RESEARCH ARTICLE

JENER Journal of Empirical and Non-Empirical Research
Volume 2, Issue 3, Page 179-183 | Article No. 25
DOI: 10.4898/jener.v2i3.a25
ISSN: 7895-9216
Journal homepage: https://jenerjournal.com
Journal email: editor@jenerjournal.com

JENER Journal
JENER Journal of Empirical and Non-Empirical Research

The Effectiveness of the Strategies in Developing the Numeracy Skills of the Kindergarten Learners in Polangui North District, Division of Albay

Loele P. Requillo[1]

[1]School of Graduate Studies, University of Northeastern Philippines

ARTICLE INFORMATION

Article history:
Published: March 2026

Keywords:
Numeracy Skills
Kindergarten Learners
Instructional Strategies
Early Mathematics Education

ABSTRACT

This study investigated the effectiveness of instructional strategies employed in developing the numeracy skills of kindergarten learners in the Polangui North District, Division of Albay, during School Year 2024–2025. Grounded in the national priority of strengthening foundational literacy and numeracy, the research focused on early mathematical competencies that serve as building blocks for learners' future academic success. Specifically, the study examined the extent to which numeracy skills were developed in terms of counting numbers, understanding numbers, addition, and subtraction, alongside the effectiveness of teaching strategies implemented by kindergarten teachers across public elementary schools in the district. A descriptive–evaluative–correlational research design was utilized. Data were gathered from fifty-nine (59) kindergarten teachers using a validated survey questionnaire designed to capture both learner numeracy outcomes and instructional practices. Descriptive statistics, particularly weighted mean, were employed to determine the extent of numeracy skill development and the effectiveness of strategies used. Kendall's Coefficient of Concordance (W) was applied to test the level of significant agreement on the rank orders of numeracy skills and instructional strategies among different groups of respondents, with the level of significance set at 0.05. Findings revealed that the numeracy skills of kindergarten learners in all four domains—counting numbers, understanding numbers, addition, and subtraction—were rated as "Very Much Evident," indicating a high level of foundational numeracy competence among learners. Similarly, the instructional strategies employed by teachers, particularly the use of visual aids, incorporation of manipulatives, promotion of learner interaction, facilitation of conceptual understanding, and opportunities for learners to explain their thinking, were rated as "Very Much Effective." Tests of agreement showed significant concordance in the rank orders of numeracy skills, while partial agreement was observed in the effectiveness of instructional strategies, with visual aids and interactive learning approaches demonstrating consistent consensus among respondents. Based on the results, the study concludes that learner-centered, developmentally appropriate strategies significantly support the development of early numeracy skills in kindergarten. The findings informed the formulation of policy-oriented recommendations aimed at strengthening professional development for teachers, improving access to instructional materials, and institutionalizing effective numeracy-focused practices at the kindergarten level. These recommendations are intended to support school leaders and education policymakers in enhancing the quality and equity of early mathematics instruction, thereby contributing to improved learning outcomes in basic education.

1. Introduction

Numeracy is widely recognized as a foundational competence that enables learners to understand, interpret, and apply mathematical concepts in everyday life and in subsequent academic learning. In the early years of schooling, particularly at the kindergarten level, numeracy development plays a critical role in shaping children's cognitive growth, problem-solving abilities, and readiness for formal mathematics instruction. Foundational skills such as counting, understanding numbers, addition, and subtraction are not merely academic requirements but essential life skills that support logical reasoning and informed decision-making. Consequently, strengthening early numeracy has become a central concern of education systems, especially in contexts where learners' mathematics performance has shown persistent challenges.

In the Philippine basic education context, the importance of early numeracy is strongly emphasized in national education policies and reform agendas. The K to 12 curriculum, the Kindergarten Education Law (Republic Act No. 10157), and the Governance of Basic Education Act of 2001 (Republic Act No. 9155) underscore the State's mandate to provide quality, inclusive, and developmentally appropriate education for young learners. Recent initiatives under the Department of Education's MATATAG

agenda further highlight the need to refocus instruction on foundational skills in literacy and numeracy, particularly in the early grades. These reforms are reinforced by empirical evidence from national and international assessments, such as the Trends in International Mathematics and Science Study (TIMSS), which revealed persistently low mathematics performance among Filipino learners, signaling an urgent need to strengthen early mathematics instruction.

Teachers play a pivotal role in addressing these challenges, as the effectiveness of numeracy instruction largely depends on the strategies they employ in the classroom. Research in early childhood education consistently shows that young learners acquire mathematical concepts more effectively when instruction is concrete, visual, interactive, and aligned with their developmental stage. Strategies such as the use of visual aids, manipulatives, hands-on activities, real-world contexts, and opportunities for learners to explain their thinking have been shown to enhance conceptual understanding and sustain learner engagement. However, the extent to which these strategies are systematically and effectively implemented in public kindergarten classrooms, particularly in district-level settings, remains an empirical concern that warrants closer investigation.

In the Polangui North District of the Division of Albay, initiatives to improve educational quality and learner outcomes have been evident, yet concerns regarding foundational numeracy persist, mirroring broader national trends. While various instructional strategies are currently employed by kindergarten teachers, there is limited empirical evidence assessing their effectiveness in developing specific numeracy skills among learners. Addressing this gap is crucial for informing data-driven instructional improvements and policy decisions. Hence, this study was conducted to determine the effectiveness of the strategies employed in developing the numeracy skills of kindergarten learners in Polangui North District, focusing on counting numbers, understanding numbers, addition, and subtraction, and to examine the level of agreement among teachers regarding the effectiveness of these strategies. The findings of this study aim to contribute to evidence-based practice, policy formulation, and the continuous improvement of early mathematics education in public schools.

2. Methodology

This study employed a descriptive–evaluative–correlational research design to determine the effectiveness of instructional strategies in developing the numeracy skills of kindergarten learners in the Polangui North District, Division of Albay, during School Year 2024–2025. The descriptive component was used to establish the extent of numeracy skills development and the level of effectiveness of teaching strategies, while the evaluative aspect assessed how these strategies contributed to learners' numeracy outcomes. The correlational dimension was applied to examine the level of agreement among respondents regarding the rank orders of numeracy skills and instructional strategies, without manipulating any variables, consistent with the natural classroom setting of the study.

The respondents of the study were fifty-nine (59) kindergarten teachers assigned in public elementary schools within the Polangui North District. These teachers were selected through total enumeration, as all kindergarten teachers in the district during the specified school year were included to ensure comprehensive representation. The respondents were grouped according to school size (big, medium, and small schools) to allow comparison of perceptions across different school contexts. The study focused solely on teachers' assessments of learners' numeracy skills and instructional strategies, and did not involve direct testing of learners, consistent with the scope and delimitations of the research.

Data were gathered using a researcher-developed survey questionnaire grounded in the competencies outlined in the kindergarten curriculum and relevant literature on early numeracy instruction. The instrument consisted of two major parts: the first measured the extent of numeracy skills development of kindergarten learners in terms of counting numbers, understanding numbers, addition, and subtraction; the second assessed the effectiveness of instructional strategies along five dimensions, namely use of visual aids, helping learners understand concepts, allowing learners to explore and interact, incorporating manipulatives in teaching, and allowing learners to explain. The questionnaire underwent content validation by experts in early childhood education and educational research to ensure clarity, relevance, and alignment with the objectives of the study.

For data analysis, weighted mean was used to determine the extent of numeracy skills development and the effectiveness of instructional strategies, based on a five-point Likert scale with corresponding verbal interpretations. To test the significance of agreement on the rank orders of numeracy skills and instructional strategies among different groups of respondents, Kendall's Coefficient of Concordance (W) was employed. The level of significance was set at 0.05, and the computed chi-square (χ^2) values were used to determine whether the observed agreements were statistically significant. The results of these analyses served as the basis for drawing conclusions and formulating policy-oriented recommendations aimed at improving kindergarten numeracy instruction in the district.

3. Results and Discussions

3.1 Extent of Numeracy Skills of Kindergarten Learners

The numeracy skills of kindergarten learners were examined in terms of counting numbers, understanding numbers, addition, and subtraction. Results indicate that learners demonstrated a consistently high level of numeracy development across all domains.

Table 1. Summary of the Extent of Numeracy Skills of Kindergarten Learners

Numeracy Domain	Weighted Mean	Verbal Interpretation
Counting Numbers	4.75	Very Much Evident
Understanding Numbers	4.79	Very Much Evident
Addition	4.67	Very Much Evident
Subtraction	4.76	Very Much Evident

As shown in Table 1, all numeracy domains obtained weighted mean scores ranging from 4.67 to 4.79, all falling within the "Very Much Evident" category. This finding suggests that kindergarten learners in Polangui North District possess a strong foundational grasp of early mathematical concepts. Among the four domains, understanding numbers obtained the highest mean, indicating learners' relative strength in recognizing quantities, number symbols, and number relationships. This result aligns with early childhood learning principles that emphasize concrete and visual experiences as precursors to abstract mathematical thinking.

In contrast, addition registered the lowest mean, although still within the highest descriptive category. This implies that while learners are capable of performing basic addition, the increasing complexity of numerical ranges requires sustained instructional support. Similar patterns were observed in subtraction, where conceptual understanding was strong but procedural fluency for larger number ranges required reinforcement. These results underscore the importance of structured progression in numeracy instruction, particularly in transitioning from concrete representations to symbolic operations.

3.2 Agreement on the Rank Orders of Numeracy Skills

To determine whether respondents demonstrated consistency in ranking the extent of numeracy skills, Kendall's Coefficient of Concordance (W) was employed.

Table 2. Test of Significant Agreement on the Rank Orders of Numeracy Skills

Numeracy Domain	Kendall's W	χ^2 Value	p-value	Decision
Counting Numbers	0.85	17.85	<0.05	Significant
Understanding Numbers	0.84	20.16	<0.01	Significant
Addition	0.87	18.27	<0.05	Significant
Subtraction	0.81	14.58	<0.05	Significant

The Kendall's W values ranging from 0.81 to 0.87 indicate a strong level of agreement among respondents regarding the rank order of numeracy skills. The statistically significant chi-square values further confirm that teachers shared consistent perceptions of learners' numeracy strengths across all domains. This agreement strengthens the reliability of the findings and suggests that observed numeracy outcomes are not isolated perceptions but reflect shared instructional realities within the district.

3.3 Effectiveness of Instructional Strategies in Developing Numeracy Skills

The effectiveness of instructional strategies was assessed across five dimensions: use of visual aids, helping learners understand concepts, allowing learners to explore and interact, incorporating manipulatives, and allowing learners to explain.

Table 3. Summary of the Effectiveness of Instructional Strategies

Instructional Strategy Dimension	Weighted Mean	Verbal Interpretation
Use of Visual Aids	4.95	Very Much Effective
Helps Learners Understand the Concept	4.86	Very Much Effective
Allow Learners to Explore and Interact	4.73	Very Much Effective
Incorporate Manipulatives in Teaching	4.93	Very Much Effective
Allow Learners to Explain	4.98	Very Much Effective

All instructional strategy dimensions were rated "Very Much Effective," with allowing learners to explain obtaining the highest weighted mean. This result highlights the pedagogical value of learner-centered practices that encourage verbalization, reasoning, and reflection in early mathematics learning. The strong rating of visual aids and manipulatives further emphasizes the role of concrete and visual representations in enhancing young learners' conceptual understanding.

The relatively lower, yet still high, rating for allowing learners to explore and interact suggests that while exploratory learning is widely practiced, its implementation may vary depending on classroom conditions such as time, class size, and availability of materials. Nonetheless, the overall findings affirm that developmentally appropriate, interactive strategies are integral to effective numeracy instruction in kindergarten.

3.4 Agreement on the Rank Orders of Instructional Strategies

The consistency of respondents' perceptions regarding instructional strategies was also examined using Kendall's Coefficient of Concordance.

Table 4. Test of Significant Agreement on the Rank Orders of Instructional Strategies

Strategy Dimension	Kendall's W	χ^2 Value	p-value	Decision
Use of Visual Aids	0.70	12.60	<0.05	Significant
Helps Learners Understand the Concept	0.51	9.18	>0.05	Not Significant
Allow Learners to Explore and Interact	0.68	16.32	<0.05	Significant
Incorporate Manipulatives	0.52	7.80	>0.05	Not Significant
Allow Learners to Explain	0.46	8.28	>0.05	Not Significant

Results reveal significant agreement among respondents in the rank ordering of strategies related to use of visual aids and learner interaction, indicating shared recognition of their importance and effectiveness. However, no significant agreement was found for other strategy dimensions, suggesting variability in classroom application and contextual constraints across schools.

This divergence implies that while certain strategies are universally valued, others may be influenced by teacher experience, training, and school resources. The findings point to the need for more standardized professional development initiatives to harmonize instructional practices and maximize the effectiveness of all numeracy-focused strategies.

Overall, the results demonstrate that kindergarten learners in Polangui North District exhibit high levels of numeracy skill development, supported by highly effective instructional strategies. The strong agreement on numeracy outcomes and partial agreement on teaching strategies suggest that while learning goals are commonly achieved, instructional approaches vary in implementation. These findings provide empirical support for strengthening policy and practice focused on learner-centered, visually rich, and interactive numeracy instruction in kindergarten education.

4. Conclusions and Implications

4.1 Conclusions

Based on the findings of the study, it is concluded that the numeracy skills of kindergarten learners in the Polangui North District, Division of Albay, are highly developed, as evidenced by the "Very Much Evident" ratings obtained across all four domains: counting numbers, understanding numbers, addition, and subtraction. These results indicate that learners possess a strong foundational competence in early mathematics, which is essential for their readiness for formal schooling and for the development of higher-order mathematical skills in later grades. The consistently high weighted means further suggest that early numeracy instruction in the district is generally effective and aligned with developmentally appropriate learning expectations.

The study likewise concludes that the instructional strategies employed by kindergarten teachers are highly effective in supporting numeracy development. Strategies emphasizing visual aids, manipulatives, learner interaction, conceptual understanding, and opportunities for learners to explain their thinking were all rated "Very Much Effective." These findings affirm the central role of learner-centered and concrete instructional approaches in early childhood mathematics education. Moreover, the significant agreement among teachers regarding the rank orders of numeracy skills indicates shared perceptions of learners' strengths, lending credibility and reliability to the assessment of learning outcomes.

However, while there was significant agreement on certain instructional strategies—particularly the use of visual aids and interactive learning—there was no significant agreement on others. This suggests variability in the implementation of some teaching practices across different school contexts. Such variation implies that although effective strategies are generally recognized, their consistent application may be influenced by contextual factors such as teacher training, availability of resources, and classroom conditions. This finding highlights the need for more unified and sustained support mechanisms to ensure instructional coherence across schools.

4.2 Implications

The findings of this study carry important implications for instruction, school leadership, and education policy. For classroom practice, the results underscore the importance of sustaining and strengthening learner-centered numeracy strategies, particularly those that utilize visual aids, manipulatives, and opportunities for learner explanation. Teachers are encouraged to continue designing developmentally appropriate activities that allow learners to actively construct mathematical understanding through exploration, interaction, and verbalization. Attention should also be given to progressively scaffolding addition and subtraction skills, especially as numerical complexity increases.

For school leaders and administrators, the results imply the need to institutionalize support systems that promote consistent and effective numeracy instruction. This includes prioritizing the allocation of instructional materials, updating classroom resources, and creating professional learning opportunities focused on evidence-based numeracy strategies. Regular instructional monitoring and collaborative reflection among teachers may further help reduce variability in strategy implementation and enhance instructional alignment across schools.

At the policy level, the study provides empirical support for initiatives that emphasize foundational numeracy in early grades, in line with national education reforms. Policymakers may use the findings as a basis for strengthening teacher training programs, integrating effective numeracy strategies into curriculum guides, and developing targeted interventions for early mathematics education. Ultimately, reinforcing high-quality numeracy instruction at the kindergarten level has long-term implications for improving learners' academic trajectories, reducing learning gaps, and advancing the overall quality and equity of basic education.

References

[1] Alkehede, M., Björklund, C., & Runesson Kempe, U. (2022). Designing learning activities for preschool mathematics: The role of variation in children's learning. *Early Childhood Education Journal, 50*(4), 673–684. https://doi.org/10.1007/s10643-021-01211-4

[2] Anders, Y., Grosse, C., Rossbach, H.-G., Ebert, S., & Weinert, S. (2012). Preschool and primary school influences on the development of children's early numeracy skills. *Early Childhood Research Quarterly, 27*(2), 231–244. https://doi.org/10.1016/j.ecresq.2011.08.003

[3] Bonifacci, P., Compiani, D., Affranti, A., & Tobia, V. (2021). Home literacy and numeracy environments and their relations with early literacy and numeracy skills. *Early Education and Development, 32*(4), 568–585. https://doi.org/10.1080/10409289.2020.1789798

[4] Cardino, J. M., Orongan, M. F., & Digamon, J. V. (2020). Learning styles, teaching strategies, and academic performance in mathematics. *International Journal of Educational Research Review, 5*(4), 391–403.

[5] Chan, W. W. L., Luk, H. K., & Leung, S. O. (2022). Early numeracy skills as predictors of later mathematics achievement. *Journal of Educational Psychology, 114*(2), 312–328. https://doi.org/10.1037/edu0000643

[6] Cook, E., Kennedy, E., & McGuire, S. Y. (2013). Effect of teaching metacognitive learning strategies on performance in general chemistry courses. *Journal of Chemical Education, 90*(8), 961–967. https://doi.org/10.1021/ed300686h

[7] Department of Education. (2023). *MATATAG: Bansang Makabata, Batang Makabansa—Basic education agenda*. DepEd Philippines.

[8] Department of Education Region V. (2022). *Regional Memorandum No. 74, s. 2022: Implementation of the 8-Week Learning Recovery Curriculum*. DepEd Bicol.

[9] Durrani, N., & Tariq, V. N. (2012). The role of numeracy skills in academic achievement. *Educational Research and Reviews, 7*(1), 1–7.

[10] Han, S. (2021). Inquiry-based learning in early mathematics education. *International Journal of Early Childhood, 53*(2), 195–210. https://doi.org/10.1007/s13158-021-00298-7

[11] Jalbani, L. N. (2014). The impact of effective teaching strategies on students' academic performance. *Journal of Education and Practice, 5*(20), 1–7.

[12] Lin, C. H., Li, Y., & Chen, Y. J. (2021). Children's numeracy development and early mathematical competence. *Early Childhood Education Journal, 49*(6), 1035–1046. https://doi.org/10.1007/s10643-020-01120-9

[13] Mercader, J., García, J., & Sánchez, M. (2018). Factors influencing mathematical performance in early childhood education. *Educational Psychology, 38*(6), 777–795. https://doi.org/10.1080/01443410.2017.1414126

[14] Miller, K. (2018). Play-based learning and technology integration in early numeracy instruction. *Journal of Early Childhood Research, 16*(3), 301–315. https://doi.org/10.1177/1476718X18762224

[15] Palmer, A., Johansson, M., & Pramling Samuelsson, I. (2022). Interactive book reading and toddlers' learning of numbers. *Early Years, 42*(4), 406–421. https://doi.org/10.1080/09575146.2020.1819246

[16] Republic Act No. 10157. (2012). *Kindergarten Education Act*. Official Gazette of the Republic of the Philippines.

[17] Republic Act No. 10533. (2013). *Enhanced Basic Education Act of 2013 (K to 12 Law)*. Official Gazette of the Republic of the Philippines.

[18] Republic Act No. 9155. (2001). *Governance of Basic Education Act of 2001*. Official Gazette of the Republic of the Philippines.

[19] Republic Act No. 7836. (1994). *Philippine Teachers Professionalization Act*. Official Gazette of the Republic of the Philippines.

[20] Trends in International Mathematics and Science Study. (2019). *TIMSS 2019 international results in mathematics*. International Association for the Evaluation of Educational Achievement (IEA).