

# Counting Abilities of Preschoolers in San Fernando City's Public Schools

Pascua, Jamaica Angel A., Enriquez, Karylle Cindy C., Tangente, Royce Jay C., Dawey, Filemon C., Ancheta, Oscar Jr.

College of Education, Don Mariano Marcos Memorial State University Mid-La Union Campus, San Fernando City, Philippines

DOI: <https://doi.org/10.47772/IJRISS.2026.10200523>

Received: 24 February 2026; Accepted: 03 March 2026; Published: 18 March 2026

## ABSTRACT

Early childhood education points out an increasing emphasis on the development of numeracy skills, which serve as the foundation for future mathematical learning. This explanatory sequential mixed-method approach was used to gather data on the counting abilities of preschool learners and the teaching strategies used by teachers. It addresses the numeracy development of preschoolers, more specifically their early number sense, as well as the effectiveness of preschoolers' counting skills and kindergarten instructional methods used by educators. This study examined the level of counting abilities of preschoolers in public schools in San Fernando City. Data were collected through assessment tests administered to kindergarten learners and one-on-one interviews with kindergarten teachers, which revealed the current level of preschoolers' counting abilities as well as the teaching methods used to scaffold their development. Findings suggest that integrating tangible materials and flexible teaching strategies in early childhood education is essential for nurturing a strong number sense, which can enhance counting abilities.

**Keywords:** Counting Strategies, Kindergarten Learners, Common Errors Observed, Counting Strategies, Level of Counting Abilities, Numerical Counting Skills, Public Schools

## INTRODUCTION

Studying counting abilities in preschoolers is crucial as it lays the foundation for school readiness. Understanding counting helps children develop number sense. Studying counting abilities helps in recognizing and addressing early disparities in understanding numbers, particularly among children from disadvantaged background. Teaching numbers early in childhood is vital for building a strong foundation in mathematics, enhancing cognitive skills, and early number learning supports cognitive development (Edison Piscataway, 2024). Counting is important for preschoolers for several reasons. Basic mathematical operations including addition, subtraction, multiplication, and division are all based on counting.

In Early Childhood Education, numeracy includes more than just numbers; it also involves problem-solving, pattern recognition, measurement comprehension, and awareness of space development. These fundamental abilities are essential for developing critical thinking and setting up kids for future academic achievement. The researcher's goal is to improve early numeracy abilities by offering a range of stimulating activities that foster creativity and curiosity. Every moment is an opportunity for kids to grow their understanding of numeracy in fun and meaningful ways, from play-based investigations of patterns and connections between spaces to interactive games that encourage counting and ordering (Jessica Kingi, 2024).

A lot of children are struggling with counting, and a lot of parents is worried that their child appears disengaged with mathematics. Some of them are feeling tension and anxiety when it comes to math, they often struggle with working memory and having troubles remembering facts. They may understand the logic behind the subject math, but they don't know how and when to apply their skills to solve problems (Jordan Nisbet, 2019). The first numeracy skill a children can learn is counting, it makes all mathematical learning possible. It is important to

teach young children in their early years how to count in preparing them for success in mathematics when they start to attend school (Learning Links, 2023).

Preschoolers in Philippines public schools face significant challenges in developing number sense and counting skills, according to a global study, underscoring the need for targeted interventions to improve early childhood math instruction (Kesicioglu, O. S., 2021).

Preschoolers learn to identify numbers, comprehend their worth, and comprehend how they relate to one another through counting. Preschoolers profit from counting because it develops critical and logical thinking, which helps them solve problems. Additionally, counting aids in the linguistic development of children. It helps children learn new words like "one," "two," "three," and so on and teaches them how to employ them in phrases. Preschoolers' cognitive abilities, such as memory, focus, and awareness of space, are enhanced by counting. They must focus on the objects they are counting, recall the numbers they have already counted, and arrange the objects in a certain way in order to count them correctly. Counting is also an essential life skill for preschoolers to comprehend time, money, and measurement, they must be able to count. Specifically, counting enables them to determine how much money they have and how long they must wait for something (Kresta Alvarado, 2024).

However, some children may not acquire these advanced skills until much later in elementary school. The Philippines ranked at second overall lowest out of 79 participating nations worldwide as regards to mathematical literacy (Dooma, Mantes, Misajon, Fautison, 2024). Similarly, in the paper by Flores et al. (2025) on the utilization of EcoExplorer, the addition of discovery-learning exercises did not only improve knowledge of environmental factors in daycare children but also offered them a chance of physical exploration that would support basic cognitive skills, to recognize the patterns and count objects in nature when performing an activity during their play-based learning that would facilitate development of early counting skills among preschool learners.

To understand these challenges, this study utilizes a variety of theoretical perspectives to investigate and comprehend the essential components in detail of grasping numbers and counting abilities of preschoolers in public schools of San Fernando City. These theories are: Cognitive

Theory (Jean Piaget), Sociocultural Theory (Lev Vygotsky), Counting Development Theory (Karen Fuson).

## **METHODOLOGY**

### **Research Design**

This study employed an explanatory sequential mixed-methods design. In this approach, the researchers first gather and analyze quantitative data to determine the level of numerical counting skills of kindergarten learners in public schools in San Fernando City, La Union. The results from the quantitative phase then guide the qualitative phase, where interviews with teachers are conducted to further explain, support, or clarify the findings. By integrating both quantitative and qualitative data, this design provides a deeper understanding of the learners' counting abilities and the teaching strategies that influence them.

This approach provides a more complete picture than using quantitative or qualitative methods alone by integrating the strengths of both. It is commonly used in the behavioral, health, and social sciences, particularly in complex research contexts (Tengan George, 2025). According to Creswell and Plano Clark (2018), combining quantitative and qualitative approaches results in a more comprehensive understanding of a research problem. In this design, one-on-one interviews gather in-depth personal insights, while assessment tests generate numerical data for statistical analysis. Using both methods helps validate findings and enhances the depth and reliability of the study. In the quantitative component, structured assessment tests are used to measure counting skills, including rhythmic counting and number recognition. This method combines direct assessment of children with insights from teacher interviews to provide a clearer understanding of preschoolers' counting abilities and mathematical development.

This research method enables a more in-depth investigation of a research question by combining quantitative and qualitative data. It can address difficult research questions that cannot be answered through qualitative or quantitative research (Dovetail Editorial Team, Miroslav Damyanov, 2023).

## Participants

This study was conducted in 19 public lowland schools in San Fernando City, La Union, involving 93 kindergarten learners randomly selected from a total population of 1,314 students using random sampling with a 10% margin of error. The participants were preschoolers in the process of developing counting skills, particularly those experiencing difficulties in learning to count. The study assessed children's counting abilities by examining common difficulties such as skipping numbers and difficulty recalling consecutive numbers. To address the third research question, one preschool teacher from each of the 19 schools was selected through criterion sampling and interviewed to identify effective counting strategies and how these strategies support children's understanding of number quantity. Data were gathered from kindergarten learners enrolled in the 19 identified public schools in San Fernando City, La Union.

## Instrumentation and Data Collection

This study used an assessment test to address research questions 1 and 2 by measuring preschoolers' counting abilities, including number recognition and accurate object counting. The test provided quantitative data on learners' counting skills. For research question 3, one-on-one interviews with preschool teachers were conducted to gather qualitative insights on children's counting challenges and teaching strategies. The integration of assessment tests and interviews ensured a comprehensive understanding of preschoolers' counting abilities in lowland public schools in San Fernando City, La Union. The assessment tool, based on the MATATAG Curriculum, included tasks such as counting objects and writing numbers from 0 to 20 to measure number recognition, matching, and sequencing skills (DepEd, 2023). Both the assessment and interview guide were validated by five experts, who suggested revisions for age appropriateness. Pilot testing with 15 preschool pupils showed high performance, confirming the clarity, reliability, and effectiveness of the instruments before their use in the main study.

## RESULTS, DISCUSSION, AND RECOMMENDATION

This section presented the analysis and interpretation of the study on the research problems following the explanatory sequential mix method to determine the level of counting abilities of preschoolers in San Fernando City's Public Schools. This method was used to gather data about the counting abilities of preschool learners and the teaching strategies of the teachers.

The content of this chapter was the data gathered through pilot testing and the assessment test of kindergarten pupils and the strategies of the teachers gathered through the one-on-one interview of the researchers. Counting helps kindergarten learners develop their cognitive skills, including attention, memorization, and spatial awareness. When they count objects, they tend to recognize the numbers that they've already counted, they pay attention to the objects they are counting, spatially arrange the objects to count them accurately (Kresta Alvarado, 2024).

### Level of Counting Abilities of Preschool learners

Early numeracy skills, particularly counting ability, are essential foundations for later mathematical learning. To determine the level of counting competence among preschool learners, a counting test was administered to kindergarten students. The results provide an overview of their current proficiency levels. The counting abilities of preschool learners were assessed through a test administered to kindergarten students. As shown in Table 1, most learners demonstrated satisfactory counting skills. Specifically, 35 learners (37%) were classified as Advanced, 28 learners (30%) as Proficient, 23 learners (25%) as Approaching Proficiency, and 7 learners (8%) as Advanced Beginners, with no learners in the Novice category.

The majority of relevant research studies have been conducted in Europe or North America; some studies were conducted outside the regions. Cheung et al. (2020) investigated 290 preschool learners in low- to middle-income areas in the Philippines and identified that the parent's education, mathematical knowledge, and activities all directly predicted the children's numeracy developmental skills.

Table 1. Result of Counting Abilities of Preschoolers

Level of Proficiency	Numerical Value	Frequency	Percentage
Novice	5 below	0	0%
Advanced Beginner	6–9	7	8%
Approaching Proficiency	10–14	23	25%
Proficient	15–19	28	30%
Advanced	20–25	35	37%
<b>Total</b>		<b>93</b>	<b>100%</b>

These results shows that more than half of the preschoolers already possess a strong understanding of counting principles and number sense, while a smaller group is still in the process of developing numerical fluency. It indicates that many preschool children are able to grasp fundamental counting concepts when exposed to consistent early numeracy experiences and supportive learning environments. Research in early childhood mathematics education emphasizes that structured, developmentally appropriate, and play-based activities significantly enhance children's understanding of number relationships, one-to-one correspondence, and cardinality. Therefore, the results highlight the continued importance of implementing engaging, play-based numeracy activities in the classroom. Teachers are encouraged to apply targeted instructional strategies and differentiated support, particularly for learners who are still emerging in their counting skills, to ensure that all children build a strong foundation for future mathematical learning (Gellings, A., 2025).

The results indicate that the percentage of preschool students who exhibited good to high counting skills was very large. In particular, 35 students (37%) were found to be advanced, and 28 students (30%) were found to be proficient. This implies that over fifty percent of the students have acquired an excellent knowledge of counting principles and number sense. In the meantime, there were 23 learners (25%) of approaching proficiency who demonstrate that they are still working at the stage of developing their numerical fluency. Only a few, 7 learners (8%), were considered advanced beginners and all were not novices.

### Common Counting Errors and Remedial Strategies

Aside from identifying proficiency levels, it is also important to understand the specific difficulties preschool learners encounter when counting. Recognizing these common errors helps teachers design appropriate interventions to strengthen foundational numeracy skills. The framework of Gelman and Gallistel's (2023) for counting principles especially one-to-one correspondence, stable order, and cardinality shows that preschoolers have difficulties in coordinating these principles. To common counting errors such as unstable sequence, miscounting, and incorrect mapping between object totals and number words.

These results highlight that the majority of preschool learners have already demonstrated satisfactory levels of counting proficiency, indicating that many young children possess foundational numeracy skills appropriate for their developmental stage. However, a portion of the learners still exhibit emerging counting skills, suggesting the need for continuous support through structured, developmentally appropriate, and play-based numeracy activities.

## Common Errors Observed Among Kindergarten Learners During Counting Tasks

Quantitative data from error tallies during the counting assessment were analyzed to identify the most frequent difficulties. Although many learners showed adequate counting skills, recurring errors were noted, particularly in number order, number representation, and symbol recognition. Table 2 shows the distribution of these common errors. This study of Way, J., et al. (2024), reveals that instead of focusing only on the numerical symbols, embedded learning views cognitive development as root of sensory and motor skills experiences as learning. As per recent study, when learners are using their body to learn such as playing, body movements, gestures, and physical interactions helps them learn and understand mathematical structures and relationships more effectively rather than the traditional learning style alone.

Table 2. Common Counting Errors Observed Among Preschool Learners

Type of Error	Description	Frequency	Percentage
Incorrect Number	Skipping numbers or reversing	18	19%
Sequencing	number order		
Miscounting Objects	Counting too fast or double- <u>counting</u> objects	22	24%
Number Symbol	Difficulty recognizing or naming	15	16%
Misidentification	written numerals		
One-to-One	Difficulty recognizing or naming	25	27%
Correspondence	object per count accurately		
Errors			
Inconsistent Counting	Starting from the wrong point	13	14%
Start Position	when counting a set		
<b>Total</b>		<b>93</b>	<b>100%</b>

These findings suggest that while learners possess emerging numeracy skills, several still experience difficulty in accurately sequencing numbers, identifying number symbols, and maintaining one-to-one correspondence. Addressing these issues through targeted numeracy activities, guided practice, and play-based interventions may strengthen early counting abilities and prevent future learning gaps.

The tendency to skip numbers in sequential counting, especially at the transition points between nine and ten or nineteen and twenty, was one of the most common ones. This implies that students were yet to gain a firm knowledge in the area of number progression and continuity of sequence.

These gaps indicate the importance of the repetitive practice and regular reinforcement of the number patterns to make sure that the basic counting rules are mastered. The counting in series concept is the basis upon which later on more advance mathematical ideas rely and a child is therefore expected to master this concept well.

The other error was also random and lacked consistency at the level of one-to-one correspondence, where children were asked to count the objects in the form of verbal counting, and then the number of objects was lower than the number of objects that could be physically counted and pointed to. This lack of consistency frequently caused miscounts and false totals on counting actions which were due to the incomplete coordination of verbal and motor information. Moreover, a few learners showed signs of numeral reversal errors, i.e. mixing up similar-looking number sequences e.g. six and nine or two and five. Such errors are usually linked to the

emergence of visual-spatial awareness and symbols recognition, which still continues to grow in the early childhood. Moreover, it was noticed that there was overcounting and undercounting, especially when pupils were required to count larger groups of objects. Such errors indicate that it may be difficult to stay focused and to remain attentive during more protracted counting sessions.

These errors may be explained by the fact that learning early numeracy is developmental in nature. At this age, children are still sharpening their number sense, logical reasoning and hand-eye coordination. They tend to have concrete idea of quantity rather than an abstract one, then there is need to introduce counting activities which are tangible, interactive and repetitive by teachers. To overcome the challenges, educators used various remedial measures, such as counted activities, one-on-one practice instructions with concrete objects, use of visual aids, such as number charts and flashcards. Also used were rhythmic songs and repetitious counting chants to make the process of learning more interesting and to build the retention of the learner. These interventions did not only strengthen the number recognition and sequencing but also made the learning process an entertaining and confidence building process. Over time, these strategies assist the learners to enhance their understanding of counting concepts as well as enhancing focus and precision.

### **Counting Strategies Employed by Preschool Teachers**

Qualitative data gathered through interviews with nineteen preschool educators from various public schools in San Fernando City revealed four major themes describing the counting strategies commonly used in kindergarten classrooms. These themes reflect developmentally appropriate practices that support early numeracy learning. These themes are Play-Based and Hands-On Learning, Use of Visual and Manipulative Materials, Repetition, Songs, and Interactive Activities.

### **Findings**

Most preschool learners demonstrated strong counting skills, with 37% rated Advanced and 30% Proficient, while 25% were Approaching Proficiency and only 8% were Advanced Beginners. No learners were Novices, indicating that all had at least basic knowledge of counting, number recognition, and one-to-one correspondence. Despite this, some errors—such as skipped numbers, inconsistent one-to-one correspondence, number reversals, and over- or undercounting—were observed, reflecting the developmental nature of early numeracy. Teachers addressed these challenges through strategies like individual counting, visual aids, and rhythmic counting songs. Interviews revealed that play-based and hands-on activities, use of manipulatives, and repetition with songs or interactive tasks were key instructional approaches, helping make counting meaningful, engaging, and effective in strengthening foundational mathematical skills.

### **Recommendation**

The study recommends that teachers use play-based, hands-on activities with manipulatives, tailoring lessons to students' developmental needs and providing regular feedback. Administrators should support teachers through professional development, resources, and collaboration, while curriculum developers should emphasize experiential approaches that integrate play, movement, music, and storytelling, alongside formative assessments. Future research should examine the long-term effects of play-based numeracy and consider factors like socio-economic status, language, and culture, as well as compare traditional and innovative teaching methods to identify effective strategies.

## **CONCLUSION**

The study concluded that most preschool learners in San Fernando City public schools demonstrated strong counting skills, reflecting the effectiveness of active, play-based, and hands-on teaching approaches. Learners' proficiency was supported by manipulatives, songs, games, and visual aids, which fostered curiosity, motivation, and confidence. In contrast, children exposed mainly to passive, teacher-centered instruction showed lower counting performance. Common errors, such as skipping numbers, miscounting, and number reversals, were viewed as natural aspects of early cognitive development, highlighting the need for repeated, structured, and multisensory activities. Overall, the findings show that foundational numeracy develops best through interactive,

experiential learning, aligning with Piaget's theory that children build knowledge through meaningful, hands-on engagement.

## ACKNOWLEDGMENTS

The researchers wish to sincerely thank and deeply appreciate everyone who generously supported and contributed to the completion of this study.

### Funding:

This study on the counting abilities of preschool learners in San Fernando City was conducted without external funding. The researchers acknowledge that access to additional resources, such as specialized teaching materials, manipulatives, and training for educators, could further enhance the scope and impact of the research. Future studies could benefit from financial support to expand sample size, incorporate advanced assessment tools, and provide targeted interventions that strengthen early numeracy skills. Such support would also allow for broader professional development opportunities for teachers, ensuring that findings translate effectively into classroom practices and improve foundational counting skills among preschool learners.

### Ethics Statement:

All data collected for this study will be used exclusively for academic purposes and will be securely destroyed upon the conclusion of the research. The study has been submitted to the Don Mariano Marcos Memorial State University (DMMMSU) Research Ethics Committee and is registered under the code 2025-1169-Counting-Pascua.

### Conflict of Interest:

The authors declare that there is no conflict of interest in this study. All authors contributed equally to the research.

### Informed Consent:

Informed consent was obtained from the parents or guardians of all participating preschoolers prior to data collection.

### Data Availability:

The data collected on the counting abilities of preschoolers are kept confidential by the researchers.

Access to the data can be granted upon request by contacting the corresponding author.

## REFERENCES

1. Alvarado, K. (2024, May 12). Why is counting important for preschoolers. Retrieved from <https://www.ejmste.com/download/a-systematic-review-on-the-definition-of-childrensnumber-sense-in-the-primary-school-years-10871.pdf>
2. Cheung, S. K., Dulay, K. M., & McBride, C. (2020). Parents' characteristics, the home environment, and children's numeracy skills: How are they related in low- to middle-income families in the Philippines? *Journal of Experimental Child Psychology*, 192, 104780. <https://doi.org/10.1016/j.jecp.2019.104780>
3. Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications. Department of Education. (2023). MATATAG K to 10 curriculum. Department of Education, Republic of the Philippines <https://www.deped.gov.ph/matatagcurriculumk147/>
4. Dodia, R., & McCray, J. (2024, January 23). What do we mean by counting principles and what do early childhood educators need to know? Erikson Institute Early Math Collaborative. Retrieved from

- <https://earlymath.erikson.edu/what-do-we-mean-by-counting-principlesand-what-do-early-childhood-educators/>
5. Dovetail Editorial Team, & Damyanov, M. (2023). What is mixed methods research? Dovetail. <https://dovetail.com/blog/mixed-methods-research>
  6. Edison, Piscataway. (2024). Teaching numbers for children's success. PALS Piscataway. <https://palspiscataway.com/why-teaching-numbers-early-is-crucial-for-young-childrensuccess-tips-and-insights/>
  7. Fuson, K. C. (1991). Children's early counting: Saying the number-word sequence, counting objects, and understanding cardinality. In K. Durkin & B. Shire (Eds.), *Language and mathematical education* (pp. 27–39). Milton Keynes, UK: Open University Press.
  8. Flores, I., Abat, M. C., Duran, K. M., Galboy, C., & Ong, D., Jr. (2025). Investigating the effects of learning by discovery on the environmental skills of daycare students using EcoExplorer. *Diversitas Journal*, 10(2). <https://doi.org/10.48017/dj.v10i2.3352>
  9. Gellings, A. (2025). Improving preschoolers' number sense using counting collections and ten frames (Master's thesis, Northwestern College). Northwestern College Repository. [https://nwcommons.nwciowa.edu/cgi/viewcontent.cgi?article=1686&context=education\\_masters](https://nwcommons.nwciowa.edu/cgi/viewcontent.cgi?article=1686&context=education_masters)
  10. Gelman, R., & Gallistel, C. R. (1978). *The child's understanding of number*. Harvard University Press. <https://link.springer.com/article/10.1007/s10643-011-0479-4?>
  11. George, T. (2025, January 14). Mixed methods research | Definition, guide & examples. Scribbr. Retrieved September 4, 2025, from <https://www.scribbr.com/methodology/mixedmethods-research/>
  12. Kesicioglu, O. S. (2021). Investigation of counting skills of pre-school children. *International*
  13. Kresta, A. (2024). The importance of counting skills in preschool cognitive development. *Early Childhood Education Journal*, <https://www.sciencedirect.com/science/article/pii/S0738059322001389>
  14. *Journal of Progressive Education*, 17(5), 322–334. <https://doi.org/10.29329/ijpe.2021.366.16>
  15. Kingi, J. (2024, December 21). The importance of numeracy in early childhood. Kids Club Early Childhood Learning Centers. Retrieved from <https://www.kidsclubchildcare.com.au/numeracy-in-early-childhood-education/>
  16. Learning Links. (2023, March 3). Counting skills: How to build strong maths foundations. Learning Links. <https://www.learninglinks.org.au/resources/counting-skills/>
  17. McLeod, S. (2025, March 18). Vygotsky's theory of cognitive development. Simply Psychology. Retrieved September 4, 2025, from <https://www.simplypsychology.org/vygotsky.html>
  18. Nisbet, J. (2019, September 11). Child struggling with math? 12 signs and 7 ways to help. Prodigy Education Blog. <https://www.prodigygame.com/main-en/blog/child-struggling-with-math>
  19. Torres-Peña, R. C., Peña-González, D., & Ariza-Echeverri, E. A. (2025). Mathematical thinking in preschool: Strengthening seriation and counting through problem solving. *International Journal of Early Childhood*, 57(1), 1– 23. <https://doi.org/10.1007/s13158-024-00402-4>
  20. Way, J., & Ginns, P. (2024). Embodied learning in early mathematics education: Translating research into principles to inform teaching. *Education Sciences*, 14(7), Article 696. <https://doi.org/10.3390/educsci14070696>