assessment revealed that Filipino learners continue to perform below global benchmarks in mathematics, underscoring the need to strengthen early numeracy development. Research increasingly shows that children's mathematical learning is influenced not only by school instruction but also by their home environment. Factors such as parental support, emotional climate, and discipline practices shape children's readiness and engagement in learning.

In addition, home-based learning activities including indoor, outdoor, and digital experiences—provide meaningful opportunities for children to apply numeracy concepts in everyday contexts. However, limited

studies in the Philippine setting have examined how both the home learning environment and learning activities jointly influence numeracy development among kindergarten learners.

To address this gap, the present study investigates the influence of the Home Learning Environment and Learning Activities on kindergartners' numeracy skills. Anchored in global educational goals such as United Nations, the study aims to contribute to improving early learning outcomes by informing strategies that strengthen collaboration among schools, families, and communities. Ultimately, it seeks to support the development of strong foundational numeracy skills among Filipino children.

Research Questions

This study sought to explore the influence of the Home Learning Environment and parental factors on the development of numeracy skills among kindergarteners. It aimed to understand how various aspects of the home setting interacted with parental characteristics.

Specifically, the study aimed to answer the following questions:

1. What is the kindergartners' assessment of their Home Learning Environment in terms of:

1.1. Warmth/support;

1.2. Managing Conflict; and

1.3 Enforcing discipline?

2. What is the kindergartners' assessment of their learning activities in terms of:

2.1. Indoor activities;

2.2. Outdoor activities; and

2.3. Digital activities?

3. What is the kindergartners' level of numeracy skills in terms of:

3.1. Identifying and naming basic colors;

3.2. Recognizing and naming basic shapes;

3.3. Comparing sizes and lengths;

3.4. Counting and writing numbers 1–10; and

3.5 Using greater than (>), less than (<), equal to (=) symbols and concepts?

4. Do the kindergartners' Home Learning Environment and learning activities significantly influence their numeracy skills?

METHODOLOGY

This study employed a quantitative research design, specifically a descriptive–correlational design. This design was consistent with the objective of correlational research, which sought to identify associations among variables without manipulation or control (Bhandari, 2021). As Creswell and Creswell (2018) emphasized, descriptive–correlational studies were well suited for examining existing conditions and the relationships among variables, while Lodico, Spaulding, and Voegtle (2010) noted their common use in education to investigate links between

learner attributes and academic outcomes. In this context, the design was appropriate for determining how the Home Learning Environment and home-based learning activities influenced the numeracy skills of kindergarten learners.

This design was suitable because the data were collected in numerical form using standardized, developmentally appropriate tools administered directly to the kindergarten learners. The descriptive component allowed the researcher to present the characteristics of the children's Home Learning Environment, the types of learning activities they experienced at home, and their numeracy performance. The correlational component examined the relationships among these variables to determine whether the Home Learning Environment and learning activities were significantly associated with children's numeracy skills.

The participants of this study were kindergarten pupils enrolled in a public school one of the districts of Division of Cagayan de Oro City, during School Year 2025–2026. The kindergarten learners served as the sole participants, as they directly participated in the assessment of the Home Learning Environment, the Learning Activities Checklist, and the numeracy skills test. All instruments were administered using developmentally appropriate, guided procedures to ensure meaningful participation from young children.

A total of one (1) public school with 250 kindergarten pupils distributed across 10 sections comprised the study population. Using a 95% confidence level and a 5% margin of error, a sample of 152 kindergarten learners was selected. To ensure fair representation across all sections, the study employed stratified random sampling with proportionate allocation, wherein the number of participants drawn from each section corresponded to its total enrollment. Within each stratum (section), simple random sampling was then used to select the required number of learners.

The inclusion criteria for learner participation were as follows: (1) the child must be officially enrolled as a kindergarten pupil in the selected public school within East 2 District for School Year 2025–2026; (2) the child must be five to six years old, consistent with Republic Act 10157 or the Kindergarten Education Act of 2012; and (3) the parent or guardian must provide written informed consent, while the learner must give verbal or age-appropriate assent. These criteria ensure the protection of participants and the validity of data collected.

All variables of Home Learning Environment, Learning Activities, and Numeracy Skills were measured directly with kindergarten learners through structured, child-friendly instruments administered individually or in small groups. No parent-reported data were included in this study.

RESULTS

Table 1 Summary Table of Kindergartners' Assessment of their Home Learning Environment

Dimensions	Mean	Interpretation	SD
Warmth/Support	1.81	Moderate	0.38
Managing Conflict	1.57	Moderate	0.33
Enforcing Discipline	1.76	Moderate	0.26
Overall Assessment	1.71	Moderate	0.22

Table 2 Summary Table of Kindergartners' Assessment of their Learning Activities

Dimensions	Mean	Interpretation	SD
Indoor Activities	2.09	Moderate	0.41
Outdoor Activities	2.26	Moderate	0.46
Digital Activities	2.29	Moderate	0.46
Overall Assessment	2.21	Moderate	0.36

Table 3 Summary Table of Kindergartners' Level of Numeracy Skills

Numeracy Skills	Mean	Interpretation	SD
Identifying and naming basic colors	4.30	High	1.22
Recognizing and naming basic shapes	3.71	Moderate	1.08
Comparing sizes	3.72	Moderate	1.20
Comparing lengths	3.41	Moderate	1.29
Counting and writing numbers 1–10	4.23	High	0.95
Using greater than (>), less than (<), equal to (=) symbols and concepts	3.70	Moderate	1.18
Overall Level	3.85	Moderate	0.90

Table 16 Regression Analysis of the Influence of Home Learning Environment and Learning Activities on Numeracy Skills

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-1.558	.271		-5.755	.000
Home Learning Environment	.564**	.181	.139	3.121	.002
Learning Activities	2.006**	.110	.808	18.202	.000
Model Summary R = .892 R^2 = .795 Adjusted R^2 = .792 F (2,149) = 289.139** p = .000					

** significant at 0.01 level; * significant at 0.05 level

DISCUSSION

Table 1 shows the kindergartners' assessment of their Home Learning Environment (HLE) across three dimensions: warmth and support, managing conflict, and enforcing discipline. All three dimensions were interpreted as Moderate Support for Learning, indicating that learners generally perceive supportive practices at home.

Among the dimensions, warmth and support obtained the highest mean (1.81), suggesting that learners moderately experience encouragement and emotional support from parents or caregivers during learning activities. Enforcing discipline followed with a mean of 1.76, indicating that routines and rules related to learning are sometimes practiced in the household. Meanwhile, managing conflict recorded the lowest mean (1.57), implying that constructive ways of resolving misunderstandings in the home learning environment are less frequently observed.

The overall mean of 1.71 indicates that kindergarten learners experience a moderate level of support at home, with minimal variation in responses. This suggests that most learners share similar perceptions regarding the presence of warmth, discipline, and conflict management within their households, although these practices may not always be consistently demonstrated.

Supporting studies highlight that the quality of the Home Learning Environment influences children's cognitive and academic development, though the level of support may vary depending on parents' availability, work demands, and familiarity with learning activities. The findings are also supported by Bronfenbrenner's Ecological Systems Theory, which emphasizes the influence of the home environment on child development, and Vygotsky's Sociocultural Theory, which highlights the importance of adult guidance and scaffolding in children's learning. Overall, while supportive interactions are present in many homes, inconsistencies in these practices may affect children's opportunities to develop early numeracy skills.

Table 2 presents the kindergartners' assessment of their learning activities at home across three dimensions: indoor activities, outdoor activities, and digital activities. All three were interpreted as Moderate Engagement in Learning, indicating that learners generally participate in home-based activities that support early numeracy development.

Among the dimensions, digital activities obtained the highest mean (2.29), suggesting that learners more frequently engage in technology-assisted learning such as educational videos and math-related games. This was followed by outdoor activities (2.26), indicating that learners occasionally participate in real-life learning experiences involving counting, measuring, and comparing objects. Meanwhile, indoor activities recorded the lowest mean (2.09), implying that structured or play-based learning activities inside the home are practiced less often. The overall mean of 2.21 (SD = 0.36) indicates that kindergarten learners demonstrate a moderate level of engagement in learning activities at home, with minimal variation in responses. While learners are exposed to different types of learning opportunities, the frequency and consistency of these activities vary across households.

These findings suggest that children occasionally engage in developmentally appropriate tasks that support early numeracy skills. The results align with theoretical perspectives emphasizing the importance of parental guidance and interaction in learning activities, as highlighted in Bronfenbrenner's Ecological Systems Theory and Vygotsky's Sociocultural Theory, which stress the role of supportive home environments and adult mediation in promoting children's participation in learning experiences.

Table 3 presents the kindergartners' level of numeracy skills across six competencies: identifying and naming basic colors, recognizing and naming basic shapes, comparing sizes, comparing lengths, counting and writing numbers from 1–10, and using the symbols >, <, and =. The overall mean of 3.85 (SD = 0.90) indicates that kindergarten learners demonstrated an Adequate Performance in numeracy skills. However, the relatively high standard deviation suggests variation in learners' abilities, meaning that while some learners performed consistently well, others showed lower proficiency in certain skills. Among the competencies, identifying and naming basic colors had the highest mean (4.30), followed by counting and writing numbers from 1–10 (4.23), both interpreted as Consistent Performance, indicating strong ability in these areas. In contrast, comparing lengths obtained the lowest mean (3.41), suggesting that learners have only adequate understanding of this skill and may require additional support.

Overall, the findings indicate that kindergarten learners possess acceptable foundational numeracy skills, but differences in performance across competencies highlight the need for continued instructional support, particularly in areas related to measurement and comparison. Supporting studies also emphasize that early numeracy development depends on learners' exposure to structured learning experiences both at home and in school, which help strengthen fundamental mathematical understanding.

Table 4 presents the results of the regression analysis conducted to determine whether the kindergartners' Home Learning Environment and learning activities significantly influence their numeracy skills. The computed F-value of 289.139 with a corresponding p-value of 0.000 indicates that the regression model is statistically significant. This means that Home Learning Environment and learning activities, when taken together, significantly predict the numeracy skills of kindergarten learners. Therefore, the first null hypothesis that home learning environment and learning activities do not significantly influence the kindergartners' numeracy skills is rejected in this study.

CONCLUSIONS

The study concludes that the Home Learning Environment specifically warmth and support, conflict management, and discipline along with children's engagement in indoor, outdoor, and digital learning activities significantly influences kindergartners' numeracy skills. Anchored on Bronfenbrenner's Ecological Systems Theory and Vygotsky's Sociocultural Theory, the findings highlight the importance of supportive home interactions and guided learning experiences in developing early mathematical skills. The results suggest that

strengthening parent–child interactions and providing meaningful learning opportunities at home can enhance the development of foundational numeracy skills among kindergarten learners.

RECOMMENDATIONS

Based on the findings and conclusions of the study, the following recommendations are proposed:

That Parents and Guardians may:

1.1 Provide Consistent Emotional Support and Encouragement to Children When Performing Numeracy-Related Tasks at Home;

1.2 Engage Children in Meaningful Indoor, Outdoor, And Digital Learning Activities That Promote Counting, Comparing, And Recognizing Shapes and Numbers; And

1.3 Integrate Numeracy-Related Activities in Daily Routines Such as Shopping, Cooking, And Household Tasks.

That Kindergarten Teachers may:

2.1 Encourage Parents To Support Children's Numeracy Development Through Home-Based Learning Activities;

2.2 Provide Guidance To Parents On How To Create Supportive Home Learning Environments That Promote Early Mathematical Learning; And

2.3 Develop Simple Home Learning Tasks That Parents And Children Can Accomplish Together To Reinforce Numeracy Skills.

That School Administrators may:

3.1 Implement Parent Education Programs That Promote Awareness Of The Importance Of Home Support In Developing Early Numeracy Skills; And

3.2 Organize Workshops That Guide Parents In Facilitating Numeracy-Related Learning Activities At Home.

That Future Researchers may:

1.1 Explore Other Factors That May Influence Numeracy Development Such As Teacher-Related Practices, Peer Interactions, Or Classroom Learning Environment; And

1.2 Conduct Similar Studies Involving More Number Of Participants To Validate And Compare The Results Of The Present Study.

Compliance with Ethical Standards

The researchers secured ethical clearance from the appropriate Research Ethics Committee prior to data collection and obtained permission from school authorities. Informed consent was secured from parents or legal guardians, and age-appropriate assent was obtained from the kindergarten learners. Participation was entirely voluntary, and both parents and children were informed of their right to withdraw at any time without penalty. Non-participation did not affect the learners' academic standing or classroom treatment.

All instruments were developmentally appropriate and administered with the assistance of teachers and the researcher to ensure that learners clearly understood the tasks. The procedures were conducted in a manner that minimized discomfort and disruption to regular classroom activities. Data collection was carried out individually or in small groups, ensuring a safe and supportive environment for the participants.

Confidentiality and anonymity were strictly maintained. Learners' identities were protected through the use of coded identifiers, and no personal information was disclosed in any reports. All data were securely stored and used solely for research purposes. Only aggregated results were presented to avoid identification or stigmatization of individual participants.

The study adhered to the ethical principles outlined in the Belmont Report (1979), including respect for persons, beneficence, and justice. The research ensured voluntary participation, minimized potential risks, and provided equal opportunity for all eligible learners to participate regardless of background. The researchers declare that there was no conflict of interest in the conduct of the study, and all findings were reported objectively and without bias. AI tools were used only for language refinement and formatting support.

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