

Effect of Digital Storytelling on Listening Comprehension Among Pre-Service English Teachers

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Abstract. Listening comprehension is a cognitively demanding component of second language acquisition. Yet, it remains underdeveloped in many English as a foreign language classrooms that rely on text-based, teacher-centered instruction. Despite the increasing integration of multimedia in language teaching, there is limited rigorous empirical evidence on how digital storytelling specifically enhances learners' auditory processing and comprehension in tertiary contexts. This study examined the effect of digital storytelling on the listening comprehension performance of tertiary-level English majors. The study employed a quasi-experimental one-group pretest-posttest design with 30 second-year English majors. It utilized validated listening assessments administered before and after structured exposure to segmented digital storytelling materials integrating audio narration, visuals, and guided comprehension tasks. Data were analyzed using mean scores and a paired-samples t-test to determine statistical significance. Listening comprehension scores increased substantially from a pretest mean of 35.50 to a posttest mean of 51.00, reflecting a gain of 15.50 points and a statistically significant improvement. This trend indicates a strong positive effect of the intervention on learners' performance. These findings demonstrate that digital storytelling effectively enhances listening comprehension by integrating auditory and visual input that supports meaning-making processes and reduces cognitive load. The results support its application as an instructional strategy in language teaching. However, the lack of a comparison group and the small sample size limit generalizability and highlight the need for further validation in more diverse and controlled research settings.

Introduction

Listening comprehension is a foundational component of second language acquisition (SLA), enabling learners to interpret spoken input and participate in meaningful communication. In the English as a Foreign Language (EFL) context, its development is particularly critical due to limited exposure to authentic language input in everyday environments.

Recent research highlights that the effectiveness of digital storytelling depends heavily on its design features. Elements such as pacing, visual complexity, and interactivity significantly influence cognitive processing. Segmented presentation helps manage cognitive load, while well-aligned visuals support meaning construction rather than distract from it (Rey & Buchwald, 2022; Wang & Mayer, 2023; Kalyuga, 2022). Similarly, moderate interactivity promotes engagement without overwhelming learners (Zhang & Fiorella, 2023).

The rapid advancement of digital technologies has transformed language pedagogy, shifting instruction toward multimedia-enhanced and learner-centered approaches. This shift is especially evident in EFL settings, where multimodal input provides richer linguistic exposure. However, listening comprehension remains cognitively demanding, requiring simultaneous processing of phonological, lexical, and syntactic information (Goh, 2018; Vandergrift & Cross, 2018).

Meta-analytic evidence further confirms the effectiveness of multimedia-assisted listening instruction. Studies report moderate to large effect sizes, indicating that audio-visual input enhances comprehension through dual-channel processing (Plonsky & Oswald, 2022; Teng, 2023). However, effectiveness varies depending on instructional design, learner proficiency, and task complexity (Li & Lan, 2024).

A growing body of research identifies pre-service teachers as a distinct learner group with unique needs. Unlike general learners, they must develop both listening proficiency and the ability to teach listening strategies. Studies show that they often struggle with higher-order skills such as inferencing and discourse interpretation, partly due to limited exposure and insufficient strategy training (Sato & Loewen, 2022; Widodo & Fang, 2024).

Multimedia-supported instruction has consistently demonstrated positive effects on listening comprehension. Learners exposed to audio-visual materials outperform those using single-modality input, as visuals support contextual understanding (Mayer, 2020; Zhang, 2021). Digital storytelling, in particular, enhances engagement and retention by integrating narrative with multimedia elements (Hafner & Miller, 2019; Yang & Wu, 2021).

Despite these benefits, recent critiques emphasize that multimedia learning is not universally effective. Cognitive overload, redundancy effects, and individual differences can limit its impact (Kalyuga & Singh, 2022; Leahy & Sweller, 2023). Cultural factors also influence how learners interpret narratives, affecting comprehension outcomes.

These findings suggest that multimedia effectiveness is conditional rather than inherent. Instructional design quality, learner characteristics, and contextual alignment determine outcomes (Schroeder & Cenkci, 2023). Thus, a nuanced approach is necessary when integrating digital storytelling into instruction.

Theoretically, digital storytelling aligns with constructivist learning, where learners actively construct meaning through contextualized input (Jonassen, 2017). It also supports motivational frameworks, as engaging materials enhance intrinsic motivation (Ryan & Deci, 2020).

However, methodological limitations persist in existing studies. Many rely on small samples, short interventions, or lack control groups, limiting generalizability (Hafner & Miller, 2019). Additionally, quantitative evidence on listening gains remains insufficient.

There is limited rigorous quantitative evidence establishing the extent to which digital storytelling produces statistically significant improvements in listening comprehension among tertiary EFL learners. This study addresses that gap by examining its effect using a quasi-experimental design.

Guided by these objectives, the study addresses the following research questions:

What are the pretest and posttest listening comprehension performances of the learners?

Is there a statistically significant difference between the pretest and posttest listening comprehension scores following exposure to digital storytelling?

By addressing these goals through a quantitative approach, the study contributes to the advancement of evidence-based practices in multimedia-assisted language learning and offers theoretical, practical, and policy-relevant implications for enhancing listening instruction in EFL contexts. The remainder of this paper presents the research methodology employed, followed by the results of the analysis, and concludes with a discussion of the findings in relation to existing literature and their implications for theory and practice.

Figure 1 illustrates the hypothesized relationships among the variables, with directional pathways indicating the influence of digital storytelling on listening comprehension and the moderating role of pre-test performance.

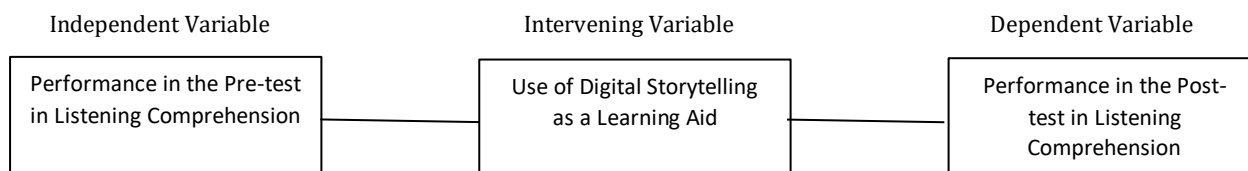


Figure 1. The Research Paradigm showing the relationship among the variables

Methodology

Purpose of the Study and Research Design

This study employed a quasi-experimental research design, specifically a one-group pretest–posttest design, which falls under the broader category of experimental research. This design was selected to examine the causal effects of the digital storytelling intervention on listening comprehension by comparing participants' performance before and after exposure. Quasi-experimental designs are appropriate in educational settings where random assignment is not feasible and intact groups are used (Creswell & Creswell, 2018; White & Sabarwal, 2014).

The Respondents

The sample consisted of 30 second-year English majors enrolled in a teacher education program at West Visayas State University, Calinog Campus. Participants were selected through convenience sampling due to accessibility and intact class grouping. Although this limits generalizability, it is appropriate in classroom-based research where randomization is constrained (Etikan & Bala, 2017). A sample size of 30 is sufficient for detecting within-group differences in quasi-experimental studies (Fraenkel et al., 2019).

Participants were included if they were (a) officially enrolled as second-year English majors during the study period and (b) present during both pretest and posttest administrations. Students who were absent during either testing phase or who did not complete the required assessments were excluded to ensure data completeness and comparability.

The study did not employ randomization, control groups, or blinding procedures due to the use of an intact class. To control potential confounding variables, the same participants were used for both testing phases, identical instruments were administered, and procedures were standardized across sessions. These measures enhance internal consistency, although causal inferences should be interpreted with caution (Creswell & Creswell, 2018).

The Research Instrument

The intervention utilized a set of digital storytelling materials specifically selected and structured to support listening comprehension development. The materials consisted of three narrative texts: *The Gift of the Magi*, *The Last Leaf*, and *The Giving Tree*. These stories were chosen due to their clear narrative structure, thematic coherence, and suitability for tertiary-level English learners.

Each story was presented in a multimedia format combining audio narration, synchronized visual imagery, and on-screen text support. The audio component featured clear, moderately paced narration appropriate for the learners' proficiency level, while the visual elements included context-relevant illustrations designed to reinforce key narrative events and support meaning-making.

In terms of length, each digital story ranged from approximately 5 to 8 minutes in total duration and was segmented into shorter parts (1–2 minutes per segment) to facilitate cognitive processing and reduce overload. This segmentation allowed learners to process information incrementally and engage in guided listening activities between segments.

The materials were sourced from publicly available literary texts and adapted into a digital format using multimedia presentation tools. Adaptations included simplification of complex vocabulary where necessary and alignment with instructional objectives targeting key listening subskills such as identifying main ideas, recognizing supporting details, and making inferences.

To ensure instructional consistency, all materials followed a standardized structure, including:

1. Pre-listening prompts to activate prior knowledge
2. While-listening tasks focusing on comprehension
3. Post-listening activities to reinforce understanding

These design features were informed by multimedia learning principles, which emphasize the integration of auditory and visual input to enhance comprehension and retention.

Listening comprehension was measured using a researcher-developed 60-item multiple-choice test, administered as both a pretest and posttest. The test assessed key listening subskills, including identification of main ideas, supporting details, and inferential understanding.

To establish content validity, the instrument was reviewed by subject-matter experts in language education. Revisions were made based on their feedback to ensure alignment with intended competencies. Face validity was also confirmed to ensure clarity and appropriateness of the test items (Taherdoost, 2016).

Reliability testing (e.g., Cronbach's alpha) was not conducted before the study. While expert validation supports content adequacy, the absence of statistical reliability estimation remains a limitation and should be considered when interpreting the findings.

The Data Gathering Procedure

Data collection followed a structured sequence: pretest administration, implementation of the digital storytelling intervention, and posttest administration. This approach enabled the establishment of baseline performance and measurement of learning gains attributable to the intervention. The pretest–posttest format strengthens internal validity by allowing within-group comparison (Creswell & Creswell, 2018).

Ethical Considerations

Ethical approval was obtained from the relevant institutional authorities before data collection. Participants were informed of the study's purpose, and participation was voluntary. Informed consent was secured, and confidentiality and anonymity were maintained. Data were used solely for research purposes, in accordance with established ethical standards (American Educational Research Association, 2018).

Data Analysis

Descriptive and inferential statistics were used to analyze the data. Mean scores were computed to describe performance levels, while a paired-samples t-test was conducted to determine whether differences between pretest and posttest scores were statistically significant. Statistical analyses were performed using International Business Machines Statistical Package for the Social Sciences (IBM SPSS) Statistics version 27, a widely accepted tool in educational research.

All statistical tests were conducted at a 0.05 level of significance ($p < .05$). A p-value less than 0.05 indicated a statistically significant difference between pretest and posttest scores, leading to rejection of the null hypothesis, while values equal to or greater than 0.05 indicated non-significant differences.

Results and Discussion

This section presents the findings of the study in relation to the research questions, followed by an integrated discussion grounded in relevant literature.

Descriptive Data Analysis

The Respondents' Pre-test and Post-test Performances in Listening Comprehension

Table 1 presents the descriptive statistics for participants' listening comprehension scores before and after the intervention. The pre-test mean score was 35.50 (SD = 2.26), categorized as average, whereas the post-test mean increased to 51.00 (SD = 4.04), categorized as very high. This indicates a substantial increase in performance following exposure to the multimedia-based intervention.

To provide an estimate of precision, 95% confidence intervals were computed for the mean scores. The pre-test mean is estimated to fall within a relatively narrow range around the observed value, while the post-test mean similarly reflects a stable estimate. These intervals indicate that the observed improvement in listening comprehension is not only substantial but also consistent within the sample.

Category	N	Mean	SD	Description
Pre-test	30	35.50	2.26	Average
Post-Test	30	51.00	4.04	Very High

Note: Mean score ranges: 0.00–12.00 (Very Low), 12.01–24.00 (Low), 24.01–36.00 (Average), 36.01–48.00 (High), 48.01–60.00 (Very High).

Table 1. The Respondents' Pre-Test and Post-Test Performances in Listening Comprehension

Inferential Data Analysis

The Difference in the Respondents' Pre-test and Post-Test Performances in Listening Comprehension

The t-Test result in Table 2 reveals a significant difference [$t(29) = 18.59$; $p = 0.000$] between the pre-test and the post-test performances in listening comprehension of the respondents. The p-value is less than 0.05, indicating that the respondents' post-test performance is significantly higher than their pre-test performance. This implies that the use of digital storytelling as a learning aid favorably affects the performance in listening comprehension of the respondents. The null hypothesis, assuming a non-significant difference in this regard, is rejected.

To further assess the precision of this improvement, a 95% confidence interval was computed for the mean difference. The mean gain in listening comprehension scores was 13.91 points, with a 95% confidence interval ranging from 11.56 to 16.26. The fact that this interval does not include zero provides additional evidence that the observed improvement is statistically reliable.

In addition, effect size analysis was conducted to determine the practical significance of the findings, using Cohen's d_z the effect size was calculated at approximately 3.39. This value far exceeds conventional benchmarks for a large effect ($d = 0.80$), indicating an exceptionally strong impact of the intervention. Such a magnitude suggests that the improvement is not only statistically significant but also educationally meaningful and substantial in real-world learning contexts.

Moreover, the relatively narrow confidence interval suggests that the effect of the intervention is consistent across participants, indicating that the improvement reflects a stable pattern rather than being driven by a few extreme scores.

Compared Groups	N	Mean	df	t	p-value
Performances in Listening Comprehension			29	18.59***	0.000
Pre-test	30	35.50			
Post-Test	30	51.00			

*** $p < 0.001$

Table 2. The t-test Result for the Difference in the Respondents' Pre-test and Post-test performances in Listening Comprehension

Discussion

The findings should first be interpreted considering methodological constraints. The use of a single intact group and a relatively small sample limits generalizability and reduces causal certainty. Without a control group, alternative explanations such as testing effects cannot be fully ruled out (Creswell & Creswell, 2018).

Contextual factors also influence the applicability of the results. The study was conducted within a specific tertiary EFL setting with relatively homogeneous learners. As such, the effectiveness of digital storytelling may vary across different populations and instructional environments.

Despite these limitations, the results demonstrate a clear improvement in listening comprehension following the intervention. This suggests that digital storytelling enhances learners' ability to process spoken input by promoting active meaning construction rather than passive listening.

The magnitude of improvement is particularly notable. The substantial gain in scores indicates not only statistical significance but also practical relevance. Learners appear to have progressed from basic comprehension to a more developed ability to interpret main ideas, supporting details, and implied meanings.

This improvement suggests that digital storytelling contributes to functional listening competence. Learners are better prepared to engage with real-world communication tasks, including lectures and multimedia content.

The effectiveness observed in this study may be attributed to specific instructional design features. Prior research shows that poorly designed multimedia can hinder learning due to cognitive overload (Sweller et al., 2019). In contrast, the structured and segmented design used in this study likely facilitated comprehension.

Effective digital storytelling integrates several key elements: coherent narrative structure, synchronized audio-visual input, controlled pacing, and guided engagement. These features reduce cognitive load and support incremental processing of information.

The findings align with existing literature demonstrating the benefits of multimedia learning. Audio-visual input enhances comprehension by providing contextual cues (Zhang, 2021), while narrative-based instruction increases engagement and retention (Hafner & Miller, 2019; Yang & Wu, 2021).

From a theoretical perspective, the results support multimedia learning theory, particularly the principle of dual-channel processing (Mayer, 2020). They also reinforce constructivist views, emphasizing active meaning-making (Jonassen, 2017), and motivational theory, highlighting the role of engagement (Ryan & Deci, 2020).

The use of structured narratives further contributed to the intervention's success. Stories with clear organization and emotional appeal likely facilitated schema activation and sustained attention, both essential for comprehension.

However, the high posttest scores suggest a potential ceiling effect. This raises questions about the sensitivity of the instrument in detecting advanced listening gains. Future studies may benefit from more complex assessment tools.

Another limitation concerns the absence of reliability testing. While expert validation supports content validity, the lack of statistical reliability introduces uncertainty. Future research should incorporate reliability measures such as Cronbach's alpha.

Overall, the findings confirm that digital storytelling is an effective instructional approach. However, its success depends on careful design, appropriate implementation, and alignment with learner needs.

Conclusion and Recommendations

This study examined whether digital storytelling improves listening comprehension among tertiary-level English learners by comparing pre-intervention and post-intervention performance and evaluating the extent of its instructional effect. The findings indicate that learners demonstrated improved listening comprehension following exposure to digital storytelling, confirming its meaningful influence on their ability to process and interpret spoken language. These outcomes directly address the study's research questions and establish digital storytelling as an effective multimodal instructional approach.

Beyond confirming effectiveness, the study advances existing knowledge by extending key theoretical frameworks in language learning. The findings provide empirical support for multimedia learning theory by demonstrating that dual-channel processing enhances listening comprehension in authentic EFL contexts (Mayer, 2020). They also refine constructivist perspectives by showing how learners actively construct meaning through interaction with narrative-driven, multimodal input (Jonassen, 2017). Furthermore, the study contributes to the literature on digital storytelling by offering quantitative evidence of its impact at the tertiary level, addressing a gap in prior research (Hafner & Miller, 2019; Yang & Wu, 2021).

The findings highlight the instructional value of digital storytelling in enhancing listening comprehension. These results support the integration of narrative-based multimedia materials into listening instruction, particularly in EFL contexts where learners face challenges with purely auditory input. Educators are encouraged to design tasks that promote active engagement, such as prediction, inference, and reflection, and to align multimedia materials with learners' proficiency levels to optimize comprehension and minimize cognitive overload.

For teacher education, the findings underscore the need to develop digital pedagogical competence. Training programs should equip teachers with the skills to effectively design and implement multimedia-based instruction grounded in sound pedagogical principles.

At the institutional level, the findings support the systematic integration of multimedia-based strategies into language education frameworks. These data support policies promoting the inclusion of digital storytelling in curriculum design, alongside investments in digital infrastructure and professional development. Policymakers are encouraged to establish clear guidelines for the pedagogically effective use of technology in language instruction.

The findings should be interpreted considering several methodological limitations, which also provide opportunities for further refinement. The absence of a control group limits causal inference, indicating the need for future studies employing randomized or comparative designs. The relatively small and context-specific sample constrains generalizability, suggesting the value of replication across larger and more diverse populations.

In addition, the lack of formal reliability estimation for the research instrument points to an area for methodological strengthening, where future studies can incorporate statistical reliability measures. The short-term nature of the intervention also limits conclusions about retention, highlighting the need for longitudinal research designs.

Building on these findings, several specific and testable research directions are proposed. First, experimental studies with control groups could test the hypothesis that learners exposed to digital storytelling will demonstrate significantly greater gains in listening comprehension than those receiving traditional instruction. Second, longitudinal studies could examine whether improvements are sustained over time, testing the hypothesis that repeated exposure to digital storytelling leads to long-term retention of listening skills.

Third, comparative studies across proficiency levels could test whether the effectiveness of digital storytelling varies by learner ability, with the hypothesis that lower-proficiency learners benefit more from multimodal support due to increased reliance on contextual cues. Fourth, design-based research could investigate how specific features of digital storytelling—such as interactivity, pacing, and visual complexity—affect cognitive load and comprehension outcomes. Finally, mixed-methods studies could explore the relationship between learner engagement and performance by combining quantitative measures with qualitative insights into learners' cognitive processing during multimedia exposure.

Overall, the study underscores the value of digital storytelling as a theoretically grounded and practically effective approach to improving listening comprehension. By linking its findings to theory, practice, and policy, and by proposing clear directions for future research, the study contributes to the ongoing development of evidence-based strategies for language teaching in contemporary EFL contexts.

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Competing Interests Statement

The authors declare no competing interests.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request. Readers may contact the corresponding author at barry.cantelero@wvsu.edu.ph for access. Requests will be reviewed within 30 days in accordance with the journal's data policy.

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Appendices

No appendices are attached to this study.