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# Effect of Technology-Assisted Storytelling for the Phonemic Awareness Among Grade 1 Learners at Musuan Integrated School

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**Abstract: Phonemic awareness is a key foundation of early reading, influencing decoding, word recognition, and overall literacy development. This study examined the effect of technology-assisted storytelling on the phonemic awareness of Grade 1 learners at Musuan Integrated School using a quantitative quasi-experimental pre-test and post-test design involving 20 pupils divided into experimental and control groups. Data were gathered through an adapted Phonemic Awareness Baseline Assessment that measured rhyme recognition, syllable segmentation, and phoneme identification. The findings revealed that learners exposed to technology-assisted storytelling showed significantly greater improvement in phonemic awareness, particularly in rhyme recognition, phoneme identification, and blending, compared to those who experienced traditional storytelling, with results supported by paired and independent samples t-tests. The study concludes that technology-assisted storytelling is an effective instructional approach that enhances engagement, supports multisensory learning, and strengthens phonemic skills, and it recommends integrating digital storytelling tools alongside traditional methods to create more engaging and developmentally appropriate early literacy instruction.**

***Keywords:*** *Phonemic Awareness, Technology-Assisted Storytelling, Early Literacy, Digital Learning.*

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## I. INTRODUCTION

➢ *Background of the Study*

Phonemic awareness is the precise ability to hear, identify, and manipulate individual phonemes, which are the smallest units of sound within spoken words, and it stood as a foundational pillar of reading proficiency for young children. As Lonigan and Burgess (2023) articulated, phonemic awareness was not merely a precursor but a powerful predictor of decoding, word recognition, and overall literacy success, distinguishing proficient readers from those at risk of long-term reading difficulties. This study targeted key phonemic components such as rhyme recognition, syllable segmentation, and phoneme identification, which were essential for emergent readers. Unlike broader phonological awareness, which encompassed larger sound units, phonemic awareness specifically focused on segmentation, blending, and substitution. These skills were critical for mapping sounds to print (Lonigan & Burgess, 2023). Research consistently showed that children entering formal reading instruction with strong phonemic skills outperformed their peers; however, many lacked this foundation due to developmental variability and limited exposure.

Conventional approaches to phonemic instruction often relied on teacher-led oral drills and faced inherent limitations in scalability and engagement. Sá et al. (2021) conducted a randomized controlled trial comparing digital and traditional oral methods among Portuguese preschoolers and found that non-technology-based instruction yielded only modest phonemic gains (d = 0.35). These results were influenced by children's short attention spans and inconsistent feedback. Similar patterns emerged globally. In diverse linguistic contexts, rote phonemic exercises struggled to provide the repetition and individualization needed for mastery, particularly for at-risk learners.

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Technology revolutionized phonemic instruction by delivering interactive and multisensory experiences that were not possible through traditional methods. Pioneering work by Olson and Wise (1992) demonstrated that computer-assisted reading with orthographic and speech feedback significantly improved phonemic decoding in struggling readers. Building on this, Altındağ Kumaş (2025) reported large effects (d = 0.72) from a digital phonemic awareness program for Turkish children aged 5 to 7, which outperformed control groups in blending and segmentation tasks. Multimedia tools such as animated talking books further promoted phonemic awareness by embedding sounds within dynamic visuals. These tools enabled children to isolate and replay phonemes independently (Chera & Wood, 2002; Chera, 2003).

A standout innovation within educational technology was technology-assisted storytelling, which fused captivating narratives with targeted phonemic practice in rhyme recognition, syllable segmentation, and phoneme identification. Interactive e-books, for example, enhanced phonemic awareness and word reading by highlighting individual phonemes during story playback, thereby fostering automaticity through contextual repetition (Korat et al., 2013). Hofmann (2021) analyzed the impact of literacy applications across international kindergarten to Grade 2 samples and found significant gains in phoneme awareness from storytelling features such as phoneme-dragging activities embedded in narratives. These platforms aligned with Mayer's (2021) multimedia learning principles by reducing cognitive load through segmented audiovisual phonemic cues. They also reflected Paivio's (1986) dual-coding theory, in which visual elements in stories reinforced auditory phoneme processing.

Vygotsky's (1978) sociocultural framework further explained why technology-assisted storytelling was effective. Digital scaffolds operated within each child's zone of proximal development and provided adaptive prompts during phonemic challenges within the narrative context. Empirical evidence showed consistent support, as digital storytelling approaches surpassed traditional methods (Sá et al., 2021), and applications produced sustained improvements in phonemic awareness (Hofmann, 2021). However, as educational technology continued to evolve, the field required deeper examination of the mechanisms underlying storytelling-based instruction.

While digital phonemic interventions demonstrated strong potential, fragmented evidence left key questions unanswered regarding how technology-assisted storytelling uniquely influenced phonemic awareness, particularly in rhyme recognition, syllable segmentation, and phoneme identification among emergent readers. Much of the existing research aggregated literacy outcomes and overlooked the motivational advantages of storytelling, as well as the need for direct comparisons with traditional instructional approaches. This study addressed these gaps by determining the impact of technology-assisted storytelling compared with traditional methods, while also providing recommendations for educators on effective digital integration to strengthen foundational reading skills in 21st-century classrooms.

➢ *Statement of the Problem*

This research study determined the significant difference of technology-assisted storytelling on the phonemic awareness of Grade 1 pupils at Musuan Integrated School.

Specifically, the study aimed to answer the following questions:

- What is the level of phonemic awareness among grade 1 pupils before and after the use of technology-assisted storytelling?
- What specific phonemic awareness skills (e.g., rhyme recognition, syllable segmentation, phoneme identification) are most improved using technology-assisted storytelling?
- Is there a significant difference on the use of technology-assisted storytelling?

➢ *Objectives of the Study*

This study determined the significant difference of technology-assisted storytelling on the phonemic awareness of Grade 1 pupils at Musuan Integrated School.

Specifically, this study aimed to achieve the following objectives:

- Determine the level of phonemic awareness of Grade 1 pupils before and after exposure to technology-assisted storytelling.
- Identify which phonemic awareness skills (e.g., rhyme recognition, syllable segmentation, phoneme identification) show significant improvement after the intervention.
- Examine the significant difference on the use of technology-assisted storytelling.

➢ *Hypothesis of the Study*

Based on the problem identified in the study, the following hypotheses were formulated and tested:

- *Null Hypotheses*

✓ There is no significant difference on the use of technology-assisted storytelling.

- *Alternative Hypotheses*

✓ There is a significant difference on the use of technology-assisted storytelling.

➢ *Significance of the Study*

This study was guided by Mayer's (2021) Cognitive Theory of Multimedia Learning and Vygotsky's (1978) Zone of Proximal Development (ZPD), which explain how technology-assisted storytelling enhances phonemic awareness among Grade 1 learners.

Mayer (2021) posits dual-channel processing (auditory phonemes + visual story animations) reduces cognitive load, enabling deeper phonemic mastery (Chera & Wood, 2002).

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Vygotsky (1978) explains digital interactivity as ZPD scaffolds, bridging learners from assisted to independent phonemic performance (Sá et al., 2021).

This study on the use of technology-assisted storytelling in strengthening phonemic awareness among Grade 1 learners at Musuan Integrated School holds significant value for various stakeholders in Early Childhood Education.

Learners. The integration of technology-assisted storytelling positively supports young learners by making literacy instruction more engaging, interactive, and enjoyable. Through multimedia stories, children develop targeted phonemic skills—rhyme recognition, syllable segmentation, and phoneme identification—in a fun environment, boosting confidence, motivation, and interest in language exploration.

Teachers. The study provides valuable insights into innovative, developmentally appropriate literacy approaches. By demonstrating how digital storytelling enhances phonemic awareness, teachers gain strategies to design lessons for diverse learning styles, blending traditional practices with digital tools.

Curriculum Developers. Results inform early literacy program design, enabling materials that integrate technology-assisted storytelling while balancing traditional methods to optimize phonemic skill development.

School Administrators. Findings support informed decisions on technology integration, guiding Musuan Integrated School policies for purposeful digital tool use to improve literacy outcomes.

Parents. Heightens awareness of interactive digital storybooks' value, encouraging home use to reinforce children's phonemic skills beyond the classroom.

Future Researchers. Contributes to digital learning literature, serving as a reference for exploring technology-driven interventions in reading readiness.

In summary, this study demonstrated how technology-assisted storytelling serves as an effective tool in enhancing phonemic awareness, a key foundation for reading success. Findings hold potential to influence teaching practices, curriculum development, and policy-making, yielding long-term literacy benefits for young children.

This study examined the effect of technology-assisted storytelling on the phonemic awareness of Grade 1 learners at Musuan Integrated School during the School Year 2025–2026. It focused on selected phonemic skills, including rhyme production, onset fluency, blending phonemes, isolating final sounds, segmenting words into phonemes, isolating medial sounds, adding initial phonemes, deleting initial phonemes, and substituting initial phonemes, using a quantitative quasi-experimental pre-test and post-test design.

The participants consisted of 20 Grade 1 learners, divided into an experimental group (technology-assisted storytelling) and a control group (traditional storytelling). Data were gathered using Heggerty's Phonemic awareness baseline assessment for 1st grade and analyzed through statistical methods.

The study was limited to one school, a small sample size, and a short intervention period. It also focused only on specific phonemic skills and did not cover other literacy areas such as comprehension and fluency. External factors like prior knowledge and home environment were not controlled.

➢ *Definition of Terms*

The following terms were defined operationally for this study:

Digital Storybook refers to an interactive electronic story that includes text, sound effects, animations, and narration. In this study, digital storybooks are used as instructional tools to enhance the learners' engagement and phonological awareness.

Emergent Readers refers to young children who are in the beginning stages of learning to read. In this study, they are the Grade 1 learners of Musuan Integrated School who are developing basic literacy skills, including sound recognition and awareness of print.

Phonological Awareness refers to the ability of learners to recognize and manipulate the sounds of spoken language. In this study, it focuses on how learners identify, blend, and segment sounds within words to improve their reading readiness.

Phonological Level refers to the measurable stage of learners' understanding of sound patterns in spoken language. In this study, it represents the degree to which learners demonstrate awareness of rhymes, syllables, and phonemes after participating in technology-assisted storytelling sessions.

Technology Assisted Storytelling refers to the use of digital tools such as electronic books, multimedia story applications, and digital read-alouds that combine sounds, visuals, and narration to deliver stories. In this study, it involves using interactive and animated story materials to develop the phonological awareness of Grade 1 learners.

Traditional Storytelling refers to the use of printed storybooks and oral narration without the aid of digital or multimedia elements. In this study, it serves as the comparison approach to evaluate the effectiveness of technology-assisted storytelling.

## II. LITERATURE REVIEW

➢ *Technology-Assisted Storytelling (TAS)*

Technology-Assisted Storytelling (TAS) refers to the use of digital or multimedia tools—such as interactive e-books, animated story applications, audio-narrated stories, tablets, and literacy platforms—to deliver narrative experiences that promote early literacy development. Erickson and Koppenhaver (2020) explain that TAS supports

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multisensory learning by integrating audio, visuals, text highlighting, sound repetition, and interactive elements that enhance children's engagement and cognitive processing. For emergent readers, this multisensory design is crucial because phonemic awareness is strengthened when children repeatedly hear, manipulate, and respond to sounds in meaningful narrative contexts.

Voyager Sopris Learning (2024) demonstrates the educational benefits of digital storytelling platforms that provide phoneme-level feedback, segmented audio tracks, and scaffolded exercises. These tools support early reading skills by allowing learners to listen to repeated story segments, identify target sounds, and receive immediate corrective input. TAS environments, therefore, provide a consistent and individualized learning experience—one that is often challenging to replicate in traditional classroom settings with large teacher-student ratios.

Liu et al. (2024) further emphasize the role of repeated and scaffolded exposure to phonemes within meaningful storytelling contexts. According to their research, children are more likely to acquire and retain phonemic skills when sounds are embedded in coherent narratives rather than isolated drill activities. Narratives provide semantic support, enabling children to connect sounds to meaning and plot events, which enhances both memory and sound discrimination. Collectively, these studies confirm that TAS offers a unique pedagogical advantage: it merges the natural appeal of storytelling with structured literacy support that is adaptive, interactive, and visually enriched. Such features make TAS especially promising for developing foundational literacy skills among emergent readers, including those who require additional scaffolding.

- *Technology in Early Literacy Development*

The integration of technology in early literacy instruction has gained considerable attention over the past decade. Numerous studies highlight how digital tools can strengthen essential pre-reading skills such as phonemic awareness, vocabulary, and reading comprehension. Hofmann (2021) found that animated e-books significantly improved phoneme recognition and blending skills among kindergarten learners due to synchronized text highlighting, embedded audio cues, and replay functions. These multimedia-supported features provide children with repeated exposure to phonemic structures such as onset–rime patterns, syllable segmentation, and rhyming.

Chera (2003) similarly noted that digital reading applications incorporating game-like elements enhance children's accuracy in phoneme isolation and segmentation. The immediacy of feedback—where a child can touch an image, hear its name, and identify its beginning sound—creates a learning cycle that accelerates phonemic mastery compared to traditional printed materials. Neuman and Danielson (2020) warn that digital environments with too many pop-ups, mini-games, or unrelated sound effects can reduce children's focus and impede their ability to attend to phonemic tasks. The effectiveness of TAS therefore depends on design quality and pedagogical alignment.

In the Philippine context, Reyes and Centeno (2022) found that the use of tablet-based storybooks in public schools improved letter-sound correspondence and increased children's motivation to read independently. Their findings highlight the potential of digital storytelling tools to bridge literacy gaps, particularly in resource-limited classrooms where individualized attention is difficult to sustain.

Despite insufficient localized studies, existing Filipino research supports the integration of technology as a complementary tool rather than a replacement for traditional instruction. The Department of Education's MATATAG Curriculum also emphasizes the integration of developmentally appropriate technologies to strengthen foundational skills such as phonemic awareness—a goal directly aligned with TAS interventions.

- *Phonemic Awareness and Early Reading Development*

Phonemic awareness is a metalinguistic skill involving the ability to recognize and manipulate the sound structures of language, including rhyming, blending, segmenting, and identifying initial and final sounds. It is one of the strongest predictors of later reading success, regardless of language or orthographic system (Maureen et al., 2021).

Sá et al. (2021) highlight that, children with strong phonemic awareness are more capable of mapping sounds to print (phonics), identifying patterns in words, and decoding unfamiliar terms. These researchers argue that phonemic awareness should be systematically developed in early education, especially in languages with transparent orthographies like Filipino, where consistent sound–letter correspondences support decoding.

Technology plays a significant role in this stage of literacy development. Digital storytelling tools, literacy apps, and interactive reading games provide repeated exposure to phonemes with visual and auditory reinforcement. Hofmann (2021) notes that children benefit from animated characters that model correct pronunciation, sound blending, and segmenting. Because phonemic awareness develops gradually, repeated presentation of target sounds—combined with story context—helps children internalize sound structures more rapidly.

Moreover, phonemic awareness is foundational not only for reading but also for spelling, fluency, and comprehension. According to National Reading Panel findings (2021), children who master phonemic skills early are more likely to become successful readers by Grade 3. This reinforces the need for research exploring how TAS can support Filipino learners during their critical literacy development period.

- *Comparing Technology-Assisted Storytelling and Traditional Storytelling*

Across multiple studies, both traditional and technology-assisted storytelling have been shown to benefit emergent readers. Traditional read-aloud sessions promote imagination, facilitate oral language development, and strengthen interpersonal connections between teachers and learners. However, research consistently indicates that TAS

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yields stronger measurable outcomes in phonemic development.

Altındağ Kumaş (2025) reports that children exposed to TAS demonstrated significantly higher gains in sound recognition, rhyme identification, and blending skills compared to those in traditional storytelling groups. The enhanced effectiveness of TAS stems from its multisensory reinforcement: learners hear the story, see visual cues, interact with on-screen elements, and receive feedback.

Similarly, Hofmann (2021) observed that children using digital storybooks retained phonemic skills longer and demonstrated higher engagement. The novelty and interactivity of digital media increase children's motivation, which in turn enhances retention and sustained attention.

Interactive features such as the following contribute to the superiority of TAS:

- Audio Narration that model phoneme articulation.
- Text highlighting that guides eye movement and reinforces sound-letter mapping.
- Built-in sound repetition functions.
- Touch-responsive activities such as tapping words to hear individual sounds.
- Visual animations that enhance meaning and vocabulary understanding.

While traditional storytelling plays an essential role in developing oral language and comprehension, TAS offers individualized learning pathways. It allows learners to pause, replay, or slow down audio segments based on their needs—adjustments not always possible during teacher-led story read-aloud.

Still, the literature emphasizes that technology should supplement, not replace, traditional storytelling. The most effective approach combines both modalities, with teachers facilitating digital story experiences, guiding discussions, and reinforcing phonemic concepts.

➢ *The Role of Quasi-Experimental Designs in Literacy Research*

Several scholars highlight the value of quasi-experimental designs in classroom-based research involving literacy interventions. Chuang and Jamiat (2023) explain that quasi-experimental designs are suitable for evaluating educational innovations where random assignment is impractical or unethical, particularly in public school settings. These designs maintain methodological rigor while allowing researchers to implement interventions in naturally occurring classroom environments.

Allen-Presley (2025) adds that quasi-experimental studies produce actionable findings beneficial for curriculum planners and teachers. Because interventions are tested in real classrooms rather than laboratory settings, findings are more readily transferable to actual educational practice.

Given that TAS interventions require comparisons between a treatment group (exposed to digital storytelling) and a control group (using traditional methods), a quasi-experimental design ensures that differences in outcomes can be attributed to the intervention. This design is aligned with the goals of the present study, which seeks to measure the effectiveness of TAS in enhancing phonemic awareness among Grade 1 learners.

➢ *Multisensory Learning and Technology-Supported Literacy*

Researchers agree that multisensory instruction strengthens phonemic awareness by engaging auditory, visual, tactile, and kinesthetic modalities. Digital storytelling naturally integrates these elements, making it a powerful tool for emergent readers.

According to Erickson and Koppenhaver (2020), multisensory learning environments support deeper cognitive processing, enhance memory retention, increase engagement, allow differentiated instruction, and promote active participation. Digital platforms also provide opportunities for repetition without boredom, which is essential for phonemic mastery. For instance, a child can listen to a story segment multiple times, tap images to hear sounds, or replay rhyming segments.

Studies also emphasized that children with learning difficulties benefit substantially from TAS. Liu et al. (2024) noted that digital stories allow struggling learners to slow down the narrative, isolate phonemes, and access multimodal cues that traditional instruction does not provide. These features illustrate why TAS interventions are promising in diverse and inclusive classroom settings, including public schools in the Philippines where class sizes may inhibit individualized phonemic support.

➢ *Theoretical Framework*

This study was anchored on three major learning theories: Mayer's (2021) Cognitive Theory of Multimedia Learning, Paivio's (1986) Dual Coding Theory, and Vygotsky's (1978) Social Development Theory. Together, these theories provide a strong foundation for understanding how technology-assisted storytelling enhances the phonemic awareness of emergent readers by integrating visual, auditory, and social learning processes.

The Cognitive Theory of Multimedia Learning, proposed by Richard E. Mayer (2021), posits that learners process information more effectively when it is presented through both verbal and visual channels. According to Mayer, the human mind has two distinct processing systems: an auditory/verbal channel and a visual/pictorial channel. Learning becomes more efficient when both channels are used in coordinated ways. Technology-assisted storytelling embodies this principle by combining narration, text, imagery, animation, and sound effects, allowing children to hear, see, and interact with story content simultaneously. For emergent readers, features such as text highlighting, voice narration, character animations, and sound cues help

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strengthen the connection between printed words and their corresponding sounds.

This multimodal input supports key phonemic skills—such as rhyme awareness, syllable segmentation, and phoneme identification—because children are exposed to clear models of pronunciation and rhythmic patterns. When digital stories present sounds and visuals in an organized manner, emergent readers are more likely to process language deeply and accurately, leading to stronger phonemic awareness.

The principles of multimedia learning are complemented by Paivio's (1986) Dual Coding Theory, which argues that individuals learn more effectively when information is encoded through two representational systems: the verbal system (words, narration, spoken language) and the nonverbal system (images, animations, visual symbols). Paivio suggests that when information is presented in both verbal and visual formats, learners create dual mental representations, making recall and comprehension easier. In technology-assisted storytelling, emergent readers encounter words through spoken narration and visual illustrations, which work together to reinforce meaning. For instance, when a digital story presents the word cat along with an animated picture of a cat and the corresponding /k/ /a/ /t/ sounds, children encode the information through both auditory and visual pathways. This dual coding process strengthens memory formation and supports phonemic processes such as sound–symbol correspondence, phoneme blending, and syllable recognition. By simultaneously activating the verbal and visual systems, digital stories help children internalize language patterns more thoroughly, building a strong foundation for decoding and early reading.

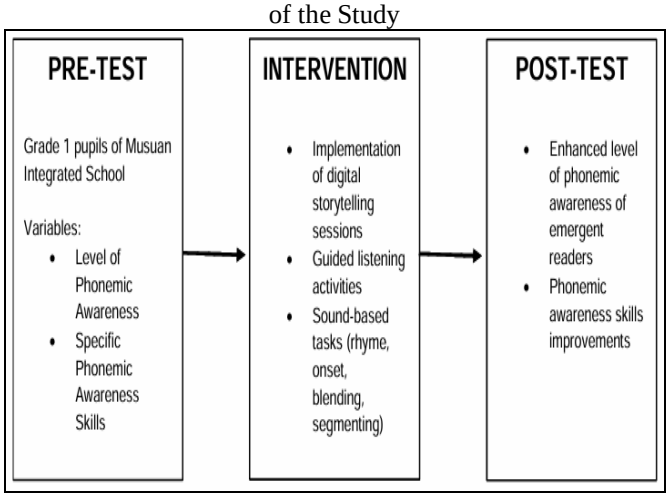
While Mayer and Paivio emphasize cognitive processing, Vygotsky's (1978) Social Development Theory highlights the social dimension of learning. Vygotsky asserts that children construct knowledge through interaction with more knowledgeable others—teachers, parents, or peers—within the Zone of Proximal Development (ZPD). Learning occurs when children receive guidance, modeling, and scaffolding during tasks they cannot yet perform independently. Technology-assisted storytelling naturally aligns with Vygotsky's theory because digital story sessions often involve shared reading, guided listening, and interactive discussions. For example, teachers may pause a digital story to ask questions, encourage children to repeat words, identify initial sounds, or predict rhymes. Parents may support children by helping them navigate story apps, echoing lines from the narration, or modeling correct pronunciation. These interactions allow learners to participate in phonemic activities that might otherwise be difficult without support. Through scaffolding, children gradually internalize phonemic skills, transitioning from assisted performance to independent mastery. In addition, the collaborative nature of digital storytelling promotes engagement, motivation, and emotional connection—all of which are essential for early literacy development.

Integrating these three theories provides a comprehensive framework for understanding how technology-assisted storytelling enhances phonemic awareness. The Cognitive Theory of Multimedia Learning explains the importance of presenting information through coordinated auditory and visual channels. Dual Coding Theory highlights how dual representations strengthen memory and comprehension. Social Development Theory emphasizes the role of guided interaction and scaffolding in helping children internalize phonemic concepts. Together, these theories show that technology-assisted storytelling is not merely a form of entertainment but a powerful instructional approach that engages multiple senses, activates multiple cognitive pathways, and fosters meaningful social interaction.

In the context of emergent readers, these theoretical foundations demonstrate how digital storybooks—with their rich multimedia features, interactive elements, and opportunities for guided engagement—support the development of phonemic skills essential for reading readiness. Technology-assisted storytelling, when purposefully implemented, creates a learning environment where children can explore sounds, words, and language patterns through multimodal input, memory-enhancing visual–verbal coding, and supportive social guidance. By grounding this study in Mayer's, Paivio's, and Vygotsky's theories, it becomes clear that digital storytelling can serve as an effective and developmentally appropriate tool for strengthening phonemic awareness among emergent readers.

- *Conceptual Framework*

Table 1 Conceptual Framework Showing the Relationship Between the Input, Process, and Output Variables of the Study




This conceptual framework systematically delineates the inputs, processes, and outputs to investigate emergent readers' phonemic awareness development via technology-assisted storytelling, aligning precisely with the study's objectives. Inputs encompass evidence-based digital resources—such as interactive audiobooks, storytelling applications, and multimedia videos—strategically infused with phonemic constructs (e.g., rhymes, alliteration, repetitive patterns) to optimize instructional efficacy. The

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process phase operationalizes targeted interventions through structured digital storytelling sessions, guided auditory discrimination activities, and scaffolded phonemic tasks emphasizing rhyme detection, onset-rime segmentation, blending, and phoneme isolation, thereby facilitating multisensory, interactive engagement. Outputs manifest as measurable gains in phonemic proficiency, evaluated via pre- and post-intervention assessments to ascertain statistical significance, enabling rigorous analysis of technology's impact on foundational literacy competencies in early childhood education.

## III. METHODOLOGY

➢ *Research Design*

This study employed a quantitative classroom-based action research design that aims to improve actual teaching practices by implementing an intervention and examining its effectiveness through measurable data. In this approach, the researcher identified a classroom problem, introduced an intervention, and evaluated whether it resulted in improvement.

To determine the effectiveness of the intervention, the study used a quasi-experimental design following a pre-test, post-test format. Before the intervention was implemented, both groups of learners took the same pre-test to measure their initial phonemic awareness level. After the intervention, they completed a post-test that measured any changes in their performance.

The intervention under investigation was technology-assisted storytelling, which made use of digital tools such as videos, interactive story apps, or audio-visual story presentations to support reading development. By comparing the pre-test and post-test scores of both groups, the study sought to determine whether technology assisted storytelling led to greater improvement in the phonemic awareness of emergent readers compared to traditional methods. This design allowed the researcher to gather measurable data, observe changes over time, and draw conclusions regarding the effectiveness of the instructional approach.

➢ *Locale of the Study*

The study was conducted at Musuan Integrated School, located in Maramag, Bukidnon. The school caters to kindergarten to secondary levels and provides a conducive environment for implementing technology-based instruction. The Grade 1 classrooms are equipped with basic multimedia facilities, such as a television or tablet, which can support digital storytelling activities.

➢ *Sampling Procedure*

The study followed the action research cycle, consisting of four phases. Phase 1. Planning: Identify the problem, prepare materials (digital stories), develop pre-test and post-test tools, and secure necessary approvals. Phase 2. Acting: Conduct pre-test, implement storytelling sessions (technology-assisted and traditional), focusing on specific phonemic skills. Phase 3. Observing: Conduct post-test, record observations, and collect numerical data. Phase 4. Reflecting: Analyze results, interpret findings, and provide recommendations.

➢ *Respondents of the Study*

The participants of the study were Grade 1 pupils enrolled in Musuan Integrated School during the current school year. The selection was use purposive sampling, as the participants are chosen based on their being emergent readers at the early literacy stage. The total number of participants was approximately 20 pupils, divided into two equal groups: Experimental Group (pupils exposed to technology-assisted storytelling using animated multimedia storybooks) and Control Group (pupils exposed to traditional storytelling using printed storybooks read aloud by the teacher). Parental consent and school permission was sought prior to the conduct of the study to ensure ethical compliance.

➢ *Research Instrument*

In measuring phonemic level of the participants, Phonemic Awareness Baseline assessment for 1st Grade, developed by Michael Heggerty (2020) was used. The tool was simplified and contextualized for grade 1 learners, assessing the following sub-skills: Rhyme production, onset fluency, blending phonemes, isolating final sounds, segmenting words into phonemes, isolating medial sounds, adding initial phoneme, deleting initial phoneme, substituting initial phoneme. The research instrument comprises 45 items, 5 items for each sub-skill. The test was administered before and after the intervention. To avoid familiarity, the researchers have made an adapted version of the assessment serving as a posttest that was validated by an expert to ensure reliability. The scores were recorded numerically for quantitative analysis.

➢ *Data Gathering Procedure*

In this study, the researchers showed the process of collecting the data, which consist the following steps:

Before implementation, permission letters were sent to the school principal and consent letters for teachers. Upon approval, a pre-test was administered to both experimental and controlled groups. The researchers then conducted the intervention through storytelling sessions using digital storybooks for the experimental group, while the control group went with their normal routine in class, in which they do traditional storytelling in the form of printed materials or delivered by their teacher. After 20 days of intervention, a post-test was given to both groups to assess their learning gains.

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Table 2 Scoring Range in Assessing Phonemic Awareness Level of Grade1 Learners

| Range | Description | Descriptive Interpretation |
|---|---|---|
| 0-1 correct | Phonemic Awareness Skill: *Rhyme Production, Onset Fluency, Blending Phonemes, Isolating Final Sounds, Segmenting Words into Phonemes, Isolating Medial Sounds, Adding Initial Phonemes, Deleting Initial Phonemes, Substituting Initial Phonemes* | Beginning |
| 2-3 correct | Phonemic Awareness Skill: *Rhyme Production, Onset Fluency, Blending Phonemes, Isolating Final Sounds, Segmenting Words into Phonemes, Isolating Medial Sounds, Adding Initial Phonemes, Deleting Initial Phonemes, Substituting Initial Phonemes* | Developing |
| 4-5 correct | Phonemic Awareness Skill: *Rhyme Production, Onset Fluency, Blending Phonemes, Isolating Final Sounds, Segmenting Words into Phonemes, Isolating Medial Sounds, Adding Initial Phonemes, Deleting Initial Phonemes, Substituting Initial Phonemes* | Proficient |

➢ *Statistical Techniques*

The quantitative data collected from the pre-test and post-test were analyzed using descriptive and inferential statistics: Descriptive analysis (to determine the level of phonemic awareness of Grade 1 learners before the exposure of technology-assisted storytelling), Paired Sample-test (to identify which of the 9 phonemic awareness skills shows significant improvement after the intervention, ranking them from most to least), and ANCOVA (to compare performance difference between the experimental and controlled group). All data were tabulated and interpreted to answer the research questions.

## IV. RESULTS AND DISCUSSION

Table 3 Pretest and Posttest Means of Grade 1 Learners Across 9 Phonemic Awareness Skills

| Phonemic Awareness Skills | EXPERIMENTAL GROUP | | CONTROLLED GROUP | |
|---|---|---|---|---|
| | Pretest Mean | Posttest Mean | Pretest Mean | Posttest Mean |
| Rhyme production | 1.30 | 2.60 | 2.4 | 2.6 |
| Onset fluency | 2.6 | 3.80 | 2.7 | 3.3 |
| Blending phonemes | 2.3 | 4.2 | 2.5 | 3.4 |
| Isolating final sound | 2.1 | 3.9 | 2.8 | 3.6 |
| Segmenting word into phoneme | 1.7 | 3.3 | 2.3 | 3.5 |
| Isolating medial sound | 2.2 | 3.5 | 2.1 | 2.8 |
| Adding initial phoneme | 2.4 | 4.1 | 2.3 | 3.5 |
| Deleting initial phoneme | 1.5 | 3.4 | 2.3 | 3.2 |
| Substituting initial phoneme | 1.9 | 3.5 | 2 | 2.9 |
| Total | 18.0 | 32.3 | 21.4 | 28.8 |

| Per-skill Mean Range: | | Total Phonemic Awareness Range: | |
|---|---|---|---|
| 0.0-1.99 | Beginning | 0.0-17.9 | Beginning |
| 2.00-3.49 | Developing | 18.0-31.4 | Developing |
| 3.50-5.00 | Proficient | 31.5-45.0 | Proficient |

The table presents the pre-intervention level of phonemic awareness among Grade 1 learners using descriptive data across several phonological subskills. These include rhyme production, onset fluency, blending phonemes, isolating final and medial sounds, segmenting words, and phoneme manipulation tasks such as adding, deleting, and substituting initial sounds. Phonemic awareness is a vital component of early reading development because it reflects learners' ability to recognize and manipulate sounds in spoken language. The data reveal the learners' initial phonemic awareness abilities prior to the implementation of any intervention.

The results show that the majority of participants were classified under the "Developing" level, while a smaller number fell under the "Beginning" level based on their total scores and score ranges. Learners at the beginning level demonstrated difficulty in manipulating phonemes, particularly in more complex tasks such as segmentation and substitution. Meanwhile, learners at the developing level showed partial mastery of basic phonological skills but remained inconsistent in advanced phonemic tasks. No learner reached the "Proficient" level, indicating that higher-order phonemic awareness skills were not yet fully developed. In terms of specific subskills, learners performed better in simpler activities such as rhyme production and onset fluency, while lower scores were observed in segmenting words and phoneme manipulation tasks involving deletion and substitution.

The findings imply that emergent readers possess basic awareness of sound structures but still struggle with complex phonemic processing skills. Their stronger performance in simpler tasks suggests that foundational phonological awareness is beginning to develop; however, the inability to consistently perform advanced phonemic manipulation tasks indicates that these skills are still at an early stage. The variation in learner performance also suggests individual differences in phonemic awareness development, meaning that not all learners acquire these skills at the same pace.

The findings of the study are supported by recent research emphasizing the importance of phonemic awareness in early literacy development. Heidi Anne E. Mesina et al. (2021) found that emergent readers tend to perform better in basic phonological tasks such as rhyming and identifying beginning sounds but experience difficulty in advanced phonemic manipulation tasks like segmentation and substitution, which is consistent with the present findings. Similarly, Louisa C. Moats (2022) explained that phonemic awareness develops gradually and requires explicit and systematic instruction for learners to master higher-order sound manipulation skills. In addition, Nell K. Duke and Kelly B. Cartwright (2023) emphasized that interventions focusing on blending, segmenting, and phoneme manipulation significantly improve emergent readers' literacy skills. These studies support the present findings, which indicate that learners are still at the developing stage of phonemic awareness and require targeted instructional support to strengthen their foundational reading skills.

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Table 4 Skill Improvement Ranking by Experimental Group's Posttest and Pretest Gains

| Phonemic Skills | Pretest Mean | Posttest Mean | Gain | Rank |
|---|---|---|---|---|
| Rhyme production | 1.30 | 2.60 | 1.30 | 5th |
| Onset fluency | 2.6 | 3.80 | 1.20 | 6th |
| Blending phonemes | 2.3 | 4.2 | 1.90 | 1st |
| Isolating final sound | 2.1 | 3.9 | 1.80 | 2nd |
| Segmenting word into phoneme | 1.7 | 3.3 | 1.60 | 4th |
| Isolating medial sound | 2.2 | 3.5 | 1.30 | 5th |
| Adding initial phoneme | 2.4 | 4.1 | 1.70 | 3rd |
| Deleting initial phoneme | 1.5 | 3.4 | 1.90 | 1st |
| Substituting initial phoneme | 1.9 | 3.5 | 1.60 | 4th |
| Per-skill Mean Range: | | | | |
| 0.0-1.99 Beginning | | | | |
| 2.00-3.49 Developing | | | | |
| 3.50-5.00 Proficient | | | | |

The table presents the mean gain scores in phonemic awareness skills among 10 Grade 1 emergent readers after exposure to technology-assisted storytelling delivered through school-provided tablets. The results show improvements across all measured phonemic awareness subskills, including rhyme production, onset fluency, blending phonemes, isolating final and medial sounds, segmenting words into phonemes, and phoneme manipulation tasks such as adding, deleting, and substituting initial phonemes. The highest mean gain scores were observed in blending phonemes and deleting initial phonemes (1.90), followed by isolating final sounds (1.80), adding initial phonemes (1.70), segmenting and substituting initial phonemes (1.60), rhyme production and isolating medial sounds (1.30), and onset fluency (1.20).

The findings indicate that technology-assisted storytelling significantly enhanced learners' phonemic awareness skills, particularly in advanced phoneme manipulation tasks. The highest gains in blending and deleting phonemes suggest that learners became more capable of combining and manipulating sounds, which are critical skills for decoding and reading development. The use of interactive storytelling through tablets, including animations, sounds, and guided narration, may have contributed to learners' engagement and active participation, making phonemic tasks easier to understand and practice. Moderate improvements in isolating sounds, segmentation, and substitution further show that the intervention effectively strengthened learners' ability to recognize and manipulate speech sounds. However, lower gains in onset fluency and rhyme production suggest that some phonological skills may require more repetitive and explicit practice beyond storytelling activities alone.

The results imply that technology-assisted storytelling is an effective instructional strategy for improving phonemic awareness among emergent readers. The substantial improvement in blending and deleting phonemes demonstrates that learners benefited from interactive and contextualized learning experiences provided by digital storytelling. These findings also suggest that integrating technology into literacy instruction can support the development of foundational reading skills in an engaging and accessible manner. However, the smaller gains in onset fluency indicate that some phonemic awareness skills develop more gradually and may require additional instructional approaches or interventions to achieve stronger mastery.

The findings are supported by the study of Susan B. Neuman and Tanya S. Wright (2021), who found that digital literacy activities enhance young learners' engagement and support the development of foundational reading skills, particularly phonological and phonemic awareness. Similarly, David A. Kilpatrick (2022) emphasized that explicit instruction in blending, segmenting, and phoneme manipulation is essential in strengthening early reading abilities among emergent readers. In addition, Timothy Rasinski and Nancy Padak (2023) explained that interactive and engaging literacy instruction improves phonological processing and reading fluency in beginning readers. These studies support the present findings that technology-assisted storytelling effectively enhances phonemic awareness skills among Grade 1 learners by providing meaningful, engaging, and interactive literacy experiences.

Table 5 Posttest Independent T-Test Result

| Group | Pretest Mean | Posttest Mean | Gain | p-value |
|---|---|---|---|---|
| Experimental | 18.00 | 32.3 | 14.3 | 0.02 |
| Controlled | 21.4 | 28.8 | 7.4 | |

The table presents the differences in phonemic awareness development between Grade 1 learners exposed to technology-assisted storytelling and those who experienced traditional storytelling methods. Both groups showed improvement from pre-test to post-test, indicating that storytelling—regardless of approach—supports phonemic awareness development. However, the magnitude of improvement differed between the two groups. The experimental group improved from a pre-test mean of 18.0 to a post-test mean of 32.3 (gain = 14.3), while the control group increased from 21.4 to 28.8 (gain = 7.4). This indicates a stronger overall performance for learners exposed to technology-assisted storytelling.

The results show that although both instructional methods contributed to learning gains, the experimental group demonstrated nearly double the improvement compared to the control group. This suggests that technology-assisted storytelling is more effective in enhancing phonemic awareness skills than traditional storytelling alone. The

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difference is especially evident in more complex phonemic tasks such as blending phonemes, isolating final sounds, segmenting words, and adding initial phonemes. These skills require active manipulation of sounds, and the experimental group's stronger performance suggests that multimedia features (audio cues, visuals, and interactivity) provided additional cognitive support. However, some skills such as rhyme production, onset fluency, isolating medial sounds, deleting, and substituting phonemes did not show significant differences between groups, indicating that these may develop more slowly or require more explicit instruction.

These findings imply that technology-assisted storytelling enhances both engagement and cognitive processing in phonemic awareness development. The interactive and multimodal nature of the intervention likely helped learners better understand and retain sound structures, particularly in higher-order phonemic tasks. While traditional storytelling remains effective in supporting basic phonological development, it appears less powerful in accelerating more complex phonemic skills. The results also suggest that not all phonemic skills respond equally to instructional methods, highlighting the need for differentiated teaching strategies depending on the skill level being targeted.

The findings are supported by the work of Susan B. Neuman and Tanya S. Wright (2021), who emphasized that digital and interactive literacy experiences enhance early reading development by increasing engagement and supporting phonological processing. Similarly, David A. Kilpatrick (2022) noted that explicit and multisensory phonemic awareness instruction strengthens learners' ability to manipulate sounds effectively, particularly in blending and segmenting tasks. In addition, Timothy Rasinski and Nancy Padak (2023) highlighted that engaging and repeated exposure to phonological tasks improves reading development more effectively when supported by interactive and meaningful instruction. These studies reinforce the present findings that technology-assisted storytelling is more effective than traditional storytelling in enhancing phonemic awareness among Grade 1 learners.

## V. CONCLUSION

Based on the study's findings, the following conclusions were formulated in relation to the identified research problems:

- The study revealed that Grade 1 learners exhibited developing phonemic awareness before the intervention, with some at the beginning stage and none proficient; they showed partial mastery of foundational skills and struggled with segmentation and manipulation, underscoring the need for structured instruction.
- Technology-assisted storytelling significantly improved phonemic awareness over traditional methods, yielding higher gains in blending, segmenting, and manipulating sounds, as multimedia elements boosted engagement and phonemic skill acquisition.
- Technology-assisted storytelling had a significant impact on phonemic awareness, outperforming traditional methods with greater and more consistent gains; however, subskills like rhyme production, onset fluency, and medial sound identification showed lower improvements, requiring complementary explicit instruction for comprehensive development.

## RECOMMENDATION

Based on the conclusions, the following practical recommendations are proposed to enhance parental involvement and address challenges in supporting children's early learning at home:

- Teachers are strongly encouraged to integrate technology-assisted storytelling into their regular literacy instruction, as it has been proven to significantly enhance phonemic awareness. However, this approach should be complemented with explicit phonemic instruction, particularly for subskills that showed lower improvement (e.g., rhyme production and onset fluency). Incorporating guided practice, repetition, and structured phonemic activities alongside digital storytelling will ensure a more balanced and comprehensive skill development.
- School administrators should support the implementation of technology-assisted instruction by providing adequate resources such as digital devices, appropriate software, and reliable technical infrastructure. Additionally, professional development programs should be conducted to equip teachers with the necessary skills to effectively integrate technology into literacy instruction. Sustained institutional support is essential for maximizing the impact of such innovations.
- Curriculum developers should design instructional materials that integrate technology-assisted storytelling with systematic phonemic awareness activities. Learning modules should ensure balanced development across all phonemic subskills, incorporating both multimedia elements and explicit skill-focused exercises. The inclusion of adaptive and differentiated activities is also recommended to address varying learner needs.

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