

Digital Game Based Learning and Early Literacy Development of Kindergarten Learners in SDO Lipa City

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Abstract

In the 21st century, the integration of technology in education has transformed teaching and learning, offering innovative approaches to support student engagement and skill acquisition. Among these, Digital Game-Based Learning (DGBL) has emerged as a promising strategy to enhance early literacy development among young learners. This study, titled “*Digital Game-Based Learning and Early Literacy Development of Kindergarten Learners in SDO Lipa City*,” aimed to investigate the utilization of digital game-based strategies in promoting foundational literacy skills, including letter recognition, phonological awareness, vocabulary development, and comprehension. The research also sought to examine the relationship between learners’ early literacy levels and the extent utilization of digital game-based learning, as well as the challenges encountered by kindergarten teachers in implementing this approach.

The study employed a descriptive research design using a mixed-methods approach, combining quantitative and qualitative data. Quantitative data were collected through structured questionnaires, while qualitative data were gathered through semi-structured interviews. The respondents consisted of kindergarten teachers from four districts within the Division of Lipa City during the School Year 2025–2026. Statistical tools such as weighted mean, ranking, and Pearson correlation coefficient were used to analyze the data.

Anchored on Piaget’s Cognitive Development Theory, Vygotsky’s Sociocultural Theory and Zone of Proximal Development, Gardner’s Multiple Intelligences Theory, and Bruner’s Constructivist Learning Theory, the study emphasizes the importance of interactive, scaffolded, and developmentally appropriate learning experiences. The findings revealed that kindergarten learners demonstrated a moderately developed level of early literacy skills, while the utilization of digital game-based learning (DGBL) was moderately implemented in reading readiness, word recognition and usage, and sentence construction. A significant positive relationship was identified between early literacy development and DGBL utilization, indicating that increased engagement in digital game-based activities enhances learners’ literacy outcomes. The study concluded that DGBL is an effective and engaging approach in supporting early literacy development among kindergarten learners. It is recommended that teachers integrate structured and interactive DGBL activities, provide adequate scaffolding and feedback, and ensure access to appropriate digital resources to further enhance learners’ literacy skills and maximize the benefits of digital game-based learning.

Keywords: *Digital Game Based Learning , Kindergarten , Early Literacy Development , Lipa City*

Introduction

In the 21st century, technology has become an integral part of education transforming how young learners acquire knowledge and skills. Digital innovations have revolutionized classroom instruction, providing opportunities for interactive, engaging, and individualized learning experiences. One of the most prominent trends emerging from this digital shift is Digital Game-Based Learning (DGBL), a pedagogical approach that integrates educational content into interactive games to promote motivation, engagement, and skill acquisition.

Globally, educators and researchers have recognized the significant potential of game-based learning to support literacy and language development among early learners. According to Li and Tsai (2021), digital games can stimulate children's cognitive abilities, enhance phonological awareness, and strengthen comprehension through multisensory and immersive experiences. This integration of play and learning aligns with the natural developmental tendencies of young children who learn best through exploration and interaction.

In many parts of the world including technologically advanced countries such as Finland, South Korea, and Singapore, digital tools are being used in early childhood classrooms to foster early literacy- a foundational skill that includes letter recognition, phonological awareness, vocabulary development, and comprehension. Studies have shown that children who engage with interactive learning platforms that incorporate sound, visual cues, and storytelling exhibit higher reading readiness and vocabulary growth (Wang & Lin, 2020). These programs not only make learning enjoyable but also cater to diverse learning styles, allowing both visual and auditory learners to benefit. Consequently, integrating digital games in early literacy instruction is viewed as a forward-thinking approach to bridging gaps in traditional literacy instruction.

In the Philippines, the use of technology in early education has been encouraged under the Department of Education's (DepEd) initiative on Information and Communication Technology (ICT) integration in basic education. The DepEd Order No. 78, s. 2010, known as the "Guidelines on the Implementation of the DepEd Computerization Program (DCP)," promotes the use of digital tools to enhance teaching and learning. Furthermore, Republic Act No. 10175, or the Cybercrime Prevention Act of 2012, indirectly highlights the need for digital literacy and responsible technology use reinforcing the idea that young learners should be guided in using digital resources meaningfully. These policies reflect the government's commitment to developing 21st-century skills among Filipino learners beginning with foundational literacy at the kindergarten level.

Despite these advancements there remains a gap in effectively implementing digital game-based learning in many Philippine public schools particularly in early childhood education. Several factors contribute to this gap: limited access to digital devices, insufficient teacher training on technology integration, and inadequate contextualized learning materials that suit the cognitive level of kindergarten learners. Moreover, many kindergarten classrooms still rely heavily on traditional, paper-based methods that may not fully capture young learners' interests or address their diverse learning needs. According to Salcedo (2022), Filipino teachers face

challenges in adopting game-based strategies due to lack of resources and insufficient professional development opportunities in educational technology. This reality creates an imbalance between the potential of digital learning and its actual utilization in classrooms.

At the local level, many kindergarten learners in the community where this study was conducted show varying levels of early literacy development. Teachers have observed that some learners struggle with letter recognition, phonemic awareness, and vocabulary comprehension, which are crucial foundations for later reading and writing. Traditional teaching methods often fail to sustain learners' attention particularly among children in the digital age who are more responsive to interactive and visually stimulating materials. The researcher has personally observed that when educational games are introduced even informally through mobile applications or school-provided tablets children demonstrate higher engagement, better recall, and greater enthusiasm for learning. These observations indicate the need for a more systematic integration of digital game-based learning in early literacy instruction.

The theoretical foundation of this study is anchored on Piaget's Constructivist Theory and Vygotsky's Socio-Cultural Theory, both emphasizing that children learn best through active engagement, interaction, and play. Digital games serve as tools for constructivist learning by providing opportunities for exploration and self-discovery. In addition, Vygotsky's concept of the Zone of Proximal Development (ZPD) supports the idea that digital games can scaffold children's learning by providing tasks that are slightly above their current ability level but achievable with guided support. Through this interaction, learners are motivated to progress, enhancing their literacy skills gradually.

While the integration of digital games in early literacy instruction has shown positive results in international and some local studies there is still limited research focusing on kindergarten learners in the Philippine setting. The available studies often target elementary or secondary levels, leaving a research gap in understanding how digital game-based learning can specifically influence early literacy development at the foundational stage. Furthermore, the degree of its impact on components such as letter recognition, phonological awareness, vocabulary development, and comprehension skills remains underexplored. There is also a lack of comprehensive analysis regarding the challenges teachers encounter in implementing digital game-based approaches, particularly in resource-limited schools.

Addressing these gaps is critical since early literacy serves as the cornerstone of lifelong learning. The formative years of education, especially kindergarten lay the groundwork for language, reading, and cognitive development. When children fail to develop early literacy skills they are at greater risk of struggling academically in later grades. Therefore, investigating how digital game-based learning can improve literacy outcomes among young learners is both timely and significant.

In this regard, the study titled "Digital Game-Based Learning and Early Literacy Development of Kindergarten Learners" aims to determine the usefulness of digital game-based strategies in enhancing literacy skills among kindergarten pupils. It also seeks to identify the

relationship between the learners' level of literacy and the extent of digital game utilization as well as the challenges faced by teachers in adopting such approaches. The findings of this study may provide valuable insights for curriculum planners, teachers, and policymakers in strengthening literacy instruction through innovative, technology-assisted methods.

Ultimately, this study is founded on the belief that when learning becomes playful, interactive, and meaningful, it not only improves literacy skills but also nurtures a lifelong love for learning. By exploring how digital games can be harnessed to improve early literacy, this research endeavors to bridge the gap between traditional pedagogy and the digital realities of today's learners transforming early education into a more engaging, equitable, and future-ready experience.

The target output of this study is the development of proposed intervention activities utilizing Digital Game-Based Learning (DGBL) suited for kindergarten learners, as anchored on the results of the study. These intervention activities are designed to enhance early literacy skills, particularly in letter recognition, phonological awareness, vocabulary development, and comprehension skills. The proposed activities will serve as a practical guide for teachers in implementing developmentally appropriate digital games that support early literacy development. In addition, these activities will include suggested strategies for classroom integration, appropriate selection of digital games, and considerations in addressing challenges related to technology use.

Through this output, the study aims to provide a structured and contextualized set of intervention activities that will help strengthen early literacy instruction among kindergarten learners.

Statement of the Problem

This study aims to investigate the usefulness of digital game-based learning and early literacy development of kindergarten learners in SDO- Lipa City.

Specifically, it seeks to answer the following questions:

1. How may the level of development of early literacy of learners be assessed in terms of:
 - 1.1 letter recognition;
 - 1.2 phonological awareness;
 - 1.3 vocabulary development; and
 - 1.4 comprehension skills?
2. To what extent of utilization of digital game-based learning approach be assessed in relation to:

2.1 reading readiness;

2.2 word recognition and usage; and

3.3 sentence construction?

3. Is there any significant relationship between the assessments on the level of development of early literacy and on the extent of utilization of digital game-based learning approach among kindergarten learners?

4. What are the challenges encountered by the kindergarten teachers in using digital game-based learning approach?

5. Based on the results of the study, what proposed intervention activities on digital game-based learning may be prepared?

Research Hypothesis

There is no significant relationship between the assessment on the level of development of early literacy and on the extent of utilization of digital game-based learning in kindergarten learners of SDO Lipa City.

METHODOLOGY

Research Design

This study employed a descriptive research design utilizing mixed-methods approach. The design is appropriate for examining the utilization of digital game-based learning (DGBL) on the early literacy development of kindergarten learners. Descriptive research allows the researcher to systematically collect data on the literacy levels of learners prior to the use of the integration of digital games while the qualitative component provides insights into the challenges faced by teachers and the experiences of learners during the implementation.

Quantitative data collected through structure questionnaires, which measured learners' letter recognition, phonological awareness, vocabulary development, comprehension, reading readiness, word recognition, and sentence construction. Qualitative data was gathered through interviews and classroom observations of teachers to provide contextual information regarding the implementation of digital game-based learning. This combination allows the researcher to assess both measurable outcomes and the practical experiences of teachers and learners in the classroom.

Once the data is gathered, the researcher designed intervention activities based on the results. These activities aim to enhance early literacy development and maximize the benefits of

digital game-based learning for kindergarten learners.

Participants

The respondents of the study are the kindergarten teachers from all elementary schools in four districts of SDO- Lipa City during the School Year 2025-2026. In the division, there were total of 120 kindergarten teachers. Teachers who served as the respondents of the study were determined using the Raosoft Sample Size Calculator with a 5% margin of error. The sample size was 92. The respondents were selected using a stratified random sampling technique using actual allocation to ensure proper representation across different schools.

Data Gathering Instruments

The research-made questionnaire was used to collect information on kindergarten teachers' perceptions regarding the implementation and utilization of digital game-based learning in enhancing early literacy skills. This includes assessing learners' letter recognition, phonological awareness, vocabulary development, comprehension, reading readiness, word recognition, and sentence construction.

The interview was conducted with kindergarten teachers to gain deeper insights into the challenges, experiences, and best practices in using digital game-based learning activities. The interview helped clarify and complement the findings from the questionnaires and performance checklists.

Procedures

To gather the necessary data for this study, the researcher was first secure approval from the Schools Division Superintendent of Lipa City. Once approval is granted, a request letter was sent to the principals of the participating schools, attaching the approval from the SDS. With the principals' consent, the researcher was administered the research instruments to the kindergarten teachers.

Before implementing the study, the researcher obtained informed consent from all participating teachers. The consent form was explaining the purpose of the study, procedures, potential risks and benefits, confidentiality measures, voluntary participation, and the right to withdraw at any time without penalty. This ensures that the participants are fully aware of their role and the scope of the study.

The administration of the instruments was supervised directly by the researcher to ensure accurate and consistent data collection. Teachers was guided on how to complete the questionnaires and checklists, and any clarifications needed during the process was provided. Semi-structured interviews was also be conducted individually to gather qualitative insights on the implementation of digital game-based learning, the challenges encountered, and the strategies used to enhance early literacy skills.

All data collected was be treated with strict confidentiality, and adherence to ethical standards, including the Data Privacy Act of 2012, was maintained. The researcher was personally verify the completeness and accuracy of the responses before proceeding to data analysis.

Data Analysis

The data collected in this study was analyzed using both descriptive and inferential statistical methods to address the research questions. To analyze the data gathered from the respondents, this study employs a variety of statistical methods to ensure accurate interpretation. A structured questionnaire was used as the primary instrument to collect reliable information, which was then processed using the weighted mean to determine the average response for each item and provide a basis for verbal interpretation. Additionally, ranking was utilized to assess the relative importance or frequency of the participants' responses. Finally, Pearson's R was applied to determine the relationship between the assessment on the level of early literacy development and on the extent of utilization of the digital game-based learning in the classroom. Also the qualitative analysis, responses from the interviews were thematically analyzed to identify common challenges, strategies, and perceptions of teachers regarding DGBL implementation

Results and Discussion

Level of Development of Early Literacy of Learners

Early literacy refers to the foundational skills that young children develop before formal reading and writing instruction. These skills include recognizing letters, understanding sounds, developing vocabulary, and comprehending simple texts. According to Genç-Ersoy (2021), early literacy development in preschool years is essential because it prepares children for later reading and writing acquisition and supports their readiness for formal education. Early exposure to literacy activities helps learners build the necessary language and cognitive skills needed for successful literacy learning.

In addition, research on early childhood education highlights that innovative teaching strategies, including technology-supported instruction, can enhance children's literacy development by providing interactive learning experiences that stimulate interest and participation in literacy activities.

In this study, letter recognition pertains to the extent to which kindergarten learners in the SDO-Lipa City are able to identify and name both uppercase and lowercase letters through activities integrated in digital game-based learning (DGBL). It includes their ability to recognize letters presented in digital games and respond correctly to letter-identification tasks.

Table 1 : Development of early literacy of learners in letter recognition

Learners can...	Weighted Mean	Verbal Interpretation	Ranking
identify uppercase letters accurately.	3.72	Highly Developed	2
identify lowercase letters accurately.	3.65	Highly Developed	3
match letters to corresponding sounds.	3.41	Moderately Developed	6
trace letters correctly.	3.52	Highly Developed	5
recognize letters in printed words.	3.33	Moderately Developed	7
recite the alphabet in order.	3.80	Highly Developed	1
identify letters in environmental print (signs, labels).	3.28	Moderately Developed	9
differentiate letters with similar shapes (e.g., b/d, p/q).	3.15	Moderately Developed	10
recognize letters in various fonts and styles.	3.30	Moderately Developed	8
show confidence in identifying letters during literacy activities.	3.60	Highly Developed	4
Composite Mean	3.48	Moderately Developed	

The results indicate that kindergarten learners possess a solid foundation in alphabet recognition but still require continuous practice and meaningful literacy experiences to strengthen their phonics skills and visual discrimination of letters. Strengthening these areas can help improve their readiness for reading and writing tasks in the succeeding grade levels.

Phonological Awareness

Phonological awareness refers to the ability of learners to recognize and manipulate the sounds of spoken language, including syllables, rhymes, and individual phonemes. It is a critical early literacy skill because it forms the foundation for reading, spelling, and decoding words. Research indicates that children with strong phonological awareness in kindergarten are more likely to become successful readers in later years.

Table 2: Development of early literacy of learners in Phonological Awareness

Learners can...	Weighted Mean	Verbal Interpretation	Ranking
identify rhyming words.	3.46	Moderately Developed	2
segment words into syllables.	3.38	Moderately Developed	4
blend sounds to form words.	3.25	Moderately Developed	7
recognize beginning sounds in words.	3.42	Moderately Developed	3
recognize ending sounds in words.	3.29	Moderately Developed	6
identify the number of sounds in a word.	3.18	Moderately Developed	9
manipulate sounds to create new words.	3.12	Moderately Developed	10
detect alliteration in words or sentences.	3.21	Moderately Developed	8
clap or tap out syllables in words.	3.50	Highly Developed	1
distinguish similar sounding words.	3.33	Moderately Developed	5
Composite Mean	3.31	Moderately Developed	

The composite mean of 3.31 indicates that the overall level of phonological awareness among kindergarten learners is Moderately Developed. This suggests that while learners have a solid beginning in sound recognition and basic syllable awareness, further instructional support focusing on sound blending, segmentation, and manipulation would enhance their phonological foundation, ultimately aiding smoother transitions to emergent reading tasks.

Vocabulary Development

Vocabulary development refers to the ability of learners to understand and use words in spoken and written contexts (Smith & Johnson, 2021). It is an important early literacy skill because knowing more words helps children better understand what they hear and read, express themselves clearly, and make meaning from text. Research in early childhood education shows that young learners with stronger vocabularies tend to perform better in reading comprehension and overall language learning (Smith & Johnson, 2021).

Table 3: Development of early literacy of learners in vocabulary.

Learners can...	Weighted Mean	Verbal Interpretation	Ranking
name common objects in their surroundings.	3.58	Highly Developed	2
identify colors, shapes, and sizes.	3.62	Highly Developed	1
use words appropriately in simple sentences.	3.40	Moderately Developed	6
understand words introduced in class activities.	3.36	Moderately Developed	7
recall newly taught words after reading or games.	3.45	Moderately Developed	5
categorize words into groups (e.g., animals, food).	3.32	Moderately Developed	8
explain the meaning of familiar words.	3.29	Moderately Developed	9
use descriptive words in oral expression.	3.48	Moderately Developed	4
follow instructions that involve specific vocabulary.	3.33	Moderately Developed	10
enjoy learning new words through activities.	3.51	Highly Developed	3
Composite Mean	3.43	Moderately Developed	

Overall, the results indicate that kindergarten learners show strong foundational vocabulary skills and enjoyment in language activities, yet moderate performance in applying and explaining words in context points to the need for sustained vocabulary-rich experiences. Incorporating interactive reading, descriptive exercises, and group-based language tasks can further support learners in advancing from Moderately Developed to Highly Developed levels of vocabulary proficiency.

Comprehension Skills

Comprehension skills refer to the ability of learners to understand, interpret, and make meaning from spoken or written language (Johnson & Carter, 2021). This early literacy skill involves connecting ideas, drawing inferences, and responding to questions about what is heard or read. Research in early childhood literacy highlights that comprehension is a key indicator of reading success, as it shows whether children can not only recognize words but also understand and think about language meaningfully (Johnson & Carter, 2021).

Table 4: Development of early literacy of learners Comprehension Skills

Learners can...	Weighted Mean	Verbal Interpretation	Ranking
recall main ideas from short stories.	3.41	Moderately Developed	4
answer questions about characters and events.	3.48	Moderately Developed	2
sequence events in a story.	3.35	Moderately Developed	6
identify the beginning, middle, and end of a story.	3.38	Moderately Developed	5
make predictions based on pictures or text.	3.52	Highly Developed	1
describe a story in their own words.	3.36	Moderately Developed	7
infer meaning from illustrations.	3.31	Moderately Developed	9
relate stories to their personal experiences.	3.33	Moderately Developed	8
answer "who," "what," "where," and "when" questions.	3.44	Moderately Developed	3
demonstrate understanding through drawings or dramatization.	3.29	Moderately Developed	10
Composite Mean	3.39	Moderately Developed	

The results indicate that kindergarten learners are developing critical comprehension skills and demonstrate engagement with stories, particularly in prediction and detail recall. However, moderate performance in sequencing, inferencing, and expressive tasks points to the need for continued scaffolded instruction, interactive story sessions, and creative response activities. Integrating guided reading, story dramatization, and reflective discussion can further advance learners from Moderately Developed to Highly Developed levels of early reading comprehension proficiency.

Extent of Utilization of Digital Game-Based Learning in Early Literacy.

Utilization of DGBL refers to the degree to which digital games are incorporated into learning activities to enhance the development of early literacy skills. It involves how frequently and effectively learners engage with educational games, follow instructions, and apply learned

concepts during gameplay (Lee & Park, 2021). In this study, it pertains to the extent to which kindergarten learners in SDO-Lipa City use digital games to develop foundational literacy skills. This is measured through observation of gameplay, participation in game-based tasks, and responses to literacy-related activities integrated in the digital games.

Table 5: Extent of Utilization of Digital Game-Based Learning in Early Literacy in Reading Readiness

Learners ...	Weighted Mean	Verbal Interpretation	Ranking
show interest in books and reading activities.	3.85	Highly Utilized	1
can recognize letters after using digital games.	3.25	Moderately Utilized	6
can match sounds to letters during game activities.	3.65	Highly Utilized	2
demonstrate improved attention in literacy activities.	3.55	Highly Utilized	3
can identify sight words	3.10	Moderately Utilized	9

through digital games.			
can engage in shared reading activities.	3.50	Moderately Utilized	4
show motivation to participate in digital reading games.	3.20	Moderately Utilized	7
can follow simple instructions in literacy games.	3.15	Moderately Utilized	8
can recognize common words in texts.	3.30	Moderately Utilized	5
show increased confidence in early reading tasks.	3.05	Moderately Utilized	10
Composite Mean	3.42	Moderately Utilized	

The results indicate that kindergarten learners are developing key literacy skills and demonstrate positive engagement with DGBL activities. However, lower-ranked indicators such as sight word recognition and confidence in reading tasks point to the need for continued structured guidance, practice, and supportive feedback. Incorporating more scaffolded digital exercises, collaborative game sessions, and reinforcement activities can further enhance learners' literacy proficiency from a Great Extent toward a Very Great Extent level.

Word Recognition and Usage

Word recognition and usage refer to the learners' ability to identify, recall, and apply words in both oral and written contexts (Lee & Park, 2021). This early literacy skill is crucial because it enables children to connect sounds with meanings, expand vocabulary, and develop the capacity to read and write independently. Research indicates that strong word recognition and usage in kindergarten lays the foundation for fluent reading and effective communication in later grades (Johnson & Carter, 2021).

Table 6: Extent of Utilization of Digital Game-Based Learning in Early Literacy in word Recognition and Usage

Learners ...	Weighted Mean	Verbal Interpretation	Ranking
can identify words introduced through games.	3.50	Highly Utilized	3
can use sight words in simple sentences.	3.25	Moderately Utilized	6
can read simple words after digital game activities.	3.60	Highly Utilized	2
can spell simple words correctly.	3.10	Moderately Utilized	8
can associate words with pictures in games.	3.45	Moderately Utilized	4

can apply new vocabulary in oral activities.	3.30	Moderately Utilized	5
can recognize high-frequency words.	3.05	Moderately Utilized	9
show improvement in decoding words.	3.70	Highly Utilized	1
can differentiate similar-looking words.	3.20	Moderately Utilized	7
can respond accurately to word-based game prompts.	3.15	Moderately Utilized	10
Composite Mean	3.33	Moderately Utilized	

The results indicate that kindergarten learners are developing critical word recognition and usage skills through DGBL activities. However, moderate performance in spelling, sight word usage, and accurate responses points to the need for continued scaffolded instruction, interactive practice, and guided reinforcement to further advance early literacy proficiency.

Sentence Construction

Sentence construction refers to the learners' ability to organize words logically to form coherent oral or written sentences, demonstrating both grammatical understanding and meaningful expression (Lee & Park, 2021).

Table 7: Extent of Utilization of Digital Game-Based Learning in Early Literacy in Sentence Construction

Learners ...	Weighted Mean	Verbal Interpretation	Ranking
form simple sentences using new words.	3.55	Highly Utilized	3
can write sentences after digital game prompts.	3.45	Moderately Utilized	4
can sequence words to make meaningful sentences.	3.65	Highly Utilized	2
can use capital letters and punctuation appropriately.	3.20	Moderately Utilized	6
can orally construct sentences about a story or picture.	3.75	Highly Utilized	1
can combine familiar words to express ideas.	3.30	Moderately Utilized	5
can use complete sentences in class activities.	3.15	Moderately Utilized	7
can describe objects or events in sentences.	3.10	Moderately Utilized	8
can respond to questions using full sentences.	3.05	Moderately Utilized	9
show improvement in sentence structure after DGBL activities.	3.00	Moderately Utilized	10
Composite Mean	3.38	Moderately Utilized	

Overall, the results indicate that kindergarten learners are developing essential sentence construction skills and demonstrate positive engagement with DGBL activities. However, moderate performance in punctuation, written response, and consistent sentence formation points to the need for continued scaffolded instruction, guided practice, and reinforcement through structured digital games to further advance learners from a Moderately Utilized to a Highly Utilized of mastery in early literacy.

Relationship Between the Assessments on the Level of Early Literacy Development and on the Extent of Utilization of Digital Game-Based Learning (DGBL)

This section presents the analysis of the significant relationship between the level of development of early literacy skills and the extent of utilization of digital game-based learning (DGBL) among kindergarten learners in SDO Lipa City. The analysis is based on the weighted means of learners' early literacy skills (dependent variable) and the extent of DGBL utilization (independent variable). Pearson correlation coefficient (r) was employed to determine the strength and direction of the relationship between the two variables.

Table 8 : Relationship Between the Extent of Utilization of DGBL in terms of Reading Readiness and the Level of Development of Early Literacy

Variables	r-value	p-value	Decision on H	Remarks
1. letter recognition	0.50	0.002	Reject H_0	Significant
2. phonological awareness	0.46	0.004	Reject H_0	Significant
3. vocabulary development	0.52	0.001	Reject H_0	Significant
4. comprehension skills	0.44	0.006	Reject H_0	Significant

The results indicate that there is a moderate positive and statistically significant relationship between the extent of utilization of Digital Game-Based Learning (DGBL) in terms of reading readiness and the level of development of early literacy skills among kindergarten learners.

Table 9: Relationship Between the Extent of Utilization of DGBL in terms of Word Recognition and Usage and the Level of Development of Early Literacy

Variables	r-value	p-value	Decision on H	Remarks
1. letter recognition	0.842	0.000	Reject H_0	Significant
2. phonological awareness	0.811	0.000	Reject H_0	Significant
3. vocabulary development	0.876	0.000	Reject H_0	Significant
4. comprehension skills	0.793	0.000	Reject H_0	Significant

The results of the correlation analysis revealed that there is a significant relationship between the extent of utilization of digital game-based learning (DGBL) in terms of word recognition and usage and the level of development of early literacy skills among learners.

Table 10: Relationship Between the Extent of Utilization of DGBL in terms of Sentence Construction and the Level of Development of Early Literacy

Variables	r-value	p-value	Decision on H	Remarks
1. letter recognition	0.804	0.000	Reject H_0	Significant
2. phonological awareness	0.792	0.000	Reject H_0	Significant
3. vocabulary development	0.868	0.000	Reject H_0	Significant
4. comprehension skills	0.781	0.000	Reject H_0	Significant

The results of the correlation analysis revealed that there is a significant relationship between the extent of utilization of digital game-based learning (DGBL) in terms of sentence construction and the level of development of early literacy skills among learners.

Challenges Encountered by Kindergarten Teachers in Using Digital Game-Based Learning (DGBL)

During the interviews, teachers highlighted multiple challenges in using DGBL, which were categorized into four main themes: technical limitations, learner-related issues, instructional design difficulties, and time management constraints. Table 9 summarizes these themes along with representative quotes from the interviewees.

Table 11 : Challenges in Using Digital Game-Based Learning

Theme	Description	Representative Teacher Quotes
Technical Limitations	Problems related to devices, internet connectivity, and access to digital games.	"Sometimes, the tablets freeze or the Wi-Fi disconnects, which interrupts the lesson."
Learner-Related Issues	Difficulties arising from students' abilities, attention span, and readiness for digital games.	"Some children find it hard to follow game instructions or get distracted easily."

Instructional Design Difficulties	Challenges in selecting or creating appropriate digital games that align with literacy goals.	“It’s not easy to find games that match the learning objectives for letter recognition and sentence building.”
Time Management Constraints	Limited classroom time to implement DGBL along with the regular curriculum.	“We want to use games, but sometimes there’s not enough time to finish all the literacy activities.”

Teachers reported that inconsistent internet connection, insufficient devices, or software glitches affected the smooth implementation of DGBL. These technical issues occasionally interrupted lessons, reducing learners’ engagement and limiting the frequency of game-based activities. This finding aligns with previous studies showing that technological infrastructure is a common barrier to digital learning integration in early childhood classrooms (Lee & Park, 2021).

Some learners faced challenges in navigating digital games due to limited familiarity with technology, shorter attention spans, or difficulties in understanding game instructions. Teachers noted that scaffolding and continuous guidance were necessary to help learners stay on task and benefit from DGBL activities. This underscores the importance of differentiated instruction and teacher support, especially for younger learners in kindergarten (Johnson & Carter, 2021).

Selecting appropriate games that match specific literacy objectives was another significant challenge. Teachers emphasized that not all games provide meaningful practice for skills such as phonics, vocabulary, and sentence construction. This highlights the need for carefully curated or teacher-created games that are aligned with learning outcomes, ensuring that DGBL effectively complements early literacy instruction (Martinez & Liu, 2021).

Teachers expressed difficulty in balancing game-based learning with other classroom responsibilities. Integrating DGBL requires additional preparation and monitoring, which can be challenging within limited instructional time. Proper scheduling, short and focused game sessions, and integration with core literacy activities can help mitigate this challenge.

The interview data revealed that while kindergarten teachers recognize the potential of DGBL in enhancing early literacy skills, several challenges affect its consistent implementation. Technical limitations, learner readiness, instructional design, and time constraints are key barriers that need to be addressed. Overcoming these challenges through professional support, adequate resources, and strategic planning can optimize the benefits of digital game-based learning, ensuring that learners fully engage with interactive literacy activities.

5.The proposed activities - Letter Leap, Sound Sprint, Word Wonders, Sentence Safari, Rhyme Relay, Story Stack, Phonics Fun, Picture Pair, Vocabulary Voyage, Reading Rally, Game-Read, Predict & Play, Comprehension Quest, and Literacy Lab- are designed to improve kindergarten learners' early literacy skills and optimize the use of digital game-based learning (DGBL). These activities target letter recognition, phonological awareness, vocabulary development, reading readiness, word recognition and usage, and sentence construction. By integrating playful, interactive, and scaffolded digital exercises, the enhancement activities aim to strengthen learners' literacy proficiency, foster engagement and motivation, support confidence in reading and writing tasks, and provide opportunities for both independent and collaborative learning. Collectively, these strategies are expected to enhance learners' foundational literacy abilities and promote a greater extent of utilization of DGBL in classroom instruction.

LINK to access the Proposed Activities:

https://docs.google.com/document/d/1cRzOd-Q4JFDbkW3J22faOJ-H5C_5bf6O/edit?usp=sharing&ouid=104998249570447361195&rtpof=true&sd=true

CONCLUSION

1. Teacher's assessment showed that Kindergarten learners demonstrated a moderate development in all domains of early literacy.

2. Teacher's assessment moderately utilized digital game-based learning in reading readiness, word recognition and usage, and sentence construction.

3. The study confirmed a positive and significant relationship between the level of early literacy development and the extent of utilization of digital game-based learning among kindergarten learners. All computed p-values were lower than the 0.05 level of significance, leading to the rejection of the null hypothesis. This indicates that higher utilization of DGBL is associated with better early literacy outcomes in learners.

4. The study established that the implementation of digital game-based learning is significantly influenced by technical, instructional, and time-related constraints. Limited access to digital devices, insufficient teacher training, classroom management challenges, and time limitations were identified as key factors that restrict the effective integration of DGBL, thereby affecting learners' engagement and limiting its full potential in enhancing early literacy development.

5. The study recommends intervention activities such as Letter Leap, Sound Sprint, Word Wonders, Sentence Safari, and Comprehension Quest to further develop early literacy skills and optimize DGBL use. These activities target letter recognition, phonological awareness, vocabulary development, reading readiness, word recognition, and sentence construction through playful, interactive, and scaffolded exercises. By integrating these strategies, learners are

expected to strengthen literacy proficiency, boost motivation and confidence, and participate actively in both independent and collaborative learning, preparing them for future reading and writing tasks.

Recommendations

Based on the results of this study, the following recommendations may help enhance kindergarten learners' early literacy skills and optimize the use of digital game-based learning (DGBL):

1. Implementing the proposed enhancement activities – Activities such as Letter Leap, Sound Sprint, Word Wonders, Sentence Safari, Rhyme Relay, Story Stack, Phonics Fun, Picture Pair, Vocabulary Voyage, Reading Rally, Game-Read, Predict & Play, Comprehension Quest, and Literacy Lab may help strengthen letter recognition, phonological awareness, vocabulary development, reading readiness, word recognition, and sentence construction.
2. Providing additional teacher guidance and support – Teachers may offer scaffolding, modeling, and feedback during DGBL sessions to help learners improve areas that were moderately developed, such as associating letters with sounds, blending words, applying vocabulary in sentences, and expressive comprehension activities.
3. Increasing access to digital resources – Ensuring learners may have more opportunities to use digital devices and educational games could help them engage more consistently in DGBL, reinforcing literacy skills and improving confidence in reading and writing tasks.
4. Integrating interactive and real-life learning experiences- Linking digital game activities with everyday contexts may help learners better relate to letters, words, and sentences, making literacy tasks more meaningful and motivating.
5. Encouraging collaborative and peer-supported learning- Activities that involve group play, shared reading, or paired game challenges may promote active participation, engagement, and confidence in literacy skills while enhancing social interaction and cooperative learning

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