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PLAY-BASED LEARNING IN KINDERGARTEN: FOSTERING LITERACY AND NUMERACY DEVELOPMENT IN PUBLIC ELEMENTARY SCHOOLS

JONA L. LLONA
Teacher I
Republic Colleges of Guinobatan, Inc., Guinobatan, Albay
jonallona22@gmail.com

ABSTRACT

This study focused on determining play-based learning in kindergarten as a means of fostering literacy and numeracy development, serving as a basis for the preparation of localized play-based learning materials in public elementary schools. Conducted in Albay, it employed the descriptive method utilizing the survey technique. Twenty-three (23) School Heads and twenty-three (23) Kindergarten Teachers in public elementary schools served as respondents. Statistical tools included Frequency Count, Percentage Technique, Weighted Mean, Kruskal-Wallis H Test, and Welch's t-test Correlation of Concordance. The extent of the play-based approach was found Moderately Implemented across Cognitive (WM = 3.13), Psychomotor (WM = 3.19), and Affective (WM = 3.22) domains. A significant difference was found among the three domains ($H = 67.97 > \chi^2 = 5.99$). Kindergarten learners' developmental levels showed notable improvement from the first to the second conduct—average performance increased from 49.69% to 86.79%. A significant relationship was established between the extent of play-based approach implementation and learner

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performance (Welch's t = 115.93 > t-tabular = 12.707). Localized play-based learning materials were prepared and rated Highly Acceptable (GWA = 3.73).

Keywords: *Play-Based Learning, Kindergarten, Literacy Development, Numeracy Development, Public Elementary Schools, Cognitive, Psychomotor, Affective, Localized Learning Material*

INTRODUCTION

The early years of a child's education lay the foundation for lifelong learning, particularly in the development of literacy and numeracy skills. In kindergarten education, traditional methods of instruction often fall short in engaging young learners whose cognitive, emotional, and physical development thrives through active experiences. Play-based learning has emerged as a child-centered approach that integrates play with purposeful instruction, enabling children to explore, experiment, and make meaning of their environment.

Republic Act No. 10157, or the Kindergarten Education Act, institutionalizes kindergarten as the compulsory and mandatory entry stage to the formal education system, emphasizing the use of child-centered, play-based, and developmentally appropriate practices. DepEd Order No. 32, s. 2012 promotes holistic development through the integration of play and experiential learning. These legal and curricular frameworks underscore the government's commitment to early childhood education as a critical stage that demands innovative approaches responsive to young learners' needs.

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Despite policy support for play-based learning, many public elementary schools continue to struggle with its practical implementation due to challenges such as overcrowded classrooms, lack of instructional materials, and limited teacher training. Consequently, literacy and numeracy performance among kindergarten learners remain inconsistent, with some failing to meet early learning benchmarks. This study examined the effectiveness of play-based learning in real classroom settings, particularly within the public school system, and explored how this approach influences foundational literacy and numeracy development to provide evidence-based insights for improving early education practices.

Statement of the Problem

This study determined play-based learning in kindergarten in fostering literacy and numeracy development in public elementary schools as a basis for the preparation of localized play-based learning material. Specifically, it answered the following questions:

1. What is the extent of implementation of the play-based approach by kindergarten teachers on literacy and numeracy development along: (a) Cognitive; (b) Psychomotor; and (c) Affective?

2. Is there a significant difference in the extent of implementation of the play-based approach among the three domains?

3. What is the developmental level of kindergarten learners in literacy and numeracy during the first and second conduct of SY 2025–2026?

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4. Is there a significant relationship between the extent of play-based approach implementation and the performance level of kindergarten learners?

5. What localized play-based learning material can be prepared based on the findings?

6. How acceptable are the localized play-based learning materials as evaluated by jurors?

Theoretical Framework

This study was anchored on three theories. Jean Piaget's Theory of Cognitive Development highlights that children progress through distinct cognitive stages—sensorimotor, preoperational, concrete operational, and formal operational—providing insights into how children build literacy and numeracy skills at each developmental level. Hebb's Theory of Motivation (1955) emphasizes that sustaining learners' curiosity and interest is fundamental to successful learning; when children are provided with age-appropriate and engaging materials, they develop a natural love for learning foundational skills. Alfred Schutz's Theory of Social Existence underscores that human development is deeply rooted in social interactions, which play naturally provides—allowing children to negotiate roles, share ideas, resolve conflicts, and develop communication and cooperative skills essential for literacy and numeracy growth.

MATERIALS AND METHODS

Research Design

This study adopted a descriptive research design utilizing the survey technique. The descriptive method was employed to accurately and systematically describe the population,

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situation, and phenomena related to the play-based learning approach of kindergarten teachers on the literacy and numeracy development of kindergarten learners. The survey technique was used as the primary data collection tool through structured questionnaires.

Participants of the Study

The respondents were twenty-three (23) School Heads and twenty-three (23) Kindergarten Teachers from public elementary schools in the study setting, for a total of 46 respondents. A total enumeration technique was used, covering all kindergarten teachers and school heads in the identified public elementary schools. Eight (8) jurors evaluated the acceptability of the localized play-based learning materials.

Table 1

Respondents of the Study

Public Elementary Schools	**Teachers**	**School Heads**	**Total**
Cluster A	7	7	14
Cluster B	7	7	14
Cluster C	5	5	10
Cluster D	3	3	6
Cluster E	1	1	2
Total	**23**	**23**	**46**
Jurors			**8**

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Research Instrument

Two sets of instruments were utilized. Part I was a survey questionnaire on the extent of the play-based learning approach of kindergarten teachers in literacy development, while Part II covered numeracy development. Indicators were constructed based on three domains: Cognitive, Psychomotor, and Affective. A 4-point Likert scale was used: 4-Highly Implemented, 3-Moderately Implemented, 2-Fairly Implemented, 1-Poorly Implemented.

Validity of the Research Instrument

The instrument was validated by eight (8) jurors who assessed content appropriateness, format, organization, and presentation. Their feedback was used to refine the questionnaire for content validity, ensuring each item was clearly presented and aligned with the indicators.

Data Gathering Procedures

A written request for permission was submitted to the Schools Division Superintendent with the recommendation of the Dean of the Graduate School. Upon approval, letters were forwarded to Public Schools District Supervisors and School Heads. The researcher personally administered the research instruments to the respondents. All 54 instruments distributed were retrieved, achieving a 100% retrieval rate.

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Table 2

Distribution and Retrieval of the Research Instruments

Public Elementary Schools	Distributed	Retrieved	Percentage
Cluster A	16	16	100
Cluster B	15	15	100
Cluster C	12	12	100
Cluster D	7	7	100
Cluster E	4	4	100
Total	**54**	**54**	**100**

Data Analysis

The data were analyzed using: (1) Frequency Count to determine the number of responses per indicator; (2) Percentage Technique to describe the distribution of answers; (3) Weighted Mean to determine the extent of play-based approach implementation; (4) Kruskal-Wallis H Test to determine significant differences among the three domains; and (5) Welch's t-test Correlation of Concordance to determine the significant relationship between the extent of play-based approach implementation and learner performance.

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RESULTS AND DISCUSSIONS

Extent of Implementation of Play-Based Approach by Kindergarten Teachers Along Cognitive

Table 3 presents the extent of the play-based approach of kindergarten teachers along the Cognitive domain. The overall average is 3.13 (Moderately Implemented). Incorporating counting songs and rhymes to reinforce numerical patterns had the highest weighted mean of 3.63 (Highly Implemented), while encouraging puzzle-solving to promote problem-solving and reasoning skills had the lowest weighted mean of 2.67 (Moderately Implemented). This implies that counting songs and rhymes are the most frequently and effectively utilized strategy in the classroom, engaging learners in rhythmic and enjoyable numerical activities, while puzzle-solving tasks—which require higher-order thinking—receive less consistent emphasis.

Table 3

Extent of Implementation of the Play-Based Approach of Kindergarten Teachers on Literacy and Numeracy Development of Kindergarten Learners Along Cognitive

Learning Delivery Indicators	4	3	2	1	WM	VI
1. Integrates storytelling and picture books to enhance vocabulary and comprehension.	31	12	2	1	3.59	HI

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2. Facilitates letter and number recognition games to develop symbol awareness.	19	7	14	6	2.85	MI
3. Incorporates counting songs and rhymes to reinforce numerical patterns.	32	12	1	1	3.63	HI
4. Guides learners in sorting and classifying objects to improve logical thinking.	16	13	12	5	2.87	MI
5. Designs role-play activities that apply literacy and numeracy concepts.	13	16	14	3	2.85	MI
6. Encourages puzzle-solving to promote problem-solving and reasoning skills.	12	15	11	8	2.67	MI
7. Uses board games with counting moves to develop number sense.	22	14	8	2	3.22	MI
8. Provides story sequencing activities to enhance comprehension and order recognition.	26	11	8	1	3.35	MI
Average					**3.13**	**MI**

Scale: 3.50–4.00 Highly Implemented (HI); 2.50–3.49 Moderately Implemented (MI); 1.50–2.49 Fairly Implemented (FI); 1.00–1.49 Poorly Implemented (PI)

These findings are supported by Mahmood (2025), who found that nursery rhymes and songs strengthen language, memory, and early numerical concepts when used regularly. McDowall and Reid (2020) similarly noted that integrating rhymes encourages children's

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understanding of number relationships and counting procedures. Rahmawati and Wahyudi (2025) demonstrated that mission-based puzzle learning media significantly improved elementary students' engagement and reasoning ability, highlighting the potential of puzzle-based activities to develop critical thinking in young learners.

Extent of Implementation of Play-Based Approach by Kindergarten Teachers Along Psychomotor

Table 4 presents findings along the Psychomotor domain, with an overall average of 3.19 (Moderately Implemented). Providing manipulatives or blocks to support counting and shape recognition had the highest weighted mean of 3.65 (Highly Implemented), while implementing outdoor games like hopscotch to connect movement and counting had the lowest weighted mean of 2.80 (Moderately Implemented). This implies that hands-on materials are regularly utilized to help learners concretely explore numbers and geometric concepts, while movement-based games that connect physical activity with numeracy are underutilized.

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Table 4

Extent of Implementation of the Play-Based Approach of Kindergarten Teachers on Literacy and Numeracy Development of Kindergarten Learners Along Psychomotor

Learning Delivery Indicators	4	3	2	1	WM	VI
1. Guides learners to trace letters and numbers in sand to refine fine motor control.	20	12	13	1	3.11	MI
2. Provides manipulatives or blocks to support counting and shape recognition.	33	11	1	1	3.65	HI
3. Supervises cutting and pasting of letters/numbers to enhance hand coordination.	15	25	3	3	3.13	MI
4. Implements outdoor games like hopscotch to connect movement and counting.	16	12	11	7	2.80	MI
5. Encourages learners to form letters/numbers using clay or playdough.	19	12	12	3	3.02	MI
6. Leads interactive movement songs to build coordination and sequencing.	28	18	0	0	3.61	HI

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7. Engages learners in finger painting and tracing for pre-writing skills.	12	23	10	1	3.00	MI
Average					**3.19**	**MI**

Scale: 3.50–4.00 Highly Implemented (HI); 2.50–3.49 Moderately Implemented (MI); 1.50–2.49 Fairly Implemented (FI); 1.00–1.49 Poorly Implemented (PI)

Carbonneau et al. (2023) documented small to medium positive effects on learning when manipulatives were used to connect concrete experiences with mathematical ideas, supporting the strong implementation of blocks and manipulatives for counting and shape recognition. Ponte (2023) further established that engaging with physical objects supports children's conceptual understanding of spatial properties and geometric relationships. Mavilidi (2021) found that preschool children who learned numeracy through movement-based activities showed improvements in number understanding, pointing to the underutilized potential of outdoor movement games.

Extent of Implementation of Play-Based Approach by Kindergarten Teachers Along Affective

Table 5 presents findings along the Affective domain, with an overall average of 3.22 (Moderately Implemented). Promoting cooperative play to enhance teamwork and communication had the highest weighted mean of 3.52 (Highly Implemented), while allowing

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learners to choose play-based activities to develop autonomy had the lowest weighted mean of 2.89 (Moderately Implemented). This implies that social interaction strategies are actively used to help learners collaborate and communicate effectively, while child-centered opportunities fostering independence and intrinsic motivation during play are less consistently provided.

Table 5

Extent of Implementation of the Play-Based Approach of Kindergarten Teachers on Literacy and Numeracy Development of Kindergarten Learners Along Affective

Learning Delivery Indicators	4	3	2	1	WM	VI
1. Promotes cooperative play to enhance teamwork and communication.	24	22	0	0	3.52	HI
2. Acknowledges learners' achievements to build confidence and motivation.	17	18	10	1	3.11	MI
3. Encourages role-play to allow emotional expression and idea sharing.	22	14	9	1	3.24	MI
4. Fosters a joyful, pressure-free atmosphere through playful learning.	16	19	7	4	3.02	MI

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5. Allows learners to choose play-based activities to develop autonomy.	11	23	8	4	2.89	MI
6. Provides praise and encouragement to maintain enthusiasm for learning.	25	15	4	2	3.37	MI
7. Incorporates stories with emotional themes to develop empathy.	21	22	2	1	3.37	MI
Average					**3.22**	**MI**

Scale: 3.50–4.00 Highly Implemented (HI); 2.50–3.49 Moderately Implemented (MI); 1.50–2.49 Fairly Implemented (FI); 1.00–1.49 Poorly Implemented (PI)

Lyons (2024) found that structured free play and self-directed activities increased children's sense of autonomy and engagement, supporting the importance of learner choice in play activities. Dunfield et al. (2023) established that young children actively use communicative intent when engaging in social interactions, underscoring that communication is integral to cooperation. Sidiropoulou et al. (2025) noted that when children's choices are acknowledged, they demonstrate increased agency and well-being in play settings.

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Significant Difference in the Extent of Implementation of the Play-Based Approach Among the Variables

Using the Kruskal-Wallis H Test, the computed χ^2 value of 67.97 is greater than the tabulated H-value of 5.99 at 2 degrees of freedom and 0.05 level of significance. The null hypothesis is therefore rejected. There is a significant difference in the extent of play-based approach implementation among the Cognitive, Psychomotor, and Affective domains. This implies that inconsistent implementation across developmental domains may limit children's holistic growth, as some areas receive stronger emphasis than others. Holistic development requires intentional and balanced stimulation across all domains.

This is supported by Sitorus et al. (2025), who found that play activities positively influence cognitive, social, emotional, and motor development but contribute differently to each domain. Cheruiyot (2024) found that children acquire early reading and language competencies more effectively when teachers intentionally integrate play-based methods across all developmental areas.

Developmental Level of Kindergarten Learners in Literacy and Numeracy During the First and Second Conduct of SY 2025–2026

Table 7 presents the developmental levels of kindergarten learners. During the first conduct, 15.09% were Significantly Delayed, 35.22% were Slightly Delayed, and 49.69% were Average. By the second conduct, no learners remained Significantly Delayed, Slight Delay decreased to 13.21%, and the Average category increased substantially to 86.79%. This

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demonstrates that kindergarten play-based instruction is supporting steady academic gains, reflecting the positive effects of developmentally appropriate learning experiences over time.

Table 7

Developmental Level of Kindergarten Learners in Literacy and Numeracy During the First and Second Conduct of SY 2025–2026

Developmental Level	First Conduct Frequency	First Conduct Percent	Second Conduct Frequency	Second Conduct Percent
Significant Delay (69-below)	48	15.09	0	0
Slight Delay (70-79)	112	35.22	42	13.21
Average (80-119)	158	49.69	276	86.79
Slightly Advanced (120-129)	0	0.00	0	0.00
Highly Advanced (130 and above)	0	0.00	0	0.00
TOTAL	**318**	**100**	**318**	**100**

Montealto (2020) found that the implementation of early language literacy and numeracy programs led to substantial improvements in learner performance over time, with

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learners moving from lower to higher performance levels during assessment periods. Lavador and Comon (2024) similarly found that early literacy and numeracy skills of kindergarten learners tended to approach proficiency as time progressed, reflecting the value of sustained structured learning across assessment periods.

Significant Relationship Between the Extent of Play-Based Approach Implementation and Performance Level of Kindergarten Learners

Using Welch's t-test Correlation of Concordance, the computed value of 115.93 is greater than the tabulated t-value of 12.707 at approximately 1.03 degrees of freedom and 0.05 level of significance. The null hypothesis is therefore rejected. There is a significant relationship between the extent of play-based approach implementation and the performance level of kindergarten learners. Stronger and more intentional use of play-based methods is associated with better academic performance among young children.

This is supported by Urado and Marquez (2025), who found a correlation between the level of play-based learning implementation and improvements in both academic outcomes and learner behavior. When teachers consistently integrate play-based activities aligned with learning goals, children show measurable gains in literacy and numeracy. Padillo (2024) also found that play-based instructional approaches were effective in developing literacy and numeracy skills, indicating that student performance in these areas is closely tied to the implementation of play-based strategies.

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Level of Acceptability of the Localized Play-Based Learning Material for Kindergarten Learners

The localized play-based learning materials were evaluated by eight jurors. Both Alignment to MELCS and Overall Structure and Flow of the Material had the highest weighted mean of 3.88 (Highly Acceptable), while Clarity and Comprehensibility had the lowest weighted mean of 3.50 (Highly Acceptable). The General Weighted Average of 3.73 indicates that the materials are Highly Acceptable. This implies that the materials effectively meet the needs, interests, and comprehension level of learners, and that the content, language, design, and cultural relevance are appropriate and engaging.

Table 9

Level of Acceptability of the Play-Based Learning Material for Kindergarten Learners

Indicators	4	3	2	1	WM	VI
Clarity and comprehensibility	4	4	0	0	3.50	HA
Relevance of the content to the intended purpose	5	3	0	0	3.63	HA
Alignment to MELCS	7	1	0	0	3.88	HA
Adequacy of response options provided	6	2	0	0	3.75	HA
Overall structure and flow of the material	7	1	0	0	3.88	HA

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GWA					**3.73**	**HA**

Scale: 3.50–4.00 Highly Accepted (HA); 2.50–3.49 Accepted (A); 1.50–2.49 Moderately Accepted (MA); 1.00–1.49 Fairly Accepted (FA)

This was supported by Thomas et al. (2021), who found that using culturally relevant materials tailored to learners' local context helps bridge the gap between home and school learning, increasing motivation, interest, and comprehension.

Summary of Findings

1. The extent of the play-based approach was Moderately Implemented across all three domains: Cognitive (WM = 3.13), Psychomotor (WM = 3.19), and Affective (WM = 3.22). Within each domain, individual indicators ranged from Highly Implemented to Moderately Implemented.

2. There is a significant difference in the extent of play-based approach implementation among the Cognitive, Psychomotor, and Affective domains ($H = 67.97 > \chi^2 = 5.99$, $p < 0.05$).

3. The average performance level of kindergarten learners was 93.17 in the first conduct and 94.74 in the second conduct, with an overall average of 93.96, reflecting substantial improvement across the school year.

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4. There is a significant relationship between the extent of play-based approach implementation and the performance level of kindergarten learners (Welch's t = 115.93 > t-tabular = 12.707, p < 0.001).

5. The localized play-based learning materials support differentiated instruction and nurture social-emotional skills, creativity, and intrinsic motivation in kindergarten learners.

6. The localized play-based learning materials were rated Highly Acceptable (GWA = 3.73), confirming their appropriateness, alignment with MELCS, and effectiveness for classroom use.

Recommendations

Based on the findings and conclusions, the following recommendations are formulated:

1. The Department of Education may strengthen and sustain play-based approaches in teaching literacy and numeracy by providing adequate materials that support consistent and effective implementation of learner-centered strategies.

2. Administrators may provide continuous professional development, adequate instructional materials, and supportive learning environments that encourage both structured and child-initiated play across all developmental domains.

3. Teachers may sustain and further enhance effective instructional strategies currently in use and developmentally apply appropriate play-based, learner-centered approaches to encourage learner engagement and academic growth.

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4. Administrators and teachers may continue to monitor learners' progress through timely feedback and enrichment activities that address developmental gaps.

5. Collaboration among teachers, school administrators, and parents may provide consistent academic support and reinforce literacy and numeracy skills both inside and outside the classroom.

6. Assessment tools may be designed and developed to capture both academic and socio-emotional learning in child-centered environments.

7. Educators may adopt the localized play-based learning materials developed in this study, particularly to strengthen strategies that currently receive less emphasis, such as puzzle-solving for cognitive development, outdoor movement games for psychomotor growth, and child-directed play for affective development.

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