



Interactive Reading Tools and Teachers' Perceptions of Pupils' Comprehension Skills in Early Childhood Education

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Abstract

Background and Aim: Reading comprehension remains a persistent concern in early childhood education, particularly in the Philippines, where literacy assessments continue to report low reading performance among young learners. Interactive reading tools, including digital storybooks, e-books, and game-based reading applications, have been introduced to support literacy instruction through engaging and technology-assisted learning experiences. This study examined the degree of implementation of interactive reading tools and their association with teachers' perceptions of pupils' comprehension-related skills in early childhood education.

Materials and Methods: The study employed a quantitative descriptive-correlational research design involving 14 Early Childhood Education teachers. Data were collected through a researcher-made survey questionnaire consisting of indicators on the implementation of interactive reading tools and teachers' perceptions of pupils' decoding skills and vocabulary knowledge. A pilot test involving 14 respondents established instrument reliability using Cronbach's alpha. Descriptive statistics, including mean and standard deviation, were used to determine levels of implementation and perceived comprehension-related skills, while Spearman's rho tested the relationship between the variables.

Results: Results showed a very high level of implementation of interactive reading tools in terms of multisensory engagement ($M = 4.73$, $SD = 0.694$), adaptive learning ($M = 4.73$, $SD = 0.420$), and narrative interactivity ($M = 4.52$, $SD = 0.551$). Teachers likewise reported very high perceptions of pupils' decoding skills ($M = 4.46$, $SD = 0.793$) and vocabulary knowledge ($M = 4.25$, $SD = 0.901$). Statistical analysis revealed a very strong positive relationship between the implementation of interactive reading tools and perceived comprehension-related skills (Spearman's $\rho = 0.967$, $p < 0.001$). However, the unusually high correlation may indicate possible overlap in measurement constructs or shared respondent bias, as both variables were assessed using teacher perceptions.

Conclusion: The findings suggest that teachers perceive interactive reading tools as widely implemented and potentially supportive of pupils' early literacy development, particularly in decoding and vocabulary acquisition. However, because the study relied solely on teacher-reported perceptions rather than direct assessment of pupils' reading performance, the results should be interpreted with caution and should not be taken as evidence of causal improvement in comprehension skills. Future studies may incorporate standardized reading assessments and multiple data sources to provide a more objective evaluation of the effectiveness of interactive reading tools in early childhood education.

Keywords: Interactive Reading Tools, Comprehension Skills, Early Childhood Education, Decoding Skills, Vocabulary Knowledge, Descriptive-correlational Study





Introduction

Reading comprehension is a fundamental skill that supports academic success and lifelong learning. However, many young learners continue to experience difficulties in reading comprehension. International assessments such as the Programme for International Student Assessment (PISA) reported that a large proportion of learners perform below minimum proficiency levels in reading (OECD, 2021). In the Philippines, the 2018 PISA results showed that Filipino learners scored significantly below the OECD average in reading literacy (DepEd, 2020). Similarly, the Philippine Informal Reading Inventory (Phil-IRI) revealed that many elementary pupils remain at the frustration level in reading comprehension despite being able to decode words (DepEd Phil-IRI, 2022).

These literacy concerns are also evident in public elementary schools in Tubod, Lanao del Norte, where teachers encounter pupils who struggle with decoding texts, understanding vocabulary, and sustaining reading engagement during classroom instruction. Limited reading resources, varying learner abilities, and the increasing use of technology-based instruction have encouraged schools to explore alternative strategies to support literacy development among young learners.

One approach increasingly used in early childhood education is the integration of interactive reading tools. Interactive reading tools refer to digital and technology-assisted materials such as digital storybooks, audio-enhanced e-books, interactive storytelling platforms, and game-based reading applications that combine text, sound, visuals, and learner participation. In this study, interactive reading tools served as the independent variable and were examined in terms of multisensory engagement, adaptive learning, and narrative interactivity. These features are believed to support active participation and improve learners' reading experiences.

Pupils' comprehension skills served as the dependent variable of the study. These skills refer to learners' ability to decode words and understand vocabulary during reading activities. Decoding skills involve recognizing and interpreting written words correctly, while vocabulary knowledge refers to understanding the meaning of words encountered in texts. Previous studies suggest that interactive reading tools may improve learner engagement, vocabulary development, and reading comprehension when used appropriately in classroom instruction (Guthrie & Wigfield, 2020).

Despite the growing use of digital reading resources, there is limited local evidence regarding the implementation of interactive reading tools in public elementary schools in the Philippines, particularly in rural or semi-rural communities such as Tubod, Lanao del Norte. Existing studies often focus on general educational technology or urban school settings, while little attention has been given to how interactive reading tools are implemented in early childhood classrooms and how teachers perceive their relationship with pupils' comprehension skills. This lack of localized evidence creates a gap in understanding whether these tools are meaningfully integrated into literacy instruction in the local context.

In response to this gap, the present study examined the degree of implementation of interactive reading tools and their relationship with pupils' comprehension skills in selected public elementary schools in Tubod, Lanao del Norte, Philippines. Specifically, the study focused on multisensory engagement, adaptive learning, and narrative interactivity as dimensions of interactive reading tools, and decoding skills and vocabulary knowledge as indicators of pupils' comprehension skills.





Objectives

This study aimed to examine the relationship between interactive reading tools and pupils' comprehension skills in early childhood education in selected public elementary schools in Tubod, Lanao del Norte, Philippines. Specifically, it sought to determine the degree of implementation of interactive reading tools in terms of multisensory engagement, adaptive learning, and narrative interactivity; assess teachers' perceptions of pupils' comprehension skills in terms of decoding skills and vocabulary knowledge; and determine whether a statistically significant relationship exists between the implementation of interactive reading tools and pupils' comprehension skills. The study also aimed to provide insights that may support the improvement of literacy instruction in early childhood education.

Hypotheses

This study tested the hypotheses at the 0.05 level of significance to determine whether a statistically significant relationship exists between the implementation of interactive reading tools and teachers' perceptions of pupils' comprehension skills in early childhood education.

H₀: There is no statistically significant relationship between the implementation of interactive reading tools and teachers' perceptions of pupils' comprehension skills in early childhood education.

Alternative Hypothesis (H₁): There is a statistically significant relationship between the implementation of interactive reading tools and teachers' perceptions of pupils' comprehension skills in early childhood education.

Literature review

This literature review examines studies related to interactive reading tools and pupils' comprehension skills in early childhood education. The review focuses on two major variables of the study: interactive reading tools as the independent variable and pupils' comprehension skills as the dependent variable. Interactive reading tools are examined in terms of multisensory engagement, adaptive learning, and narrative interactivity, while pupils' comprehension skills are discussed in terms of decoding skills and vocabulary knowledge. The review also presents the theoretical foundations that explain the possible relationship between these variables.

1. Interactive Reading Tools

Interactive reading tools refer to technology-assisted reading resources that combine text, visuals, sound, animation, and learner participation to support literacy learning. These include digital storybooks, interactive e-books, reading applications, and storytelling platforms. Unlike traditional printed materials, interactive reading tools provide learners with opportunities to interact actively with texts through touch-based responses, audio support, and immediate feedback.

Several studies suggest that interactive reading tools can support literacy development by improving learner engagement and motivation. Chuang and Jamiat (2023) reported that multimedia-supported interactive reading activities helped learners sustain attention and participate more actively during reading sessions. Similarly, Chuang and Jamiat (2023) reported that interactive digital reading applications promoted vocabulary development and increased learner engagement through multimedia-supported reading experiences.

However, existing studies also emphasize that the effectiveness of interactive reading tools depends on how they are implemented in classroom instruction. Some researchers argue that excessive multimedia features may distract learners rather than support comprehension when poorly designed or insufficiently guided by teachers. This suggests that interactive reading tools are not automatically effective and must be aligned with learners' developmental needs and instructional goals.

Although international studies on interactive reading tools continue to increase, there is still limited evidence from Philippine public elementary schools, particularly in rural communities such as Tubod, Lanao del Norte. Most local discussions focus broadly on educational technology rather than specific dimensions of interactive reading tools and their relationship with comprehension-related





skills in early childhood education. This gap highlights the need for localized studies examining how teachers implement these tools in actual classroom settings.

2. Pupils' Comprehension Skills

Pupils' comprehension skills refer to learners' ability to understand and construct meaning from written texts. In this study, comprehension skills are examined through two dimensions: decoding skills and vocabulary knowledge. Decoding skills involve recognizing and pronouncing written words accurately, while vocabulary knowledge refers to understanding the meanings of words encountered in texts.

Research consistently identifies decoding and vocabulary as foundational components of reading comprehension. Duke and Pearson (2002) explained that learners must first recognize words accurately before constructing meaning from texts. Snow (2010) further argued that vocabulary knowledge plays a critical role in comprehension because learners cannot understand texts fully without understanding word meanings.

Studies also show that supportive and engaging instructional environments contribute to stronger comprehension development. Neuman and Celano (2006) and Pressley (2006) emphasized that repeated exposure to meaningful reading experiences strengthens learners' language development and comprehension abilities. However, scholars also note that comprehension difficulties remain common among young learners, especially in contexts where reading materials and instructional support are limited.

In the Philippine context, literacy challenges remain evident despite curriculum reforms and reading programs. Reports from Phil-IRI continue to show that many elementary pupils struggle with comprehension even when basic decoding skills are present. Despite these concerns, few local studies have examined how interactive reading tools relate specifically to decoding and vocabulary development in early childhood classrooms.

3. Dimensions of Interactive Reading Tools

3.1 Multisensory Engagement

Multisensory engagement refers to the use of visual, auditory, and tactile elements during learning. Interactive reading tools often include narrated texts, animated illustrations, sound effects, and touch-responsive features. Research suggests that multisensory learning can improve attention, memory retention, and learner participation because information is processed through multiple sensory channels simultaneously (Shams & Seitz, 2008).

While several studies report positive effects of multisensory instruction, other scholars caution that sensory-rich features may become distracting if they are unrelated to the reading content. This indicates that the effectiveness of multisensory engagement depends not only on the presence of multimedia features but also on their instructional relevance.

3.2 Adaptive Learning

Adaptive learning refers to the ability of digital tools to adjust instruction according to learners' performance and needs. Features such as personalized reading levels, automated feedback, and progress monitoring allow learners to receive differentiated instruction.

Adaptive learning systems have been found to enhance learner engagement and provide individualized instructional support by adjusting learning activities according to learners' needs and performance levels (Alrawashdeh et al., 2024). However, researchers also emphasize that technology alone cannot replace teacher guidance, as the effectiveness of adaptive learning depends on how teachers meaningfully integrate these tools into literacy instruction.

3.3 Narrative Interactivity

Narrative interactivity refers to learners' active participation in stories through choices, responses, and interaction with story elements. Interactive storytelling platforms allow learners to manipulate characters, respond to prompts, and influence story progression.

This finding is consistent with Chuang and Jamiat (2023), who reported that interactive storytelling and digital reading applications increased learner engagement and supported deeper understanding of narrative content among young learners. Similarly, Chuang and Jamiat (2023) reported that interactive narrative features promoted learner engagement and supported deeper





understanding of story content among young learners. Nevertheless, some researchers argue that excessive interactivity may interrupt reading flow and reduce comprehension when digital features become more entertaining than instructional.

These findings suggest that narrative interactivity can support comprehension when balanced appropriately with literacy objectives.

4. Theoretical Foundations

This study is anchored in Sociocultural Theory, Multisensory Learning Theory, and Constructivist Learning Theory. These theories explain how interactive reading tools may influence pupils' comprehension skills in early childhood education.

Sociocultural Theory (Vygotsky, 1978)

Sociocultural Theory by Lev Vygotsky (1978) explains that learning occurs through social interaction and the use of cultural tools such as language and technology. In this study, interactive reading tools function as instructional tools that support pupils' literacy development through guided interaction with teachers and peers. Features such as audio support, feedback, and collaborative reading activities may help pupils develop decoding skills and vocabulary knowledge within their Zone of Proximal Development.

Multisensory Learning Theory (Shams & Seitz, 2008)

Multisensory Learning Theory explains that learners understand and retain information more effectively when multiple sensory modalities are engaged simultaneously. Interactive reading tools support this process by combining text, visuals, sounds, and touch-based interaction. In this study, multisensory engagement is expected to support pupils' comprehension skills by strengthening attention, word recognition, and vocabulary retention.

Constructivist Learning Theory (Fosnot, 2005)

Constructivist Learning Theory views learning as an active process in which learners construct meaning through interaction and experience. Interactive reading tools encourage active participation through storytelling choices, learner responses, and immediate feedback. In relation to this study, narrative interactivity and adaptive learning features may help pupils become more engaged in meaning-making activities, thereby supporting comprehension development.

Together, these theories provide the conceptual basis for examining how the implementation of interactive reading tools may relate to pupils' comprehension skills in early childhood education.

Synthesis of Literature

The literature reviewed shows that reading comprehension in early childhood education is a complex skill that depends on the integration of decoding skills and vocabulary knowledge. Decoding allows learners to recognize written words accurately, while vocabulary knowledge enables them to understand word meanings and construct text understanding. Studies consistently emphasize that these two components must develop together for effective comprehension to occur (Duke & Pearson, 2002; Snow, 2010). However, despite their importance, many early learners continue to experience difficulties in comprehension, particularly in contexts with limited instructional support and reading resources.

To address these difficulties, interactive reading tools have been introduced as instructional support for literacy development. These tools are characterized in this study through three dimensions: multisensory engagement, adaptive learning, and narrative interactivity. Across the literature, there is general agreement that these features can improve learner engagement, motivation, and vocabulary development. Multisensory engagement enhances learning by combining visual, auditory, and tactile inputs, while adaptive learning supports individualized instruction based on learner performance. Narrative interactivity, on the other hand, allows learners to actively participate in storytelling and meaning-making processes.

However, the literature does not present entirely consistent findings. While many studies report positive effects of interactive reading tools on literacy outcomes, some researchers argue that their effectiveness depends heavily on implementation quality. In particular, overly complex multimedia features may distract learners or reduce focus on comprehension if not properly guided by teachers. This suggests that interactive reading tools are not inherently effective but are influenced by classroom context, teacher competence, and instructional design.





A further review of studies reveals that most existing research on interactive reading tools is conducted in international or urban settings with strong technological infrastructure. There is limited empirical evidence in the Philippine context, especially in rural public elementary schools. In particular, little is known about how interactive reading tools are implemented in early childhood education in places such as Tubod, Lanao del Norte, and how teachers perceive their relationship with pupils' decoding and vocabulary skills. Existing local studies tend to focus broadly on ICT integration in education rather than on specific reading-related digital tools and their role in comprehension development.

This lack of localized evidence creates a clear research gap. First, there is limited documentation on the actual degree of implementation of interactive reading tools in early childhood classrooms in Tubod. Second, there is insufficient analysis of how these tools relate specifically to pupils' comprehension skills as reflected in decoding and vocabulary development. Third, there is a need to understand whether teachers' perceptions align with actual instructional practices involving interactive reading tools.

Therefore, this study addresses these gaps by examining the implementation of interactive reading tools in terms of multisensory engagement, adaptive learning, and narrative interactivity, and determining their relationship with pupils' comprehension skills in terms of decoding skills and vocabulary knowledge in selected public elementary schools in Tubod, Lanao del Norte.

Conceptual Framework

This study is anchored on the proposition that the implementation of interactive reading tools is associated with pupils' comprehension skills in early childhood education. The independent variable is the implementation of interactive reading tools, while the dependent variable is pupils' comprehension skills, specifically decoding skills and vocabulary knowledge.

The framework is guided by Lev Vygotsky's Sociocultural Theory, Multisensory Learning Theory, and Constructivist Learning Theory. Collectively, these theories explain that learning occurs through guided interaction, sensory stimulation, and active knowledge construction. In this study, interactive reading tools function as mediating instructional resources that support teacher-guided learning, learner engagement, and meaning-making during reading activities.

The relationship between the variables is explained through three interconnected dimensions of interactive reading tools. Multisensory engagement supports decoding skills by strengthening phonemic awareness and word recognition through simultaneous visual and auditory input. Adaptive learning contributes to both decoding and vocabulary development by adjusting reading difficulty, providing immediate feedback, and reinforcing word learning based on learner performance. Narrative interactivity enhances vocabulary knowledge and comprehension by allowing learners to actively engage with texts, make choices, and encounter words in meaningful and contextualized story experiences.

Together, these dimensions influence pupils' comprehension skills by improving how learners process written language, connect sounds to symbols, and understand word meanings. The framework assumes that when these features are effectively implemented in classroom instruction, they create supportive conditions for early reading development.

Empirically, the study examines this relationship by measuring the degree of implementation of interactive reading tools and assessing teachers' perceptions of pupils' decoding skills and vocabulary knowledge in selected early childhood classrooms in Tubod, Lanao del Norte.

Overall, the conceptual framework presents a direct and testable relationship between the implementation of interactive reading tools and pupils' comprehension skills, while explaining how specific instructional features may contribute to decoding and vocabulary development in early literacy learning.



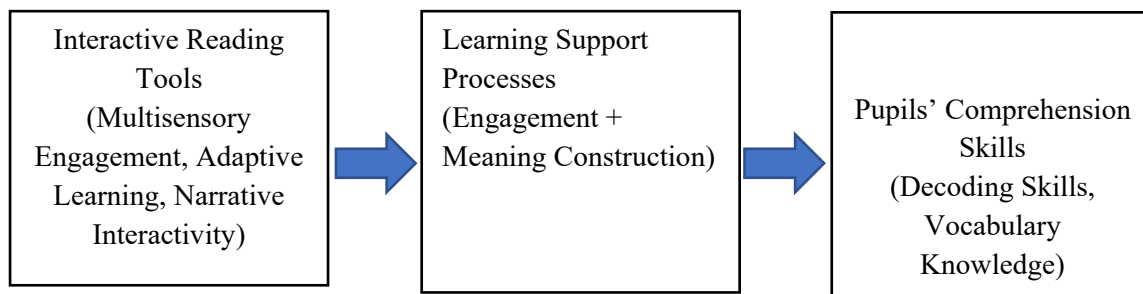


Figure 1. Hypothesized model of the relationship between interactive reading tools and pupils' comprehension skills.

Methodology

This study employed a descriptive-correlational research design to determine the degree of implementation of interactive reading tools and their relationship with pupils' comprehension skills in early childhood education. This design was appropriate because it described existing conditions and examined relationships among variables without manipulating them.

The descriptive component was used to determine the level of implementation of interactive reading tools in terms of multisensory engagement, adaptive learning, and narrative interactivity. It was also used to assess teachers' ratings of pupils' comprehension skills in terms of decoding skills and vocabulary knowledge. The correlational component was used to determine whether a significant relationship exists between the two variables.

Population and Sample

The respondents of the study were Early Childhood Education teachers from selected public elementary schools in Tubod, Lanao del Norte during the School Year 2024–2025. These teachers were selected because they directly implement reading instruction and observe pupils' literacy-related performance in classroom settings.

A stratified proportionate random sampling technique was used to ensure representation across grade levels (Kindergarten to Grade 6). The population was first grouped according to grade level assignment. Respondents were then randomly selected from each stratum in proportion to the number of teachers in each grade level. This procedure ensured that all grade levels were adequately represented in the sample and reduced sampling bias.

The total population and final sample size ($n = 14$) were determined based on the number of eligible teachers in the selected schools and the proportional allocation per stratum.

Research Instrument

The study used a researcher-made structured questionnaire as the primary data-gathering instrument. The questionnaire was designed to measure two main variables: (1) implementation of interactive reading tools and (2) pupils' comprehension skills as perceived by teachers.

The questionnaire consisted of three parts:

Part I: Profile of the Respondents

This section gathered demographic and professional information such as age, sex, grade level handled, teaching experience, and relevant training in literacy instruction or educational technology.

Part II: Implementation of Interactive Reading Tools

This section measured the degree of implementation of interactive reading tools in terms of: Multisensory Engagement, Adaptive Learning, and Narrative Interactivity.

Responses were rated using a Likert scale to determine the extent of implementation in classroom instruction.

Part III: Pupils' Comprehension Skills

This section measured teachers' perceptions of pupils' comprehension skills in terms of: Decoding Skills, Vocabulary Knowledge. Responses were also rated using a Likert scale.

Validity and Reliability

To ensure content validity, the questionnaire was reviewed by two subject matter experts in literacy education and educational technology. Their feedback was used to refine item clarity, relevance, and alignment with the study variables.

A pilot test involving 14 respondents was conducted to determine the reliability of the instrument. The internal consistency of the questionnaire was computed using Cronbach's alpha, and results were interpreted based on accepted reliability standards. Revisions were made where necessary to improve clarity and consistency of items.

Data Collection

Data collection was conducted after securing permission from school authorities.

The process involved three streamlined phases: Preparation Phase: The researcher finalized the validated questionnaire, conducted the pilot testing, and secured approval from school administrators.

Administration Phase: The questionnaire was distributed personally to selected respondents. Before distribution, respondents were informed about the purpose of the study, voluntary participation, and confidentiality of responses.

Retrieval Phase: Completed questionnaires were collected, checked for completeness, and prepared for encoding and analysis.

All data were treated with confidentiality and used solely for academic purposes. Participation was voluntary, and respondents had the right to withdraw at any time.

Data Analysis

Descriptive Statistics

Frequency and percentage were used to describe the respondents' profile. Mean and standard deviation were used to determine:

- the level of implementation of interactive reading tools, and
- the level of pupils' comprehension skills as perceived by teachers.

Inferential Statistics

To determine the relationship between variables, correlation analysis was used at the 0.05 level of significance.

- Pearson Product-Moment Correlation Coefficient (Pearson r) was used if the data met assumptions of normality and linearity.
- Spearman Rank-Order Correlation (Spearman ρ) was used if the data were non-normally distributed or ordinal in nature.

These tests were appropriate because both variables were measured using Likert-scale responses and the study aimed to examine the strength and direction of association between variables.

All data were encoded using Microsoft Excel and analyzed using SPSS.

Results

This chapter presents the findings of the study on the degree of implementation of interactive reading tools and their relationship with pupils' comprehension skills in early childhood education. Specifically, it discusses the level of implementation of interactive reading tools in terms of multisensory engagement, adaptive learning, and narrative interactivity; teachers' perceptions of pupils' comprehension skills in terms of decoding skills and vocabulary knowledge; and the significant relationship between interactive reading tools and pupils' comprehension skills.

The data were gathered using a validated survey questionnaire administered to the teacher-respondents. Descriptive statistics such as mean and standard deviation were used to determine the level of implementation of interactive reading tools and the level of pupils' comprehension skills, while Spearman's ρ was used to test the significant relationship between the variables.

1. Degree of Implementation of Interactive Reading Tools



Table 1: Degree of Implementation of Interactive Reading Tools in Terms of Multisensory Engagement

Statements	Mean Score	SD	Verbal Interpretation	Descriptive Rating
Use of auditory elements (e.g., recorded narrations, read-aloud features)	4.58	0.900	Very High	Very High
Integration of visual stimuli (e.g., color-coded texts, illustrated books)	4.75	0.866	Very High	Very High
Incorporation of tactile/kinesthetic activities (e.g., letter tracing, movement-based learning)	4.75	0.622	Very High	Very High
Effectiveness of multisensory activities in improving phonemic awareness and word recognition	4.83	0.389	Very High	Very High
Overall	4.73	0.694	Very High	Very High

Table 1 shows that the degree of implementation of interactive reading tools in terms of multisensory engagement obtained an overall mean of 4.73 (SD = 0.694), indicating a very high level of implementation.

Among the indicators, effectiveness in improving phonemic awareness and word recognition recorded the highest mean (M = 4.83), while the use of auditory elements obtained the lowest mean (M = 4.58). The relatively close mean scores suggest a generally uniform perception among teachers across indicators.

These results indicate that multisensory features are widely integrated in reading instruction. However, the consistently high ratings may also suggest a tendency toward positive response bias, as variability among responses is relatively limited.

Table 2 Degree of Implementation of Interactive Reading Tools in Terms of Adaptive Learning

Indicators	Mean Score	SD	Verbal Interpretation	Descriptive Rating
Use of AI-driven or computer-assisted reading platforms	4.33	0.651	Very High	Very High
Customization of reading materials based on individual learner needs	4.92	0.289	Very High	Very High
Real-time feedback mechanisms to monitor pupil progress	4.92	0.289	Very High	Very High
Pupil engagement and motivation when using adaptive learning tools	4.75	0.452	Very High	Very High
Overall	4.73	0.420	Very High	Very High

Table 2 shows that Adaptive learning obtained an overall mean of 4.73 (SD = 0.420), interpreted as a very high level of implementation.

The highest-rated indicators were customization of learning materials and real-time feedback (both M = 4.92). The lowest was the use of AI-driven or computer-assisted platforms (M = 4.33).

The smaller standard deviation indicates strong agreement among respondents. However, this may also suggest limited differentiation in responses, which can occur when items are perceived as uniformly positive or when respondents are evaluating based on general impressions rather than specific implementation evidence.





Table 3 Degree of Implementation of Interactive Reading Tools in Terms of Narrative Interactivity

Indicators	Mean Score	SD	Verbal Interpretation	Descriptive Rating
Use of interactive storytelling (e.g., digital stories, choose-your-own-adventure books)	4.67	0.492	Very High	Very High
Opportunities for pupils to manipulate story elements (e.g., selecting plot outcomes)	4.42	0.515	Very High	Very High
Enhancement of vocabulary knowledge through interactive narratives	4.50	0.674	Very High	Very High
Impact of interactive storytelling on pupils' oral reading fluency and comprehension	4.50	0.522	Very High	Very High
Overall	4.52	0.551	Very High	Very High

Table 3 shows that Narrative interactivity obtained an overall mean of 4.52 (SD = 0.551), indicating a very high level of implementation.

Interactive storytelling had the highest mean (M = 4.67), while learner manipulation of story elements had the lowest (M = 4.42). Compared to other dimensions, narrative interactivity shows slightly lower mean values, suggesting that it may be less consistently implemented.

This pattern indicates that while interactive storytelling is present, more advanced interactive features (such as learner-controlled narratives) may not be fully maximized in some classrooms.

2. Teachers' Perceptions of Pupils' Comprehension Skills

Table 4 Teachers' Perceptions of Pupils' Comprehension Skills in Terms of Decoding Skills

Indicators	Mean Score	SD	Verbal Interpretation	Descriptive Rating
Ability to recognize letter-sound relationships	4.42	0.793	Very High	Very High
Accuracy in pronouncing unfamiliar words	4.42	0.793	Very High	Very High
Fluency in reading aloud	4.58	0.793	Very High	Very High
Response to phonics-based interventions	4.42	0.793	Very High	Very High
Overall	4.46	0.793	Very High	Very High

Table 4 shows that the Teachers' perceptions of pupils' decoding skills obtained an overall mean of 4.46 (SD = 0.793), interpreted as a high level of observed performance.

Fluency in reading aloud obtained the highest mean (M = 4.58). Other indicators such as phonics recognition and pronunciation accuracy were rated equally (M = 4.42).

The identical standard deviation across all indicators suggests uniform response patterns, which may reflect limited discrimination among items or a tendency to generalize pupil performance.

Overall, teachers perceive pupils as demonstrating adequate decoding ability, although the results are based on subjective observation rather than direct reading assessment.

Table 5 Teachers' Perceptions of Pupils' Comprehension Skills in Terms of Vocabulary Knowledge

Indicators	Mean Score	SD	Verbal Interpretation	Descriptive Rating
Ability to understand and use new words	4.17	0.937	High	High
Application of vocabulary in speech and writing	4.33	0.778	Very High	Very High





Indicators	Mean Score	SD	Verbal Interpretation	Descriptive Rating
Recognition of word meanings in different contexts	4.33	0.778	Very High	Very High
Confidence in using newly learned vocabulary	4.17	1.11	Very High	High
Overall	4.25	0.901	Very High	Very High

Table 5 shows that Vocabulary knowledge obtained an overall mean of 4.25 (SD = 0.901), interpreted as a high level of perceived performance, but lower than decoding skills.

Application of vocabulary in speech and recognition of word meanings in context both obtained higher ratings (M = 4.33), while confidence in using vocabulary and understanding new words were lower (M = 4.17).

The relatively higher standard deviation indicates more variation in teacher responses compared to decoding skills. This suggests that vocabulary development may be less consistent across learners or more difficult for teachers to uniformly assess.

Overall, vocabulary knowledge appears to be moderately developed, but less strong than decoding skills.

3. Significant Relationship Between Interactive Reading Tools and Pupils' Comprehension Skills

Table 6 Relationship Between Interactive Reading Tools and Pupils' Comprehension Skills

Correlation	Df	Spearman's rho	p-value
Interactive Reading Tools	10	0.967	< 0.001
Pupils' Comprehension Skills			

A Spearman's rho correlation analysis was conducted to determine the relationship between interactive reading tools and pupils' comprehension skills.

The results showed a very strong positive correlation ($\rho = 0.967$, $p < 0.001$). Since the p-value is less than 0.05, the null hypothesis is rejected.

However, this extremely high correlation should be interpreted with caution. Because both variables were measured using the same respondents (teachers) and based on perceptual ratings, there is a possibility of common method bias or inflated association due to shared measurement source. In addition, the uniformly high mean scores across variables suggest limited variability, which may contribute to an artificially strengthened correlation coefficient.

Despite these limitations, the results suggest that higher perceived implementation of interactive reading tools is associated with higher perceived levels of pupils' decoding and vocabulary skills.

Discussion

The findings of the study revealed that the implementation of interactive reading tools in early childhood education was generally very high and was significantly associated with pupils' comprehension skills. Teachers reported strong implementation across multisensory engagement, adaptive learning, and narrative interactivity, while pupils' decoding skills and vocabulary knowledge were also perceived to be at a very high level. These findings suggest that interactive reading tools may serve as meaningful supports for early literacy instruction when integrated purposefully into classroom practice.

It can be observed that interactive reading technologies are employed at a very high level in early childhood education and are highly associated with pupils' literacy skills, particularly decoding skills





and vocabulary knowledge. Teachers assessed the implementation of multisensory technologies, adaptive techniques, and interactive storytelling practices as very high. These findings indicate that literacy instruction incorporates visual, auditory, and tactile features, as well as adaptive and narrative elements, which encourage learner engagement and support literacy development among young children.

The very high implementation of multisensory engagement indicates that teachers frequently use reading tools that combine visual, auditory, and tactile elements. This suggests that teachers recognize the value of presenting literacy content through multiple sensory channels to support phonemic awareness, word recognition, and learner engagement. This finding is consistent with the study of Shams and Seitz (2008), who argued that learning becomes more effective when multiple sensory modalities are activated. It also supports the view of Neumann (2018) that multisensory digital reading environments and tablet-based literacy applications can strengthen early literacy learning and learner engagement among young children.

The strong implementation of adaptive learning suggests that teachers value individualized and responsive reading experiences. The high ratings for customized materials and real-time feedback imply that teachers see adaptive features as helpful in addressing learners' varying needs and levels of readiness. This finding aligns with Alrawashdeh et al. (2024), who reported that adaptive learning technologies support reading development by personalizing instruction according to learners' abilities and learning needs. Similarly, Alrawashdeh et al. (2024) reported that adaptive and feedback-supported digital reading technologies enhanced learner engagement and improved reading performance by providing individualized instruction tailored to learners' needs.

The very high rating for narrative interactivity indicates that teachers strongly utilize interactive storytelling and participatory reading features. This suggests that pupils are given opportunities to engage actively with stories rather than passively receiving text. Such practices may support motivation, vocabulary growth, and story understanding. This finding is consistent with Chuang and Jamiat (2023), who reported that interactive digital stories enhanced learner engagement and supported vocabulary and comprehension development among young learners. It also agrees with Chuang and Jamiat (2023), who reported that interactive storytelling applications positively supported oral language development, vocabulary growth, and learner engagement among young readers.

Teachers also perceived pupils' decoding skills to be at a very high level. This indicates that pupils are generally able to recognize letter-sound relationships, pronounce unfamiliar words, and read aloud with fluency. Since decoding is a foundational reading skill, this result suggests that pupils possess essential literacy competencies that support comprehension. This finding supports Ehri (2005), who emphasized the importance of systematic phonics instruction in decoding development, and Ehri et al. (2001), who found that early phonics instruction improves word recognition and reading fluency among beginning readers.

Similarly, teachers perceived pupils' vocabulary knowledge to be at a very high level, although some indicators were slightly lower than those for decoding skills. This suggests that pupils are generally capable of understanding and applying word meanings but may still require reinforcement in confidently using newly learned vocabulary. This finding aligns with Neuman and Kaefer (2013), who highlighted the role of rich language exposure in supporting vocabulary growth and comprehension development among young learners. This finding is consistent with Beck, McKeown, and Kucan (2013), who emphasized that explicit and meaningful vocabulary instruction improves learners' word understanding and language use. Moreover, although teachers rated pupils' vocabulary knowledge highly, the relatively lower confidence in vocabulary use suggests that additional instructional support may still be necessary in this area.

Most importantly, the study found a very strong positive relationship between the implementation of interactive reading tools and pupils' comprehension skills. This suggests that classrooms with higher implementation of interactive reading tools also tended to demonstrate higher levels of decoding skills and vocabulary knowledge. Considering the strong correlation between interactive reading technologies and comprehension skills, it may be inferred that increased use of such technologies supports improved literacy development, consistent with previous research findings. This result is consistent with Chuang





and Jamiat (2023), who reported that interactive reading applications enhanced vocabulary acquisition and reading comprehension among young learners. Likewise, Alrawashdeh et al. (2024) reported that technology-supported and adaptive reading platforms enhanced reading comprehension by providing individualized support and immediate feedback tailored to learners' needs.

Overall, the findings suggest that interactive reading tools may serve as valuable instructional supports in early childhood education. Their high level of implementation and strong association with pupils' comprehension skills indicate their potential to support decoding and vocabulary development. However, since the study employed a correlational research design, the findings should be interpreted as evidence of association rather than direct causation.

Knowledge Contribution

This study contributes to early childhood literacy education by providing empirical, pedagogical, and contextual evidence on the implementation of interactive reading tools and their relationship with pupils' comprehension skills. The findings revealed that interactive reading tools were implemented at a very high level in terms of multisensory engagement, adaptive learning, and narrative interactivity, and these dimensions were significantly associated with pupils' decoding skills and vocabulary knowledge. Unlike many previous studies that generally discuss digital literacy tools, this study examined specific implementation dimensions within a localized public-school setting.

The study also contributes to educational practice by demonstrating that the instructional value of interactive reading tools depends on their purposeful classroom implementation. The findings suggest that literacy instruction becomes more meaningful when reading tools provide multisensory support, learner-responsive activities, and interactive storytelling experiences. These features may help strengthen decoding skills and vocabulary development among young learners.

In terms of contextual contribution, the study provides localized evidence from selected public elementary schools in Tubod, Lanao del Norte. Since many related studies were conducted in international or technologically advanced settings, this study offers practical evidence that interactive reading tools may also support literacy development in Philippine public-school contexts.

Furthermore, the study proposes an instructional contribution model that connects the implementation of interactive reading tools with pupils' comprehension skills and instructional implications. The model highlights how multisensory engagement, adaptive learning, and narrative interactivity may support decoding and vocabulary development when integrated appropriately into literacy instruction. Its value lies in providing teachers and schools with a practical framework for the effective use of digital reading tools in early childhood classrooms.

Despite these contributions, the study has certain limitations. The research used a descriptive-correlational design; therefore, the findings indicate association rather than direct causation. The study was also limited to selected public elementary schools, which may affect the generalizability of the findings to other educational settings. Future studies may employ experimental or longitudinal designs to further examine the effectiveness of interactive reading tools on literacy development.

Overall, the originality of this study lies in its examination of specific dimensions of interactive reading tools within a localized early childhood education context and in the development of an instructional contribution model grounded in empirical classroom data.



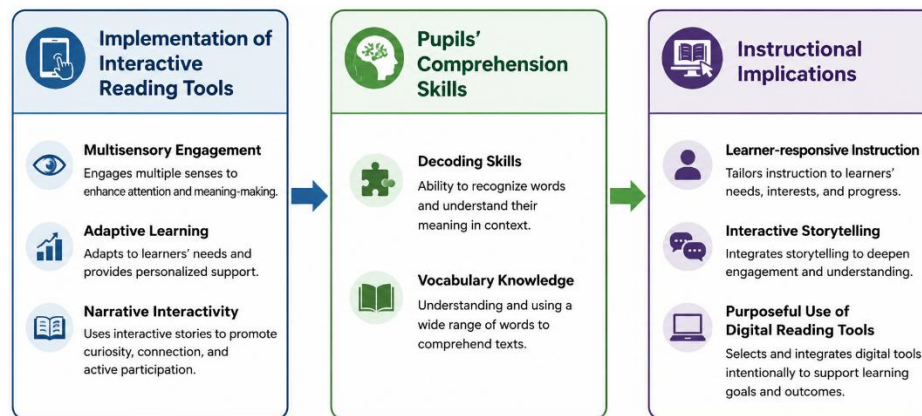


Figure 1: Model derived from the findings of the study

Figure 2 presents the instructional contribution model derived from the findings of the study. The model shows that multisensory engagement, adaptive learning, and narrative interactivity are key dimensions of interactive reading tools associated with pupils' decoding skills and vocabulary knowledge. The findings further suggest that the purposeful and learner-responsive use of digital reading tools may support effective early literacy instruction.

Conclusion

This study examined the implementation of interactive reading tools and their relationship with pupils' comprehension skills in selected public elementary schools in Tubod, Lanao del Norte. The findings showed that interactive reading tools characterized by multisensory engagement, adaptive learning, and narrative interactivity were widely implemented in early childhood classrooms and were positively associated with pupils' decoding skills and vocabulary knowledge.

The study contributes to the understanding of technology-supported literacy instruction by identifying specific dimensions of interactive reading tools that are linked with early literacy-related skills in a localized public-school context. Rather than simply describing the general use of technology in education, the study highlights how interactive and learner-responsive reading practices may support literacy instruction in early childhood education.

However, the findings should be interpreted within the limitations of the study. Since the research employed a descriptive-correlational design and relied primarily on teacher perceptions, the results indicate association rather than direct causation. In addition, the study focused only on selected public elementary schools, which may limit the generalizability of the findings to other educational settings.

Overall, the study provides empirical and contextual evidence that interactive reading tools may serve as meaningful instructional supports when used purposefully and developmentally appropriately in early literacy instruction.

Recommendation

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

1. Enhance teacher capability in interactive literacy instruction.

Professional development programs may focus on the effective classroom use of multisensory, adaptive, and interactive reading strategies to support pupils' literacy development.

2. Develop learner-responsive digital reading practices.

Teachers and schools may design literacy activities that encourage active participation, guided storytelling, and vocabulary enrichment using age-appropriate interactive reading tools.

3. Strengthen access to appropriate instructional resources.

School administrators may support the availability of digital reading materials and basic technological resources that are aligned with early childhood literacy objectives.



4. Conduct broader and methodologically diverse studies.

Future researchers may use larger samples, multiple school settings, observational methods, or experimental designs to further examine the instructional value of interactive reading tools and their relationship with other literacy outcomes.

5. Explore additional dimensions of early literacy development.

Future studies may investigate other variables such as reading comprehension, oral language development, learner motivation, and classroom engagement to provide a more comprehensive understanding of technology-supported literacy instruction.

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