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Enhancing Digital Literacy Skills through Gamified Digital Storytelling: Assessment in Early Childhood English Education

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ABSTRACT

This study explores the implementation of gamified digital storytelling as an innovative to enhance digital literacy skills among early childhood learners in English education. This study addresses the challenge of integrating effective assessment practices within this innovative educational approach while considering the developmental needs of young learners. Existing literature highlights gaps in understanding how gamification can impact early literacy acquisition and the effectiveness of digital storytelling in assessing language skills. The study aims to fill these gaps by employing a mixed-methods approach, involving qualitative observations and interviews with Six educators and quantitative assessments with 60 preschoolers aged 4-6 years at TK Aisyiyah Bebekan Sepanjang, East Java, Indonesia. Findings from the study show that implementing gamified digital storytelling activities notably increases student engagement and motivation. This engagement not only fosters a deeper understanding of language concepts but also cultivates essential digital literacy skills, such as interactive learning and navigation of digital content, among early childhood learners. However, challenges include varying levels of technological access and digital proficiency among educators and students, which can hinder effective implementation. Implications suggest that gamified digital storytelling could transform early childhood education by fostering interactive learning environments. Recommendations include tailored professional development for educators on integrating digital tools effectively and ensuring equitable access to technology-enhanced learning resources to maximize learning outcomes.

I. Introduction

The integration of digital technology into education has revolutionized how early childhood learners engage with language learning. Among various innovative methods, gamified digital storytelling has emerged as a promising approach to enhance digital literacy and language skills in young learners (Churchill, 2020; Kuswandi & Fadhli, 2022; Rahiem, 2021). This gamification approach combines the interactive and engaging nature of games with educational benefits, creating a rich, immersive learning environment (Jogo et al., 2022; Romsi et al., 2024; Slamet et al., 2024). However, despite its potential, the effective implementation and assessment of gamified digital storytelling in early childhood English education face several challenges. One of the primary challenges is the lack of comprehensive understanding and structured approaches to integrating gamification and digital storytelling in early childhood education. Many educators struggle with effectively incorporating these tools into their curriculum due to insufficient training and resources.

According to a study by Ong'ayi et al (2020), while digital storytelling has been shown to improve engagement and literacy skills, many educators lack the necessary digital literacy to implement these tools effectively. This gap in educator proficiency can result in inconsistent and suboptimal learning experiences for students. In facing the digital era and the changing learning styles of early childhood, educators are required to implement more engaging and relevant learning strategies suitable for children's ages. One innovative approach that can be used is gamification, which integrates game elements into the learning process. By integrating digital-based storytelling skills and English language learning for early childhood, gamification allows for the exploration of more interactive and enjoyable learning methods, thereby increasing children's interest and learning effectiveness

Furthermore, early childhood learners, particularly those from service families, face unique challenges that can impede their learning progress. Service children often experience frequent relocations and disruptions, which can

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affect their educational continuity and emotional well-being. Studies have shown that these children may have lower academic performance and literacy rates compared to their peers (Korosidou & Griva, 2021; Munawar et al., 2021). Integrating gamified digital storytelling could provide a stable and engaging learning tool that helps mitigate these disruptions. However, there is limited research on how these methods can be tailored to meet the specific needs of service children, highlighting a significant gap in the existing body of knowledge.

Existing empirical studies have demonstrated the potential benefits of gamified digital storytelling in enhancing language and digital literacy skills. For instance, a study by Korosidou and Bratitsis (2021) found that gamified digital storytelling significantly improved vocabulary acquisition and narrative skills among early childhood learners. Another study by Rahiem (2021) indicated that students engaged in digital storytelling activities exhibited higher levels of motivation and participation. These studies underscore the positive impact of gamification on young learners' engagement and language development. Despite these positive findings, several issues remain unresolved. One significant problem is the digital divide, which refers to the disparity in access to digital technologies and the internet (Na et al., 2024; Romsi et al., 2024; Slamet et al., 2024). This divide can be particularly pronounced in underprivileged and rural areas, where students may not have reliable access to the necessary tools for gamified digital storytelling. This lack of access can severely limit the effectiveness of digital educational tools and exacerbate educational inequalities.

Moreover, while gamified digital storytelling can enhance engagement and learning outcomes, there are concerns about the potential over-reliance on technology. Excessive screen time has been linked to negative health outcomes, including reduced physical activity, sleep problems, and impaired social skills (Churchill, 2020; Ong'ayi et al., 2020). The empirical evidence also highlights a lack of standardized assessment methods to evaluate the effectiveness of gamified digital storytelling. Traditional assessment techniques may not adequately capture the interactive and dynamic nature of these activities (Rahiem, 2021; Slamet & Mukminatien, 2024). As a result, there is a need for developing innovative assessment tools that can measure both the cognitive and affective learning outcomes associated with gamified digital storytelling. Research by (Munawar et al., 2021) suggests that incorporating formative assessment within gamified activities can provide real-time feedback and support personalized learning. However, practical implementations of such assessments are still in their infancy and require further exploration. Therefore, it is crucial to strike a balance between utilizing digital tools for education and ensuring holistic development in early childhood learners (Jogo et al., 2022; Na et al., 2024; Zainudin & Zulkiply, 2023). This balance is often overlooked in existing studies, which primarily focus on academic outcomes without considering the broader impacts of technology use.

Educational institutions should start incorporating digital literacy into the curriculum from an early age because it is crucial to ensure that the younger generation possesses adequate digital skills. With early digital literacy education, students will be better prepared to face future technological challenges and can effectively and responsibly leverage various opportunities. One way to enhance digital literacy skills is through gamified digital storytelling, which can be applied in English language education assessments for early childhood. This approach not only makes learning more engaging but also helps children develop both digital and language abilities in a fun and interactive manner.

To the best of our knowledge, while the integration of gamified digital storytelling in early childhood English education shows considerable promise, several challenges and gaps remain. These include the lack of educator proficiency in digital literacy, the unique educational needs of service children, the digital divide, potential over-reliance on technology, and the absence of standardized assessment methods. Addressing these issues is crucial for maximizing the benefits of this innovative approach and ensuring equitable access to quality education for all early childhood learners. Given these identified issues, this study aims to explore the following research questions:

- How does gamified digital storytelling impact digital literacy skills in early childhood English education?
- Does the challenge include the need for teachers' skills in operating and integrating technology effectively into the learning process?
- It provides great opportunities to create more engaging and effective learning experiences for children in early childhood.

A. Digital Literacy Skills in Early Childhood Education

Digital literacy has become a fundamental skill in the 21st century, essential for navigating an increasingly digital world. In early childhood education, digital literacy involves the ability to use digital tools and resources to enhance learning and development (Churchill, 2020; Na et al., 2024). Despite its importance, there are significant challenges in integrating digital literacy into early childhood education effectively. One primary issue is the digital divide, where disparities in access to technology and internet connectivity exist. Children from underserved communities, including service families, often lack the necessary resources to develop digital literacy skills at the same pace as their more privileged peers (Ong'ayi et al., 2020). Empirical studies have highlighted the positive impact of digital tools on early literacy development. For example, a study by Rahiem (2021) found that digital

devices can support phonological awareness, vocabulary acquisition, and narrative skills among young learners. However, these benefits are contingent upon the availability of appropriate resources and the digital literacy of educators. Many educators in early childhood settings are not adequately trained to integrate digital technologies into their teaching practices, which limits the effectiveness of these tools (Alt & Raichel, 2020; Jogo et al., 2022). This gap in educator preparedness underscores the need for comprehensive professional development programs focused on digital literacy.

B. Gamification in Early Childhood Education

Gamification, the use of game design elements in non-game contexts, has been increasingly adopted in education to enhance student engagement and motivation. In early childhood education, gamification can make learning more interactive and enjoyable, fostering a positive attitude towards learning. Despite its potential, there are challenges associated with implementing gamification effectively. One major issue is the over-reliance on extrinsic rewards, which can undermine intrinsic motivation and lead to superficial learning (Romsi et al., 2024; Slamet et al., 2024; Zainudin & Zulkiply, 2023). Research has shown that gamification can significantly enhance learning outcomes when implemented thoughtfully. A study by Kuswandi and Fadhli (2022) demonstrated that gamified learning environments improved vocabulary acquisition and engagement among early childhood learners. Similarly, Rodr√≠guez et al (2020) found that gamification increased motivation and participation in educational activities. However, these studies also highlight the importance of balancing extrinsic rewards with intrinsic motivation to ensure deep, meaningful learning. Despite these positive findings, research on the long-term effects of gamification in early childhood education is lacking. Most studies focus on short-term interventions, leaving a gap in evidence regarding the sustained impact on learning outcomes. Furthermore, more research is needed on how to tailor gamification to meet the specific needs of service children, who face unique educational challenges.

C. Digital Storytelling in Early Childhood Education

Digital storytelling combines the art of storytelling with multimedia elements, providing a powerful tool for language development and creative expression in early childhood education. It allows young learners to create and share their own stories using digital tools, fostering both language and digital literacy skills. However, the integration of digital storytelling into early childhood education is not without challenges. One significant issue is the need for appropriate digital tools and resources, which can be a barrier for schools with limited budgets (Churchill, 2020; Ong'ayi et al., 2020). Empirical studies have highlighted the benefits of digital storytelling in early childhood education. According to Rahiem (2021), digital storytelling enhances narrative skills, creativity, and engagement among young learners. Another study by Munawar et al (2021) found that digital storytelling activities led to higher levels of student participation and motivation. Despite these positive outcomes, standardized assessment methods to measure digital storytelling's effectiveness in early childhood education are lacking. Traditional assessments may not capture skills like creativity and digital literacy. Additionally, limited research exists on how digital storytelling can support service children, who face educational disruptions due to frequent relocations. Further research is needed to tailor digital storytelling to their specific needs and integrate it effectively into their education

D. Assessment in Early Childhood Education

Effective assessment is crucial for understanding and improving learning outcomes in early childhood education. However, traditional assessment methods, such as standardized tests, often fail to capture the full range of skills and abilities in young learners. This is particularly true for digital literacy and creative skills, which require more dynamic and formative assessment approaches (Churchill, 2020; Na et al., 2024). The challenge of assessing these skills is compounded by the rapid pace of technological change, which necessitates continuous adaptation of assessment tools and practices. Research has shown that formative assessment techniques, such as real-time feedback and performance-based tasks, can provide a more comprehensive understanding of student learning. (Romsi et al., 2024; Slamet et al., 2024) found that integrating formative assessment into gamified learning activities enhanced student engagement and learning outcomes. However, practical implementations of such assessments are still limited, and there is a need for more research on how to effectively assess digital literacy and language skills in early childhood education.

II. Method

A. Research Design

This study employed a mixed-methods approach to explore the impact of gamified digital storytelling on digital literacy skills and language comprehension in early childhood English education. This approach integrated both quantitative and qualitative methods to provide a comprehensive understanding of the educational interventions and their outcomes (Ivankova et al., 2006; Slamet, 2024). Quantitative data were gathered through mid-term and post-test evaluations, while qualitative insights were obtained from interviews with educators to explore their perceptions of the program. The study spanned a full semester of 14 weeks. The syllabus was designed around five broad thematic units, each featuring a digital story at its core.

Mixed methods research is an approach that combines quantitative data, which consists of numbers and statistics, with qualitative data, which is based on narratives and

descriptions, within a single study. This method aims to leverage the strengths of both approaches to provide a more comprehensive and in-depth understanding of the problem being investigated. Table 1 presents the thematic units and their corresponding stories:

Table 1. Thematic units of the stories

Thematic Unit	Story
Colors	Our Colorful World
Numbers	Numbers Through Stories
Family	Our Family Tales
Animals	Animal Adventures
Face and Body Parts	Our Amazing Bodies

B. Participants

The study involved 60 preschoolers aged 4-6 years from TK Aisyiyah Bebekan Sepanjang in East Java, Indonesia. The participants were selected to represent a diverse range of backgrounds, including service children, ensuring the findings would be applicable to a broad population. Six educators who implemented the program were also involved in the study. These educators provided valuable insights through interviews regarding the challenges and benefits of using gamified digital storytelling in early childhood education.

C. Instruments

Digital Literacy Skills through Digital Storytelling have a Cronbach's alpha value of (0.1342) or a significance value smaller than the 5% significance level, so it is concluded that the question items are valid, and if the alpha value > 0.60, it is called reliable

1) Mid-term and Post-test Evaluations:

These assessments were designed to measure the students' digital literacy skills and language comprehension. The tests included tasks and questions aligned with the thematic units covered in the syllabus. Table 2 presents the assessment rubrics and focuses:

Table 2. Assessment rubrics and focuses

Assessment Focus	Rubric Description	Mid-term Evaluation	Post-test Evaluation
Digital Literacy Skills	Ability to navigate digital tools and resources	1. Limited recognition and basic use of icons/functions, needing constant support. 2. Adequate navigation skills with occasional support, demonstrating partial independence. 3. Good navigation skills with minimal assistance, showing substantial independence. 4. Advanced navigation skills with little to no assistance, exhibiting high independence. 5. Expert navigation skills with complete independence and mastery of all tools.	1. Basic proficiency with some guidance. 2. Proficient use independently with occasional assistance. 3. Excellent proficiency independently and effectively. 4. Advanced proficiency independently and effectively. 5. Expert proficiency independently and innovatively.
Language Comprehension	Understanding and interpreting digital stories	1. Limited understanding, requiring frequent guidance. 2. Adequate identification of main ideas with occasional support, demonstrating partial independence. 3. Good comprehension skills with coherent and detailed retelling, showing substantial independence. 4. Advanced comprehension with nuanced interpretation, exhibiting high independence. 5. Expert comprehension with insightful interpretation, demonstrating mastery.	1. Basic comprehension with guidance. 2. Proficient comprehension independently. 3. Excellent comprehension and comprehensive retelling. 4. Advanced comprehension and storytelling with innovation. 5. Expert comprehension and narrative innovation.
Engagement and Motivation	Participation in activities and enthusiasm	1. Limited participation and minimal engagement. 2. Adequate participation with some enthusiasm and involvement. 3. Good participation, high enthusiasm, and proactive engagement. 4. Advanced participation, exceptional enthusiasm, and proactive leadership. 5. Expert participation, outstanding enthusiasm, and innovative leadership.	1. Basic participation with occasional engagement. 2. Proficient participation with sustained enthusiasm. 3. Excellent participation and sustained enthusiasm. 4. Advanced participation and exceptional enthusiasm. 5. Expert participation and outstanding enthusiasm.
Story Retelling	Ability to retell stories with correct sequence and details	1. Limited ability with significant guidance. 2. Adequate retelling with occasional guidance, demonstrating partial independence. 3. Good retelling skills with accurate sequence and details, showing substantial independence. 4. Advanced retelling with nuanced interpretation, exhibiting high independence.	1. Basic ability with minimal coherence. 2. Proficient retelling independently. 3. Excellent retelling skills and narrative coherence. 4. Advanced retelling with innovation and creativity.

Assessment Focus	Rubric Description	Mid-term Evaluation	Post-test Evaluation
		5. Expert retelling with insightful interpretation and creative delivery, demonstrating mastery.	5. Expert retelling with exceptional creativity.

2) Interviews:

Semi-structured interviews were conducted with the six educators to gather qualitative data. The interviews focused on the following dimensions:

- *Benefits of Digital Storytelling:* Educators shared their views on the effectiveness and appeal of digital storytelling, highlighting its positive impact on student engagement and motivation.
- *Challenges in Implementation:* Educators discussed the difficulties faced in integrating gamified digital storytelling, including technical challenges and variations in student readiness.
- *Impact on Skills Development:* The interviews revealed specific improvements in students' digital literacy skills and language comprehension, emphasizing the overall enhancement in learning outcomes.

D. Data Collection Procedure and Data Analysis

Data collection was conducted in two main stages. First, quantitative data were collected through mid-term and post-test evaluations administered to the students. These tests were designed to be age-appropriate and engaging, incorporating elements of the digital stories to maintain student interest. Second, qualitative data were gathered through interviews with the educators. The interviews were conducted at the end of the semester, providing a comprehensive overview of their experiences with the program.

Quantitative data from the mid-term and post-test evaluations were analyzed using descriptive and inferential statistics to determine the effectiveness of the program in enhancing digital literacy and language comprehension. Specific statistical methods included paired t-tests to compare pre- and post-test scores. Qualitative data from the interviews were analyzed using thematic analysis, identifying common themes and patterns in the educators' responses. This mixed-methods approach allowed for a robust analysis of the data, combining numerical measures of student progress with in-depth qualitative insights.

E. Ethical Clearance

Ethical clearance for the study was obtained from the relevant institutional review board at Universitas Muhammadiyah Surabaya. Informed consent was obtained from the parents or guardians of the preschoolers participating in the study. The educators also provided informed consent to participate in the interviews. The study was conducted in accordance with ethical guidelines to ensure the confidentiality and welfare of all participants. All data collected were anonymized to protect participants' identities.

It is known that if the sig. value for each variable is > 0.05, it is concluded that heteroscedasticity has not occurred. In other words, the assumption of non-heteroscedasticity has been met.

It is known that the independent variables in this research have Variance Inflation Factors smaller than 10, so there are no signs of multicollinearity among the independent variables.

III. Results and Discussion

A. Impact of Gamified Digital Storytelling on Digital Literacy Skills in Early Childhood English Education

To investigate the impact of gamified digital storytelling on digital literacy skills in early childhood English education, we analyzed the mid-term and post-test evaluation scores of 60 preschoolers at TK Aisyiyah Bebekan Sepanjang, East Java, Indonesia. The evaluations assessed students' ability to navigate digital tools, recognize basic icons and functions, and demonstrate proficiency with educational apps. Our findings reveal significant improvements in digital literacy skills, indicating the effectiveness of gamified digital storytelling as a pedagogical approach.

The data presented in Table 3 show the mean scores for digital literacy skills during the mid-term and post-test evaluations. The mean score increased from 2.35 (mid-term) to 3.55 (post-test), indicating an overall improvement in digital literacy skills among the students. Moreover, the paired samples test results in Table 4 provide a detailed statistical analysis of the significance of this improvement. The mean difference between the mid-term and post-test evaluations is -1.20, with a standard deviation of 0.87. The t-value of -10.91 with 59 degrees of freedom and a significance level of 0.000 indicates that the improvement in digital literacy skills from mid-term to post-test is statistically significant. These results confirm that gamified digital storytelling significantly enhances digital literacy skills in early childhood English education. The substantial increase in mean scores from mid-term to post-test evaluations reflects the positive impact of this educational approach. This indicates that incorporating gamified digital storytelling in early childhood education can effectively promote digital literacy and learning outcomes.

Table 3. Paired samples statistics

	Mean	N	Std. Deviation	Std. Error Mean
Mid-term Evaluation	2.35	60	0.97	0.13
Post-test Evaluation	3.55	60	0.98	0.13

Table 4. Paired samples test

Paired Differences	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference	t	df	Sig. (2-tailed)
Mid-term Evaluation - Post-test Evaluation	-1.20	0.87	0.11	-1.42 to -0.98	-10.91	59	0.000

B. *Challenges and Benefits of Gamified Digital Storytelling for Service Children*

Gamified digital storytelling has emerged as a valuable educational tool in early childhood education for service children, presenting both notable benefits and significant challenges. Insights gathered from interviews with six educators (T1-T6, anonymous) illuminate their perspectives on the effectiveness of this approach, the hurdles they encounter in its implementation, and the observed impacts on students' skill development.

1) Perceptions and Benefits of Digital Storytelling

Educators expressed strong support for gamified digital storytelling, highlighting its ability to enhance student engagement and motivation. T1 remarked, "The use of digital stories transforms our lessons into dynamic experiences. Children are not just passive listeners; they actively participate and respond." T2 added, "The visual elements and interactivity draw the children in, making learning enjoyable and memorable." T3 emphasized the educational value, stating, "When stories are gamified, students connect emotionally, which deepens their understanding of the content." T4 reflected, "I've noticed that they remember key concepts better when taught through stories; it resonates with them on a personal level." T5 observed, "The excitement they show during storytelling sessions translates into increased participation in other activities as well." T6 concluded, "Digital storytelling not only engages them but also cultivates a love for reading, which is foundational for their literacy development." The positive feedback from T1-T6 underscores the transformative nature of gamified digital storytelling in creating an interactive learning environment. By facilitating emotional connections and fostering active participation, educators can effectively enhance students' engagement and retention of knowledge. These insights highlight how narrative-driven education not only captures students' attention but also promotes a deeper comprehension of complex ideas, demonstrating the pedagogical value of integrating storytelling in early childhood curricula.

2) Challenges in Implementation

Despite the advantages, educators highlighted several challenges in integrating gamified digital storytelling. T1 expressed concern about technical issues: "Connectivity problems can disrupt the lesson flow, leaving students frustrated and disengaged." T2 mentioned, "The variability in students' technological skills can create disparities in participation. Some are eager and tech-savvy, while others struggle." T3 elaborated, "Inconsistent access to devices can be a barrier, especially when we have limited resources." T4 noted, "Managing the technology while trying to facilitate the lesson can be overwhelming at times." T5 added, "Training is crucial; we need to feel confident using these tools to maximize their potential." T6 pointed out, "When technology fails, it can lead to a loss of momentum and interest, making it harder to re-engage students." These challenges reveal the practical barriers educators face when implementing gamified digital storytelling. Issues such as technical difficulties, varying levels of student readiness, and resource constraints can hinder effective teaching and learning experiences. Recognizing these obstacles is essential for developing strategies that support educators in overcoming them. Professional development and adequate technical support can enhance teachers' confidence and efficacy in using digital storytelling as an instructional tool.

3) Impact on Skills Development

Educators provided compelling evidence of the positive impact of gamified digital storytelling on students' skill development. T1 observed, "There's a noticeable improvement in their ability to navigate digital tools; they approach technology with curiosity and confidence." T2 remarked, "Students demonstrate greater comprehension of stories, often able to summarize key points and express their thoughts clearly." T3 noted, "They are using new vocabulary and concepts they learned from our stories in their conversations." T4 shared, "Digital storytelling encourages collaboration; I see them discussing and debating ideas more frequently." T5 added, "The skills they develop through this medium extend beyond literacy; it fosters critical thinking and creativity." T6 concluded, "Overall, their communication skills have improved significantly, which I attribute to the engaging nature of storytelling." The insights from T1-T6 highlight the educational benefits of gamified digital storytelling, particularly in enhancing digital literacy and language comprehension. These developments are crucial for equipping young learners with essential skills for their

academic journey. By improving digital literacy and language skills, gamified digital storytelling aligns with educational goals aimed at fostering comprehensive skill sets in early childhood education, preparing students for future academic and social success.

Overall, while gamified digital storytelling offers substantial benefits in enhancing engagement and skills development among service children, it also presents implementation challenges that require thoughtful consideration. The experiences and perspectives of educators underscore the importance of ongoing support, professional development, and adaptive teaching strategies to maximize the educational potential of digital storytelling in diverse learning environments.

This study investigates the impact of gamified digital storytelling on digital literacy skills in early childhood English education, integrating insights gathered from mid-term and post-test assessments. The findings illuminate educators' perceptions of gamified digital storytelling as a robust tool for enhancing student engagement and motivation, aligning with literature that highlights the efficacy of interactive narrative-based learning approaches.

From the mid-term and post-test assessments, significant improvements were observed in students' digital literacy skills and comprehension abilities following engagement with gamified digital storytelling activities. Educators reported a noticeable increase in student engagement levels throughout the study period, underscoring the interactive and captivating nature of digital storytelling. These findings corroborate previous research emphasizing that interactive learning environments are pivotal in fostering sustained student engagement and deeper emotional connections with educational content (Churchill, 2020; Na et al., 2024). The integration of gamified elements in storytelling not only captivates students' attention but also enhances their retention and understanding of the material, as evidenced by the positive outcomes observed in both assessments (Korosidou & Bratitsis, 2021; Romsi et al., 2024; Slamet et al., 2024).

The interviews with six educators revealed a unanimous perception that gamified digital storytelling significantly enhances student engagement levels. Educators noted that children actively participate in the learning process rather than being passive recipients of information. This active engagement is crucial as it fosters deeper emotional connections with the educational content. These findings resonate with previous research, which highlights the importance of interactive environments in promoting student engagement (Kingsley & Grabner-Hagen, 2015; Lamrani & Abdelwahed, 2020; Rodríguez et al., 2020). The current study demonstrates that integrating gamified elements into storytelling captivates students' attention, thereby improving memory retention and comprehension of educational content. However, the study also identifies challenges encountered during the implementation of gamified digital storytelling. Technical issues, varying levels of students' digital literacy proficiency, and the need for comprehensive teacher training emerged as prominent barriers. These challenges echo findings from Churchill (2020) and Kuswandi and Fadhli (2022), highlighting the critical role of adequate technical support and professional development for educators in successful technology integration. Despite these obstacles, the study underscores the potential of gamified digital storytelling to transform learning experiences by promoting active student participation and fostering a collaborative learning environment.

Moreover, the study underscores the significant strides made in skills development among students. Educators observed tangible improvements in digital literacy skills and language comprehension, attributing these advancements directly to the interactive and participatory nature of gamified storytelling. These findings align with previous research suggesting that technology-enhanced literacy instruction enhances critical thinking and communication skills among students (Alt & Raichel, 2020; Zainudin & Zulkiply, 2023). The study further illustrates how gamified storytelling facilitates vocabulary acquisition and stimulates collaborative learning interactions among peers, reinforcing the importance of interactive educational strategies in early childhood education. Additionally, educators noted broader positive impacts on students' attitudes towards learning. Increased curiosity and proactive engagement with new concepts were evident, indicating a transformative effect on learning attitudes. This finding supports gamification impact which emphasizes the role of interactive learning environments in fostering independent thinking and inquiry skills (Jogo et al., 2022). By encouraging students to explore and inquire autonomously, gamified digital storytelling nurtures a culture of curiosity and lifelong learning among young learners. Despite the evident benefits, the study identifies areas requiring further exploration. Educators' enthusiasm notwithstanding, the variability in students' readiness for digital tools underscores the importance of personalized instructional approaches. Previous research underscores that student readiness significantly influences the effectiveness of technology integration (Alt & Raichel, 2020; Kingsley & Grabner-Hagen, 2015; Munawar et al., 2021). Thus, future research should focus on tailoring digital storytelling experiences to accommodate diverse learner needs effectively.

Overall, this study contributes valuable insights into the potential of gamified digital storytelling as a transformative educational tool in early childhood English education. By addressing implementation challenges and maximizing the benefits of interactive storytelling, educators can create enriching learning environments that enhance digital literacy skills and cultivate a lifelong

passion for learning among young children. Future research should continue to explore the long-term impacts of digital storytelling on learning outcomes and develop strategies to overcome implementation barriers effectively.

IV. Conclusion

This study explored the impact of gamified digital storytelling on digital literacy skills in early childhood English education, revealing both significant benefits and notable challenges. The findings indicate that gamified digital storytelling enhances student engagement and motivation, fostering active participation in learning processes. Educators observed marked improvements in students' digital literacy skills and language comprehension, demonstrating the potential of this approach to facilitate deeper understanding and retention of educational content. However, the study also identified several challenges associated with implementing gamified digital storytelling. Technical difficulties, varying levels of digital literacy among students, and the necessity for targeted teacher training emerged as significant barriers. These challenges underscore the need for adequate technical support and professional development to ensure successful integration of technology in the classroom. The implications of these findings are profound, suggesting that while gamified digital storytelling holds great promise for enhancing early childhood education, careful consideration of implementation strategies is essential. Educators must be equipped with the necessary tools and training to navigate potential obstacles effectively, ensuring that all students can benefit from this innovative teaching method.

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