



Application and Challenges of Digital Storytelling Based Artificial Intelligence for Language Skills: A Narrative Review

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ABSTRACT

Digital storytelling, coupled with Artificial Intelligence (AI), has emerged as a powerful tool for enhancing language skills in learners. This study explores the multifaceted applications of digital storytelling based AI in the realm of language education, shedding light on its pedagogical benefits and innovative possibilities. However, while the potential of AI digital storytelling is promising, it also presents several significant challenges. It critically examines the challenges and offer insights into its application for language classroom. The data were 12 journal publications studied searched on the Publish or Persih, Google Scholar and Scopus database and its publication time range is in 2020- 2023. By conducting narrative review, this study provides a comprehensive overview of the evolving intersection of technology and the benefits of AI- digital storytelling in language education. The findings indicates that some studies shows the success of application Digital Storytelling especially based Artificial Intelligence however some aspects needed in applying AI based digital storytelling such as the necessity of addressing ethical considerations, data privacy, the digital divide, and teacher training to ensure successful implementation.

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1. Introduction

Technology has been more and more integrated into the educational environment in recent years due to its rapid development (Plowman, Stephen, & McKenzie, 2010; Donohue, 2014). It is also the case for early childhood education. While digital tools can present a plethora of opportunities for new researchers, practitioners, and students (Clements & Sarama, 2003) must make sure that the effective and responsible technology implementation is achieved (Flewitt, Messer, & Kucirkova, 2015). Consequently, being aware of how technology functions in early childhood education, especially its influence on the educational process, which has grown crucial for educators and legislators (Livingstone, 2012).

The art of storytelling has long been used in education as a means of fostering moral principles and an appreciation for the cultural diversity of others. It is also a teaching tactic to help students improve their language abilities (Wang & Zhan, 2010). It improves students' reading, writing, and verbal skills while promoting the use of imagination and creativity. Because of their fixation with technology, language teachers nowadays have a difficult time inspiring their students' reading abilities. Because of their excessive reliance on technology, students are considered digital natives. As a result, educators are eager to adopt the newest technological tools to supplement their traditional teaching methods in order to help students become more fluent in language (Morgan, 2012).

One genre that has been encouraged in language and literacy training is the digital story. Students gain computer skills and language proficiency, according to the instructor (Yit, Siew, & Hazita, 2015). For 12 weeks, students were given a project-based assignment called "Digital Storytelling," which helped them develop personal qualities like leadership, cooperation, self-management, and cooperation in addition to their academic abilities (Brenner, 2013). In their study, (Sepp & Bandi-Rao, 2015) found that digital storytelling is a useful tool for English language learners. Students find it enjoyable and it's technically accessible. By the end of the project, the study's participants had become more involved and confident in their communication abilities. Digital storytelling, a method of conveying information through a narrative format, has traditionally been a powerful tool for human communication and education.

Digital storytelling, coupled with generative AI have greater potential for education, especially when it comes to creating learning resources that are relevant to the learners' cultural context. By doing so, educators may produce content that is infused with regional traditions, values, and languages, therefore fostering in young learners a deep sense of kinship and belonging (Baskara, 2023). By engaging with these technologies, students learn to create meaningful narratives and become adept at navigating and leveraging digital tools for communication, collaboration, and problem-solving. Consequently, these skills prepare them for upcoming learning endeavors and professional opportunities in an interconnected digital world.

Baskara (2023) investigates the potential of Generative AI and digital storytelling for enhancing learning experiences in early education. The finding reveals that digital storytelling can create inclusive, engaging learning experiences that resonate with young learners, remarkably when grounded in their local community context. Ribeiro (2015) also found out that Digital Storytelling empowering, motivating and engaging the students. DST-based instruction also facilitated the conducive leaning environment of flipped classroom as student academic performance was enhanced (Lashari, 2022). Based on the previous studies, it has been recommended for future studies to be considered the collaboration of digital story telling pedagogies and generative AI to overcome the learning difficulties in learning English language.

2. Literature Review

2.1 Digital Storytelling (DST)

Since storytelling is a natural and effective way to convey and exchange knowledge and experiences, it has been employed throughout human and social development history as a tool for knowledge transmission and value sharing. Storytelling is a process where students personalize what they learn and develop their own meaning and knowledge from the stories they hear and tell. According to Behmer (2005, p. 105), its implementation in the classroom is also not new.

Studies on digital storytelling has been conducted in many places across the United States, Europe, Asia, and the Middle East. It has become a global field of study. DST is referred to as the "twenty-first-century learning mode" in Jenkins, Purushotma, Clinton, and Robison's 2009 description. The majority of current DST research, aside from writing about it for academic publications, focuses on assisting students in reaching their own or society's objectives (Hull & Katz, 2006; Hull, Zacher, & Hibbert, 2009; Stewart & Ivala, 2017). Similar to previous studies, DST has been shown to be highly significant in that it enables students to acquire proficiency in both simple and complex subjects as well as in writing and presenting.

Digital stories employed in the teaching-instruction environment frequently feature social, cultural, and linguistic aspects (Banaszewski, 2005; Yang & Wu, 2012; Demirer, 2013). Research on the application of digital storytelling, particularly in the training of physics subjects, is extremely limited. Digital storytelling has not yet been applied extensively in Pakistani physics education, with the exception of a few studies. In Pakistan, people are able to interact with physics through digital storytelling. People could use computers, smartphones, and the internet to access multimedia resources more effectively and efficiently and to benefit from them outside of the classroom. People can access digital stories related to physics themes at any time and from any location by using internet sharing.

2.2 Artificial Intelligence

Active learning in the twenty-first century is also known to have a very close association with the usage of technology. With the help of technology, students can study from a variety of sources in addition to their own textbooks and lecturers. It expanded into the huge potential that internal educators must see in order to apply learning.

The use of application technology in the classroom has beneficial influences on students. Artificial intelligence technology is one of the newest innovations that has been shown to positively impact the educational process. Artificial intelligence, stated by Rich and Knight in Amrizal and Aini (2013), is the technology that allows a computer to perform a task that is typically completed by a human. From the

perspective of aspect education, artificial intelligence has been demonstrated in several research that are recognized to have a major impact on students' learning processes (Groff, 2017). Although it is not new in some places, artificial intelligence has proven to have advantages.

Students can create posters or movies regarding supporting learning content to efficiently accomplish specific tasks with the help of this artificial intelligence (Yoga Siswa, 2020). Individual initiatives, for instance, advance the capacity to design tailored apps that support online public service systems without necessitating service users' physical visits to service places. These include all the comforts that artistic intelligence has to offer. For instance, it might be feasible to adopt a single online submission. Students can certainly develop web apps that make public service delivery easier.

2.3 Language Skills

Language skills encompass a multifaceted set of abilities that enable individuals to effectively communicate with others. The primary components of language skills include reading, writing, listening, and speaking. These skills are essential for effective communication and are often categorized as the fundamental abilities that enable individuals to express themselves clearly and precisely, as well as to understand and interpret the communication of others. These skills are essential for effective communication and are often categorized as the fundamental abilities that enable individuals to express themselves clearly and precisely, as well as to understand and interpret the communication of others.

Proficiency in reading involves the comprehension of written text, allowing individuals to extract meaning and information from diverse sources. Writing skills involve the ability to articulate thoughts, ideas, and information coherently in a written form, be it essays, reports, or creative works. While listening skills are crucial for understanding spoken language, including nuances in tone, inflection, and context. This skill is essential for effective communication in various settings, such as conversations, lectures, and presentations. In addition, speaking skills involve the ability to convey thoughts and ideas verbally, engaging in clear and effective communication. Mastery of language skills is not only about the technical aspects of grammar and vocabulary but also about the nuanced use of language to convey intended meanings, emotions, and nuances.

Language skills are foundational to academic success, professional achievement, and social interaction. They enable individuals to express themselves, understand others, and navigate complex social and professional environments. Moreover, language skills are dynamic and continue to evolve throughout one's lifetime, influenced by exposure to diverse linguistic contexts and ongoing learning experiences. Ultimately, a robust set of language skills enhances an individual's ability to participate actively in society, fostering effective communication and mutual understanding.

3. Method

This study was a narrative review in the context of language learning. Ford (2020) said that narrative literature review is a type of qualitative data analysis that focuses on interpreting the core narratives from personal stories. The objective of this model was to explore the various applications of digital storytelling based AI in language education, highlighting the applications and the challenges in implementing digital storytelling based artificial intelligence in the educational system. The data gathered from 12 journal publications studied searched on the Publish or Persih, Google Scholar and Scopus database and its publication time range is in 2020- 2023. In order for collecting the data, using keywords such as "digital storytelling based artificial intelligence," was how to search. Then, the PRISM method was utilized to carry out for analysis. These include the identification phase, screening phase, eligibility phase and inclusion phase (Nair &Yunus, 2021).

Phase 1 : Identification Phase

It involved identifying relevant studies. This phase consisted of collecting relevant articles and choosing suitable articles. Google Scholar and Scopus served as the study's main databases. Moreover, the publications included in this narrative review have their publication dates ranging from 2020 to 2023. The keywords used was digital storytelling based artificial intelligence.

Phase 2: Screening Phase

Duplicate papers were found and eliminated after the relevant papers from Publish or Perish, Google Scholar and Scopus were selected in this phase. After then, the papers were reexamined by reviewing the titles and abstracts of the studies to make sure the surviving ones still fulfilled the researcher's criteria.

Phase 3: Eligibility Phase

In the third phase, the collected articles were examined for eligibility; they had to meet the requirements listed in the Table 1. This is a crucial stage in guaranteeing the high quality and dependability of the data gathered for this investigation.

Table 1. Inclusion criteria

Inclusion criteria
Digital storytelling based artificial intelligence
Research methodologies :quantitative, qualitative, mixed method
Contribution and application of artificial intelligence and digital storytelling in education
Journals published between 2020-2023

Phase 4 : Inclusion Phase

After checking the eligibility in the third phase, the remaining articles were eliminated from this systematic literature review. It indicates that the remaining articles align with the research question and the predefined inclusion criteria.

4. Results and Discussions

The main goal of this study was to find out how well digital storytelling based artificial intelligence (AI) works in the classroom. This study specifically examined from 12 articles searched on the Publish or Persih, Google Scholar and Scopus database. Some studies have been conducted related to the digital storytelling, among them are:

NO	TITLE	YEAR	METHOD	DISCUSSIONS
1	Inclusive Digital Storytelling: Artificial Intelligence And Augmented Reality To Re-centre Stories From The Margins	2023	Pilot study	MEMEX, an interactive digital storytelling tool where Artificial Intelligence and Augmented Reality play enabling roles in support of the cultural integration of communities.
2	Fostering Professional Trainers With Robot-based Digital Storytelling: A Brainstorming, Selection, Forming And Evaluation Model For Training Guidance	2023	Experimental research	The approach improved professional trainers' learning effectiveness, quality, attitude, satisfaction, and critical thinking awareness.
3	Using Chatgpt To Investigate Trends In Digital Storytelling And Knowledge Sharing In Higher Education	2023	Literature review	ChatGPT is a powerful complementary tool promising effective and efficient ways to aid in the research process by using artificial intelligence.
4	Innovative Digital Storytelling With AIGC: Exploration And Discussion Of Recent Advances	2023	Qualitative research method	AIGC, while proficient in image creation, voiceover production, and music composition, falls short of replacing humans due to the irreplaceable elements of human creativity and aesthetic, especially in complex character animations, facial expressions, and sound effects.
5	Centering The Human: Digital Humanism And The Practice Of Using Generative AI In The Authoring Of Interactive	2023	Qualitative method	GenAI's capacity to augment human narrative creation and unveils the complexities of its

	Digital Narratives			incorporation, including potential risks such as data exploitation, displacement of human labor, and the potential diminishment of human agency and creativity.
6	Fostering Culturally Grounded Learning: Generative Ai, Digital Storytelling, And Early Childhood Education	2023	Literature Review	The role of educators in harnessing Generative AI's potential within early childhood education, from curriculum design to classroom implementation. In addition, the use of robotics and play-based learning to make AI more accessible to young children.
7	Working With Intelligent Narrative Technologies	2023	Qualitative	AI can be utilized in the creation of narrative systems, exploring the successes and open research questions pertaining to the use of narrative intelligence in entertainment, education, and training.
8	Digital Storytelling Outcomes, Emotions, Grit, And Perceptions Among EFL Middle School Learners: Robot-assisted Versus Powerpoint-assisted Presentations	2021	Mixed method	Robot-assisted presentations have a positive impact on the emotions, grit, and perceptions of EFL middle school learners compared to PowerPoint-assisted presentations
9	Hey Siri, Tell Me A Story: Digital Storytelling And AI Authorship	2022	Literature review	The possibility of replacing striking screenwriters with AI authors, noting that increasingly, AI agents and virtual assistants like Siri, Cortana, Alexa, and Google Assistant are incorporated into our daily lives. The factors that limit the literary potential of narrative creation by machines, such as comprehensibility and innovation.
10	Digital Interaction Literacy Model – Conceptualizing Competencies For Literate Interactions With Voice-based AI Systems	2023	Qualitative method	The importance of developing AI literacy as a key competency for individuals in the digital era, and the model provides a guideline for educators and policymakers to promote literate interactions with AI-based systems.

11	Brand Storytelling In The Age Of Artificial Intelligence	2021	case studies, surveys, interviews, data analysis, comparative analysis, and trend analysis	AI in content creation for brand storytelling offers benefits such as personalization, efficiency, creativity, relevance, and measurement, and it is poised to shape the future of brand storytelling
12	Rethinking Of Artificial Intelligence Storytelling Of Digital Media	2020	case studies, surveys, interviews, data analysis, comparative analysis, and trend analysis	AI storytelling in the digital media age offers tremendous opportunities to enhance brand storytelling, enabling brands to leverage data-driven insights, cultural references, and emotional cues to create engaging and relevant narratives that resonate with their target audience

Applications

The findings of some papers found that some digital storytelling based artificial intelligence were applied in various ways. Nisi, et.al (2023) found out that the concept of inclusive digital storytelling, utilizing artificial intelligence (AI) and augmented reality (AR) to re-center stories from the margins, has been the focus of the MEMEX project. This project has developed an interactive digital storytelling tool where AI and AR play enabling roles in support of social inclusion. The MEMEX project aims to bridge the digital divide and help marginalized groups participate in societal progress by leveraging technology such as AI and AR. The research was supported by MEMEX (MEMories and EXperiences for Inclusive Digital Storytelling) and the Portuguese Recovery and Resilience Program, among others. The use of digital storytelling, AI, and AR is seen as a means to create a shared cultural heritage and facilitate social inclusion, particularly for immigrant communities. The MEMEX project, launched in 2019, focuses on developing AI and AR technologies to aid social inclusion.

The study conducted by Chang, Hwang, & Chen (2023) proposes an approach based on a brainstorming, selection, forming, and evaluation model using robot-based digital storytelling to improve the learning effectiveness and quality of professional trainers. An experiment conducted in a nursing training program demonstrated the positive impact of the approach. The model aims to enhance the training guidance for professional trainers through the use of robot-based digital storytelling, offering a promising method to elevate the effectiveness of training programs in various domains. The results showed that in comparison with the conventional DST (C-DST) learning approach, the R-DST learning approach could enhance professional trainers' learning achievement, learning attitude, critical thinking awareness, and learning satisfaction. On the other hand, it also increased their cognitive load. While study by Cranfield, Venter, & Daniels (2023) found out that ChatGPT is a powerful complementary tool promising effective and efficient ways to aid in the research process by using artificial intelligence.

Hence, it can be concluded that using digital story writing (DSW) in the classroom is an effective inquiry-based pedagogical approach to address literacy development by improving language and technological abilities across disciplines. However, some AI based applications used for digital storytelling are various such as Storybots, CHATGPT, story generator, Siri, Cortana, Alexa and Google Assistant,. Some studies had trained high-level AI to help students learning language. It is found that the participating students were able to propose an authentic scenario, apply their new knowledge of AI and think up meaningful AI-driven solutions in their digital stories. The participating students were enthusiastic in applying Artificial Intelligence especially for digital storytelling.

Challenges

Although some findings of some studies shows the success of application Digital Storytelling especially based Artificial Intelligence (Tarigan &Hasibuan,2023; Baskara, 2023) for teaching learning process, it was found that study of working with intelligent narrative technologies presents several challenges of using AI in narrative systems. The research highlights the potential risks associated with the use of AI in narrative systems, such as data exploitation, displacement of human labor, and the potential diminishment of human agency and creativity. In addition, some studies had trained high-level AI to help students write better stories. However, some studies also found that many people failed to brainstorm story settings and struggle with technical challenges or digital competencies and feel difficult to produce multimedia elements (e.g., graphics, animation) using digital tools. Hence, some aspects needed in applying AI based digital storytelling such as the necessity of addressing ethical considerations, data privacy, the digital divide, and teacher training to ensure successful implementation.

5. Conclusion

This study analysed 12 articles on the application and challenges of digital storytelling based artificial intelligence and it was shown that digital storytelling has a variety of implementation and challenges that play a vital role in education. The application of digital storytelling based on artificial intelligence (AI) for language skills has shown great promise in revolutionizing language education. By integrating Artificial Intelligence into language learning platforms, a shift towards personalized and interactive learning experiences were proved based on some studies. It was found out that the participating students were able to propose an authentic scenario, apply their new knowledge of AI and think up meaningful AI-driven solutions in their digital stories. However, this innovative approach also comes with its set of challenges.

Moreover, while AI facilitates personalized learning paths, there is a need for continuous improvement in the algorithms to better understand and adapt to the diverse learning styles of individuals. The integration of multimodal elements, conversational agents, and story creation tools presents technical and pedagogical challenges that require ongoing research and development. In navigating these challenges, the potential benefits of digital storytelling with AI in language education remain significant. As technology continues to advance, addressing these challenges will pave the way for more effective, inclusive, and culturally sensitive language learning experiences, ultimately contributing to the broader goal of fostering global communication and understanding.

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