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Enhancing Students' Speaking Skills through Digital Storytelling: A Mixed-Methods Study

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Abstract

This study examines the effectiveness of digital storytelling in enhancing English speaking skills among students at MA Mamba'ul Ulum. Based on multimedia learning theory and social constructivism, the research tackles low speaking proficiency and limited participation in English learning. It uses a mixed-methods sequential explanatory design combining a pre-experimental (one-group pretest-posttest) approach with qualitative analysis. Twenty-four students participated in the quantitative part, while six students and one teacher provided qualitative insights through interviews. The digital storytelling process involved five stages: warming-up, viewing, comprehension check, retelling, and individual presentation. Results showed significant improvement, with mean scores rising from 50.13 to 77.63 (N-Gain: 57.34%, moderately effective). The paired sample t-test confirmed the results were statistically significant (p < 0.001). Fluency saw the most tremendous improvement, followed by content and coherence. Teachers and students reported positive perceptions of higher participation, motivation, and confidence. However, technical issues such as limited equipment and unstable internet connections were identified as barriers. The study concludes that digital storytelling effectively improves English speaking skills in Islamic educational settings, with implications for EFL teaching in environments with limited resources. Recommending improvements in technical infrastructure and teacher training.

Keywords: digital storytelling, speaking skills, English as a foreign language, mixedmethods, EFL, Madrasah

Introduction

English is a foreign language often taught in Indonesian schools. In today's globalized world, the ability to speak English has become an essential skill (Rahmawati et al., 2023). Speaking is considered the most important for learning a foreign or second language among the four main language skills. According to Derakhshan et al. (2016) Speaking is an interactive process of constructing meaning that involves producing, receiving, and processing information, while speaking proficiency is the ability to communicate effectively and accurately in the target language (Jon et al., 2022). However, many students find it challenging to master this skill, especially in English as a Foreign Language (EFL) settings, due to factors such as limited exposure to the language, speaking anxiety, a small vocabulary, and low self-confidence. (Al-Amri, 2020) and (Kho & Ting, 2023)

Based on observations at MA Mambaul Ulum, students encounter specific speaking challenges that reflect broader issues in Indonesian EFL education. Students show little interest in speaking English due to a lack of confidence, often make pronunciation errors, leading to classroom silence, and struggle with phonological aspects such as stress and intonation. These challenges are compounded by the unique educational context of Madrasah Aliyah, where students must balance learning English with Islamic educational values, creating a complex learning environment that requires innovative teaching methods.

Recent research has investigated digital storytelling as a new method to improve speaking skills challenges in EFL settings. Digital storytelling, defined as using computer-based tools to tell stories that blend personal narratives with multimedia elements like images, audio, and video Yuliani et al. (2021) Has become a promising teaching tool. This method is supported by multimedia learning theory, which suggests that combining different elements like text, images, sound, and video can boost learning effectiveness. Social constructivism theory highlights the value of interaction and active student participation in learning.

Comprehensive studies have shown notable improvements in speaking skills through digital storytelling. Fu et al. (2022) found that digital storytelling significantly improved EFL learners' speaking abilities in fluency, coherence, vocabulary, grammar, and pronunciation. Arroba and Acosta (2021) reported improvements across various aspects, including organization, language use, and delivery techniques. In Indonesian contexts, Ningsih (2016) revealed that 86% of students were fully engaged during digital storytelling activities, with 88.5% agreeing that this technique improved their speaking skills.

While extensive research demonstrates the effectiveness of digital storytelling, significant gaps still exist in understanding its application within Indonesian Islamic secondary schools. Most previous studies focus on university-level or general secondary education settings, with limited exploration of Madrasah Aliyah environments where students must combine English language learning with Islamic educational values. Additionally, there is a notable lack of mixed-methods research that combines quantitative measures of speaking skill improvements with qualitative analysis of implementation processes and stakeholder perceptions.

This study explores digital storytelling techniques to improve students' speaking skills at MA Mambaul Ulum using a mixed-methods sequential explanatory approach. The research aims to answer three main questions: first, how effective are digital storytelling techniques in enhancing students' English-speaking abilities? Second, how are digital storytelling techniques implemented at MA Mambaul Ulum? Furthermore, third, what are teachers' and students' perceptions of digital storytelling techniques in English learning?

Based on the theoretical framework and prior research findings, this study hypothesizes that, (1) digital storytelling techniques will significantly improve students' English speaking skills, especially in fluency and coherence; (2) implementing digital storytelling at MA Mambaul Ulum will encounter technical challenges but can be effectively addressed through creative strategies; (3) both teachers and students will view digital storytelling positively, reporting increased motivation and engagement in learning English.

This research's novelty lies in its comprehensive mixed-methods study of digital storytelling implementation in Indonesian Islamic secondary schools. It employs a sequential explanatory design to provide quantitative data on effectiveness and qualitative insights into the implementation process within the unique context of Madrasah Aliyah schools with limited resources.

Method

This study used a mixed methods approach with a sequential explanatory design, involving the collection of quantitative data first, followed by qualitative data to clarify the quantitative results (Creswell, 2009). The study employed a quasi-experimental design with a pre-test and post-test on a single group because the educational research at MA Mambaul Ulum did not allow for random assignment. The independent variable was the digital storytelling technique, defined as a technology-based storytelling method that incorporates multimedia elements. The dependent variable was students' English-speaking skills, assessed through fluency, pronunciation, vocabulary, grammar, and comprehension.

The research population included all grade 11 students at MA Mambaul Ulum, totaling approximately 70-80 students across three classes. For the quantitative phase, 24 students from one class were selected through purposive sampling based on specific criteria: students with basic English language skills from previous education, availability during the entire intervention period, and willingness to participate in digital storytelling activities. The selection also considered students not under immediate examination pressure, making them suitable for implementing new teaching methods. For the qualitative phase, six students were chosen using purposive sampling based on the results from the quantitative phase, including two with the highest improvement, two with medium improvement, and two with the lowest speaking skill scores. Additionally, one English teacher served as a key informant, providing pedagogical insights on the

implementation of digital storytelling.

The research instruments included speaking skill tests (pre-test and post-test) assessed with validated rubrics covering fluency, pronunciation, grammar, vocabulary, and comprehension. The rubrics demonstrated high content validity through expert judgment and acceptable reliability (Cronbach's alpha = 0.84). The student perception questionnaire used a 5-point Likert scale adapted from Khan et al. (2021), addressing usability, effectiveness, and satisfaction, with good reliability (α = 0.83). Semi-structured interviews with students and the teacher explored experiences, challenges, and suggestions. All instruments underwent expert review to establish content validity, and internal consistency was assessed statistically; however, no separate pilot study was conducted.

Data collection took place over six meetings divided into three main stages, spanning four weeks from April to May 2025. The pre-test was administered on April 17, 2025, where students delivered short presentations (with 3-5 minutes of preparation and 2-3 minutes of presentation), recorded for objective assessment. The digital storytelling treatment was carried out during five consecutive meetings from April 19 to May 10, 2025, each lasting 90 minutes. This treatment included digital narrative materials such as a folklore video, a slideshow of narrative images, a podcast, and an inspirational video designed to practice retelling, expressing opinions, and making personal connections. On May 28, 2025, the post-test was conducted using the same format as the pre-test, followed by questionnaire administration and interviews.

Ethical considerations were thoroughly addressed throughout the study. Formal ethical approval was obtained from the institutional review board, and informed consent was secured from all participants and their parents or guardians. Students were assured of confidentiality, voluntary participation, and the right to withdraw at any time without penalty. All recordings and data were stored securely and will be destroyed once the research is complete.

Quantitative data analysis started with prerequisite tests, including normality testing using the Kolmogorov-Smirnov method with SPSS version 30. If assumptions were satisfied, paired sample t-tests were used to identify significant differences between pre-test and post-test scores. The method's effectiveness was evaluated using normalized gain scores, categorized as ineffective (<40%), less effective (40-55%), effective enough (56-75%), and effective (>76%), following Arikunto (2010) classification.

Qualitative data were analyzed using Braun and Clarke (2006) six-phase thematic analysis framework, which involved familiarizing with data, generating initial codes, searching for themes, reviewing, defining, naming, and producing the report. Data integration followed the sequential explanatory design principles, where qualitative findings were used to explain and deepen understanding of quantitative results, providing a comprehensive understanding of digital storytelling's effectiveness in improving students' speaking skills at MA Mambaul

Ulum.

This study recognizes certain limitations. The quasi-experimental design without a control group restricts causal claims. The sample size (24 students) and single-site setting limit generalizability. The relatively short intervention period might not capture long-term effects. The researcher's dual role as instructor and evaluator could introduce bias, although standardized procedures and external validation were employed to reduce this risk.

Results

This study evaluated the effectiveness of digital storytelling techniques in enhancing the English-speaking skills of 24 eleventh-grade students at MA Mambaul Ulum. The research was carried out from April to May 2025, using a mixed-methods approach that combined both quantitative and qualitative data collection methods to understand the intervention's impact thoroughly.

The Effectiveness of Digital Storytelling in Improving Students' Speaking Skills Pre-test and Post-test Analysis

The quantitative analysis showed notable improvements in students' speaking skills after the digital storytelling intervention. Before implementation, students demonstrated moderate proficiency with a mean score of 50.13 (SD = 12.34), with considerable variation, with scores ranging from 25 to 71. After the intervention, students achieved significant progress, with post-test scores averaging 77.63 (SD = 10.52), reflecting an average increase of 27.50 points. The smaller standard deviation in post-test scores indicated more consistent performance among students, emphasizing the intervention's effectiveness across different ability levels.

Statistical Measure	Pre-test	Post-test	Difference
Mean	50.13	77.63	+27.50
Median	50.00	75.00	+25.00
Mode	50.00	68.00	+18.00
Maximum Score	71	96	+25
Minimum Score	25	54	+29
Standard Deviation	12.34	10.52	-1.82
Range	46	42	-4

Testing for Statistical Significance

Normality testing with the Shapiro-Wilk test confirmed that both pre-test (p = 0.768) and post-test (p = 0.222) data were normally distributed, meeting the assumptions for parametric statistical analysis. The paired sample t-test showed a statistically significant improvement in speaking abilities (t = -25.579, df = 23, p <

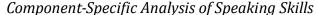
0.001), with a 95% confidence interval from -29.724 to -25.276. The Cohen's d value of 2.39 indicates a strong effect size, demonstrating both statistical significance and notable practical impact.

Table 2. Paired Sample t-test Results	for Speakina Skills Improvement
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Variable	Mean	95% CI	T-value	df	Sig. (2-	Cohen's	Effect
	Difference				tailed)	d	Size
Pre-test to	-27.500	[-29.724, -	-25.579	23	<.001	5.267	Very
Post-test		25.276]					large

Effectiveness Analysis Using N-Gain Score

The normalized gain (N-Gain) analysis offered further insight into practical effectiveness. The average N-Gain score of 57.34% falls within Hake's "moderately effective" range (30-70%), indicating that students improved by about 57% of their potential maximum gain. Individual N-Gain scores ranged from 39.00% to 88.00%, showing that all students made significant progress, with some reaching near-optimal gains.



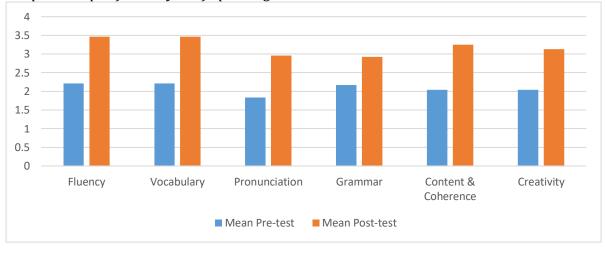


Figure 1. Comparison of Pre-Test and Post-Test Mean Scores Across Speaking Components

Analysis of specific speaking components revealed different improvement patterns across various aspects of oral communication. Fluency showed the most significant progress, with students' average scores rising by 1.25 points (from 2.29 to 3.54). Vocabulary also improved significantly, increasing by 1.25 points (from 2.08 to 3.33). Improvements in content and coherence (from 2.04 to 3.25, +1.21 points) indicate a stronger ability to organize ideas logically. Pronunciation improved notably from 1.83 to 2.96 (+1.13 points). Grammar showed the most minor improvement (from 2.17 to 2.92, +0.75 points), but still reflects meaningful progress.

Student Perceptions and Engagement

Student perception analysis via questionnaire responses showed mostly positive attitudes toward digital storytelling implementation. The overall average perception score was 3.37 on a 5-point Likert scale, indicating moderate to positive feedback. Students reported the highest satisfaction with increased confidence in speaking English (M = 3.73), followed by perceived improvement in speaking skills (M = 3.68) and enhanced creativity (M = 3.59).

Table 3.	Student	Perception	of Dia	<i>iital</i> Stor	vtelling
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Agnest	Maan	Intermedation
Aspect	Mean	Interpretation
Confidence in speaking	3.73	Good
Speaking skill improvement	3.68	Good
Creativity enhancement	3.59	Good
Learning interest	3.50	Good
Pronunciation improvement	3.50	Good
Idea development	3.50	Good
Grammar improvement	3.32	Moderate
Vocabulary retention	3.23	Moderate
Technology integration challenges	2.95	Moderate
Technical difficulties	2.68	Moderate

Implementation of Digital Storytelling

Implementation Process and Challenges

The implementation followed a structured five-stage framework, including warming-up, viewing, comprehension check, retelling, and individual presentation phases. However, significant infrastructure limitations emerged as the main obstacles. Teachers reported insufficient projectors in classrooms and delays caused by equipment sharing. Internet connectivity issues affected video playback in three out of five sessions, disrupting the planned activities.

Adaptive strategies were created to address these challenges, including predownloading materials to remove internet reliance and establishing devicesharing protocols among students. Assessment was done formatively, emphasizing effort and progress over strict correctness. One student said, "I liked the assessment because it did not just focus on right or wrong, but also on effort and improvement."

Perceived Benefits and Limitations

Participants highlighted increased engagement and motivation as the key benefits, with students displaying greater enthusiasm during digital storytelling sessions. The multimodal format offered essential comprehension support, with visual and auditory elements helping students understand content more easily. However, concerns arose about potential over-reliance on multimedia stimuli and unequal access, especially for students with limited technology at home.

Integrated Mixed-Methods Findings

The convergence of quantitative and qualitative data provided strong evidence for digital storytelling's effectiveness. The significant statistical improvements (Cohen's d = 5,267) were consistently supported by student interviews showing increased confidence and engagement. However, some discrepancies appeared between objective measurements and subjective perceptions, especially in vocabulary retention and grammar improvement, indicating gaps between actual progress and students' awareness of their improvements.

Discussion

Effectiveness and Theoretical Foundations

The significant improvements in students' English-speaking abilities provide strong evidence for digital storytelling's effectiveness in EFL settings. The large effect size (Cohen's d = 2.39) supports multimedia learning theory, which suggests that combining visual, auditory, and textual elements together enhances cognitive processing and memory. This theoretical basis explains why students experienced such notable gains across various speaking skills.

The N-Gain classification of "moderately effective" (57.34%) reflects significant achievement given the resource constraints and short intervention period. This practical effectiveness supports comprehensible input theory, which states that meaningful, contextualized language exposure encourages natural acquisition processes. The narrative structure inherent in digital storytelling offers the meaningful context needed for both lexical retrieval and improving speech flow.

Table 4.	Comparative A	Analysis	with Previou	s Studies
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Study	Context	Key Findings		
Current Study	Indonesian Islamic	Fluent and Vocabulary showed the most		
(2025)	School	remarkable improvement		
Fu et al. (2022).	EFL Learners	Significant speaking skill enhancement		
, ,	Product-based	Enhanced delivery techniques		
(2021)	learning	1		
Ningsih (2016)	Indonesian context	High student satisfaction		

Compared to prior research, this study shows very large effect sizes while using more rigorous assessment criteria. The moderate N-Gain compared to Ningsih's findings may result from stricter evaluation standards and a shorter intervention period, suggesting that digital storytelling's effectiveness depends on context

Component-Specific Improvements and Learning Mechanisms

The significant increase in fluency (from 2.29 to 3.54, +1.25 points) highlights digital storytelling's role in improving natural speech flow. This supports social cognitive theory's emphasis on observational learning, where students subtly imitate natural speech patterns by repeatedly engaging with authentic narrative models. The modeling effect appears more powerful than previously thought, providing opportunities for implicit learning through audiovisual input. Pronunciation also improved considerably (from 1.83 to 2.96, +1.13 points), challenging traditional ideas about pronunciation development timelines.

The concurrent improvements in fluency and vocabulary (both +1.25 points) show that digital storytelling develops multiple skills at the same time rather than separately. This integrated growth supports the idea that narrative structure boosts both speech flow and lexical diversity through meaningful context. Students gained from multimodal language input that offered multiple retrieval cues for vocabulary while encouraging natural speech patterns.

Grammar showed only a minor improvement (0.75 points), supporting the output hypothesis theory's focus on explicit instruction for grammatical accuracy. This suggests that while digital storytelling effectively enhances communicative competence, improving grammatical precision needs extra targeted instruction. The gap between improvement in grammar and other skills indicates that implicit learning via storytelling alone may not be enough for mastering complex grammatical structures.

Implementation Framework and Adaptive Strategies

The five-stage implementation framework that has emerged offers a systematic approach for educators aiming to incorporate digital storytelling into language teaching. The organized progression from warm-up activities to individual presentations tackles common challenges in technology integration by providing clear pedagogical guidance. This framework shows that effective implementation relies more on careful planning than on having the best resources.

The adaptive strategies developed to address infrastructure limitations provide practical solutions for resource-limited environments. Pre-downloading materials removed internet dependence, while device-sharing protocols optimized available resources and encouraged collaborative learning. These adaptations show that creative problem-solving can preserve instructional effectiveness despite technological constraints.

However, the challenges faced reflect broader issues in adopting educational technology in developing regions. The coordination needed for sharing facilities and managing equipment shows the necessity for institutional support systems. The finding that preparation time increased significantly compared to traditional methods highlights the importance of administrative support for successful implementation.

Teacher and Students' Perceptions and Technology Acceptance

The largely positive perceptions of students and teachers confirm that digital storytelling is practically viable in Islamic educational settings. Building student confidence was identified as the most notable benefit (M = 3.73), reinforcing self-determination theory's focus on competence as a key factor in intrinsic motivation. This finding goes beyond language learning and applies to broader educational participation and academic self-efficacy.

Teacher observations of increased participation, especially among usually passive learners, mark a significant pedagogical achievement. The transition from teacher-centered to student-centered interactions matches social constructivist principles, where engaging environments foster active knowledge building. However, teachers' concerns about preparation time and potential reliance on multimedia highlight challenges in implementation that need ongoing professional development.

The identified technical difficulties (M = 2.68) and integration challenges (M = 2.95) highlight the need for infrastructure development. These moderate ratings indicate that while digital storytelling can be successfully implemented with limited resources, achieving the best results requires focusing on technological support systems and user training.

Unexpected Findings and Individual Variation

Several unexpected results warrant discussion about theoretical and practical implications. The wide range in individual N-Gain scores (39.00% to 88.00%) shows different responses to digital storytelling, possibly affected by learning styles, prior technology exposure, or motivation levels. This variability suggests that personalized approaches could improve effectiveness for various learner types.

The notable improvement in fluency was especially significant, since fluency usually depends on extensive practice and exposure to natural language. This suggests that digital storytelling's narrative flow modeling effect might be more substantial than previously thought, providing new insights into how fluency can develop through implicit learning. The impressive pronunciation gain (+1.13 points) was also surprising, as pronunciation generally needs a lot of practice and time to improve.

The gap between objective measurements and subjective perceptions, especially in vocabulary retention (significant gains versus moderate perception of 3.23) and grammar improvement (meaningful progress versus 3.32 rating), indicates that students might not fully recognize their progress. This discrepancy emphasizes the need for more precise feedback mechanisms to help students track their learning progress.

Limitations and Validity Considerations

Several methodological limitations restrict the generalizability of the findings and point to directions for future research. The quasi-experimental design without a control group weakens causal inference, although the large effect size and consistent qualitative evidence strongly support the intervention's effectiveness. The single-site setting limits how well the results apply to other contexts, and the short intervention period may not reflect long-term retention effects.

The researcher's dual role as instructor and evaluator poses a potential bias, although standardized procedures were used to reduce this risk. Selection bias from purposive sampling and possible Hawthorne effects from research participation are additional threats to internal validity. While focusing on speaking skills is appropriate for the research questions, it raises questions about the impact on other language competencies.

These limitations suggest that findings should be understood within the specific context of Islamic secondary education, which faces similar resource constraints. The moderate success despite infrastructure issues shows that creative adaptation can preserve learning outcomes in complex environments, although optimal implementation needs stronger support systems.

Practical Implications and Recommendations

For educators, this study shows that meaningful speaking skill improvements are possible through the structured use of digital storytelling. The five-step framework offers clear guidance for lesson planning, while flexible strategies help address common technological issues. Teachers should prioritize fluency and vocabulary growth while providing explicit grammar instruction to maximize results. The significant improvements in pronunciation also indicate that digital storytelling can be an effective tool for implicit pronunciation learning.

Educational administrators should consider infrastructure and support needs when planning technology integration efforts. Investing in teacher professional development and continuous technical support is essential for successful implementation. The finding that device-sharing and coordinated facility use can maximize limited resources suggests that strategic resource management can improve outcomes.

Policymakers should recognize digital storytelling's potential to address language learning challenges in resource-limited settings. The evidence shows that meaningful improvements can be achieved with modest technological investments and that cost-effective ways can be found to enhance instruction quality. However, policies need to focus on digital equity issues and infrastructure development needs.

Future Research Directions

Longitudinal studies examining the durability of digital storytelling's effects would offer valuable insights into the longevity of improvements. Comparing digital storytelling with traditional methods using controlled experimental designs would provide more substantial evidence of its effectiveness. The observed individual variation (N-Gain range: 39.00% to 88.00%) indicates that personalized approaches could improve outcomes.

Cross-cultural studies examining effectiveness across different educational settings would deepen understanding of broader applicability. Investigating optimal intervention length, story content features, and how to combine different teaching methods would give practical advice for teachers. The minor grammar improvements indicate that research into blending digital storytelling with explicit grammar instruction could be helpful.

Studies investigating the link between infrastructure quality and learning outcomes could provide valuable insights for educational planning. Research into adaptive digital storytelling systems that customize to individual learner traits might address the variation in student responses observed in this study.

Conclusion

This study presents strong evidence that digital storytelling can significantly improve English speaking skills in Islamic secondary education settings. The very large effect size (Cohen's d=2.39) and moderate practical impact (N-Gain = 57.34%) show meaningful gains possible through systematic use, even in environments with limited resources. The mixed-methods approach indicates that effectiveness goes beyond quantifiable skill improvements to include motivational and attitudinal shifts with lasting educational benefits.

The systematic implementation framework and adaptive strategies developed provide practical guidance for educators while showing that creative problem-solving can remain effective despite technological limitations. The mostly positive stakeholder perceptions, along with objective evidence of improved speaking skills, indicate that digital storytelling is a feasible method for enhancing language instruction in similar educational settings.

Despite limitations such as the quasi-experimental design, single-site setting, and short intervention period, this study offers valuable evidence of digital storytelling's transformative potential in language education. The findings show that, with proper planning, creative adaptation, and ongoing support, digital storytelling can be a powerful tool for improving speaking skills and increasing student engagement in English language learning.

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