| **RESEARCH ARTICLE**

AI-Driven Digital Storytelling: A Strategy for Creating English as a Foreign Language (EFL) Materials

Jose Belda-Medina[1] ✉ **and Max Benjamin Goddard[2]**
[1]Senior Lecturer, Dept. of English Studies, Digital Language Learning (DL2), University of Alicante, Alicante, Spain
[2]Teaching Assistant, Dept. of English Studies, University of Alicante, Digital Language Learning (DL2), Alicante, Spain
Corresponding Author: Jose Belda-Medina, **E-mail**: jr.belda@ua.es

| **ABSTRACT**

This study aimed to explore the intersection of Artificial Intelligence (AI) tools and digital storytelling in the context of English as a Foreign Language (EFL) education among pre-service teachers. Conducted with third-year college students enrolled in a teacher training program, the study focuses on three main objectives: assessing the participants' prior knowledge of AI tools for EFL material creation, examining their attitudes towards the use of AI in language education, and evaluating the impact of collaborative digital storytelling projects on their perspectives towards integrating AI tools in educational settings. Employing a mixed-methods approach, the study engaged a convenience sample of 115 pre-service teachers, utilizing both quantitative and qualitative research instruments such as a pre-post-test based on the Technology Acceptance Model (TAM) and class discussion. Quantitative data were analyzed using SPSS, while qualitative insights were derived through QDA Miner to ensure a comprehensive understanding of the participants' experiences and viewpoints. The findings reveal a notable gap in the pre-service teachers' prior knowledge of AI tools designed for educational purposes, indicating a limited exposure to or engagement with such technologies in their training. Despite this low level of familiarity, the study uncovers a predominantly positive attitude towards the adoption and integration of AI tools in language education. This positive disposition suggests an openness among future educators to explore and incorporate innovative technologies that can enhance teaching and learning experiences in EFL contexts. The research highlights how the practical experience of creating collaborative digital storytelling narratives using AI tools can positively influence pre-service teachers' attitudes towards technology integration. This shift in perspective underscores the potential of hands-on, project-based learning experiences to enrich teacher training programs by fostering a more receptive and adaptive mindset towards the use of emerging technologies in educational settings. The study underscores the importance of integrating AI and digital storytelling into teacher education curricula to better prepare pre-service teachers for the evolving demands of the digital age, advocating for a more informed, and innovative approach to EFL material development and teaching strategies.

1. Introduction

The integration of Artificial Intelligence (AI) marks a significant evolution from traditional to AI-driven storytelling (Aydemir & Fetha, 2023; Tarigan, 2024). Historically, traditional storytelling has played a crucial role in language learning, engaging students and enhancing their linguistic skills through captivating narratives that foster oral communication, vocabulary development, and cross-cultural understanding (Sabari & Hashim, 2023). This method, rooted in the holistic engagement of learners and addressing multiple intelligences, has proved more effective and engaging than conventional teaching materials (Nair et al., 2021).

As educational technology advanced, digital storytelling emerged, revolutionizing the way stories are told and consumed. By allowing for the inclusion of various media elements, digital storytelling has made language learning more interactive and immersive, improving students' information and media literacy skills alongside their linguistic abilities (Nisi et al., 2023). This technological integration facilitates a more comprehensive approach to language education, connecting learners and enabling them to share their narratives with a broader audience, thus enriching their learning experience with a global perspective (Ates, 2022).

The advent of AI-driven storytelling further transforms educational practices by leveraging machine learning and Natural Language Processing (NLP to create engaging, animated narratives from text. This progression not only simplifies content creation but also enhances storytelling with AI-generated characters, offering unprecedented opportunities for innovation and diversity in the classroom. AI tools can adapt learning materials to the needs of a wide range of learners, including those with special needs.

In the EFL classroom, the use of AI-driven digital storytelling represents a promising avenue for creating more diverse and innovative educational materials (Moulieswaran & Kumar, 2023). By integrating AI tools, educators can develop content that is not only linguistically enriching but also culturally innovative, ensuring that all students, regardless of their background or learning abilities, have access to quality language education (Dhanapal et al., 2024). This shift towards AI-enhanced storytelling underscores the potential of emerging technologies to foster a more effective, and innovative language learning environment (Almelhes, 2023)t.

Despite the transformative potential of AI in creating innovative digital storytelling environments, there remains a notable scarcity of research on the application of AI-driven tools in language learning. This gap is particularly evident in studies exploring how AI can enhance digital storytelling to promote students' creative skills and produce EFL materials that reflect the diversity of student experiences. The need for further investigation into utilizing AI to craft more innovative digital narratives in language education is crucial for advancing pedagogical practices and ensuring equitable access to quality learning opportunities for all students (Son et al., 2023).

This research paper explores the convergence of Artificial Intelligence (AI) tools, digital storytelling, and EFL education, particularly focusing on pre-service teachers. It assesses how AI can enrich digital storytelling to create more engaging and innovative EFL learning environments. Through a mixed-methods analysis of responses from 115 participants, the study provides insights into pre-service teachers' knowledge and attitudes towards AI in language teaching through the Technology Acceptance Model (TAM), alongside the impact of AI-enhanced storytelling on fostering an innovative educational setting.

2. Literature Review

The evolution from traditional to digital storytelling in language learning signifies a transformative shift in educational practices, offering a multifaceted approach to language acquisition (Belda-Medina, 2022). Digital storytelling, integrating multimedia elements like images, text, audio, and video, enhances language learning by providing an interactive experience that caters to various learning styles (Kahanurak et al., 2023). This shift from traditional methods to digital narratives not only retains the motivational and engaging aspects of storytelling but also introduces a layer of digital literacy, enriching students' linguistic and cultural competencies. Further, digital storytelling promotes a personalized learning experience, improving communication skills and fostering an integrated language learning approach (Raffone, 2022).

Several authors have highlighted the affordances of integrating Digital Storytelling in language education. Ribeiro (2015) underscored the benefits of it as a creative process, emphasizing its role in fostering overall student development, and enhancing digital literacy, interpersonal relationships, and self-awareness. This author also established a connection between digital storytelling and the enhancement of the four fundamental language-learning skills, presenting it as an integrated approach to language education. Liu et al. (2018) explored the integration of a free-space digital storytelling approach in an elementary classroom in Taiwan, highlighting student autonomy and creativity. With sixty-four sixth graders participating, the study utilized motivation tests, achievement tests, and digital story projects to assess the impacts on language learning motivation and performance. The findings indicated significant, varied effects of language usage and creativity on learning outcomes, with digital storytelling enhancing both language skills and motivation, particularly in extrinsic goal orientation and elaboration. Similarly, Anderson et al. (2018) delved into the impact of multilingual digital storytelling (MDST) on multiliteracies through the critical connections project. Their research highlighted the importance of storytelling in self-expression and cultural engagement, leveraging digital platforms for multimodal and collaborative storytelling across different contexts. It pointed out the necessity for multilingual approaches within multiliteracies research, advocating for educational practices that recognize and utilize the unique expressive capabilities of each language, thereby promoting an innovative and integrated approach to language learning. The study called for a greater policy and teacher development focus on multilingualism within the multiliteracies framework.

More recently, Ahmad and Yamat (2020) conducted a comparative study of conventional and digital storytelling methods in learning English among young students, focusing on learners' perceptions. Their research revealed a preference for digital storytelling, noting that it made English learning more enjoyable and understandable. Students reported greater engagement and attentiveness with digital methods, highlighting the effectiveness of integrating technology into language learning. This study underscored the potential of digital storytelling in enhancing motivation, comprehension, and participation in the EFL classroom, suggesting a shift towards more interactive and technologically integrated teaching approaches. Likewise, Budianto et al. (2021) investigated the use of digital storytelling combined with discovery learning in EFL listening classes for middle school students. The qualitative study, involving in-depth interviews, classroom observations, and open-ended questionnaires with one teacher and thirty students, indicated that digital storytelling enhanced student engagement, motivation, and listening skills, though limited vocabulary was a challenge. The study emphasized the need for EFL teachers to incorporate relevant vocabulary support during digital storytelling sessions to facilitate effective communication skills development in students.

The impact of employing digital storytelling on various language skills (reading, speaking, listening, writing) has been examined across diverse educational levels (Torku et al., 2017; Rahman et al., 2020). Ong & Vahid Aryadoust (2022) scrutinized the methodological quality of digital storytelling (DS) research on children's language learning, but the author stressed the need for more rigorous methodological standards in some studies to ensure their robustness and reliability, offering suggestions for future research directions. At the higher education level, Tyrou (2022) examined how digital storytelling impacts undergraduate students' engagement and skill development in foreign language learning. The study revealed digital storytelling's significant role in enhancing communication abilities, creativity, and motivation among learners. By facilitating authentic language use and improving pronunciation, digital storytelling emerged as a key educational tool, enriching the learning experience and teaching practices in foreign languages.

In teacher training programs, Maruf & Halyna (2023) conducted a qualitative study to explore English as a Foreign Language (EFL) teachers' perceptions and interpretations of digital storytelling. Engaging seven EFL teachers with experience in digital storytelling in their instructional practices, the research uncovered positive perceptions towards using digital storytelling as a pedagogical tool. Teachers appreciated its creativity, engagement potential, and facilitation of language acquisition and cultural understanding. However, they also noted

However, most of these studies were based on the integration of digital storytelling before the emergence and widespread of Artificial Intelligence (AI) tools in education. The integration of AI tools in this domain represents the next frontier, offering the potential to create more innovative and tailored educational experiences. AI's adaptability facilitates personalized learning experiences, addressing the diverse needs of learners (Moulieswaran & Kumar, 2023). This technology's integration into teacher training programs underscores its importance in preparing educators to utilize digital tools effectively in language education (Tarigan et al., 2024). The use of generative AI platforms for creating digital stories has been found to influence narrative intelligence and writing self-efficacy in undergraduates. Additionally, student-created digital stories provide opportunities for multimodal learning and flexibility in how students relate to the curriculum, thereby enhancing their learning experience (Dhanapal et al., 2024). A systematic review of the literature on the use of AI in story-writing was conducted, highlighting the growing interest in this area (Fang et al., 2023). These findings demonstrate the potential of AI in creating digital stories to support educational objectives. AI tools such as Jasper AI, Visme, and Murf AI offer a spectrum of functionalities for digital storytelling, from AI-powered writing assistance to creating visual narratives and enhancing storytelling with innovative technology. These tools exemplify AI's versatility in digital content creation, enabling personalized and engaging storytelling across different media.

Nevertheless, the use of AI in digital storytelling faces challenges, including its struggle to match human creativity and emotional depth, difficulties in grasping context, tone, and narrative nuances, and producing content that may seem impersonal (Tarigan et al., 2024). Additionally, ethical concerns regarding privacy and confidentiality emerge with AI's application in storytelling (Moulieswaran & Kuma, 2023). These limitations underscore the importance of balancing AI's capabilities with the human touch and ethical considerations in storytelling endeavors. Research on the use of AI tools in creating digital narratives for language education is scarce. For this reason, this paper analyzes pre-service teachers' skills in using such tools in the English as a Foreign Language (EFL) classroom and their perceptions of using AI tools for digital storytelling and language education through the Technology Acceptance Model (TAM).

3. Methodology
3.1. Objectives
This research paper has three main objectives :

- To analyze pre-service teachers' previous knowledge of AI tools for EFL material creation, aiming to identify their initial competence and familiarity with digital tools that can enhance language learning through innovative methods.

- To examine pre-service teachers' attitudes towards the use of AI tools in language education, focusing on their perceptions, openness, and potential concerns through the Technology Acceptance Model (TAM).

- To evaluate the impact of employing AI tools in the creation of collaborative digital storytelling narratives on pre-service teachers' attitudes and perceptions, assessing how hands-on experience with AI-driven storytelling can influence their perspective on the utility and effectiveness of AI tools.

3.2. Context and sample

The research utilized convenience sampling with 115 third-year college students from a middle-sized Spanish university, focusing on their EFL teacher training. Engaged in a mandatory Applied Linguistics course based on Project-based Learning (PBL), students were required to create collaborative digital projects aimed at teaching English, including a third project on AI integration in language education. Female students constituted 84% of the sample, with 93% aged between 20-30 years. Students, randomly assigned into 17 teams of 7-8 members had English proficiency levels of B2-C1 according to the CEFR, including 12 native speakers. The research adhered to the University of Alicante's Ethics Committee guidelines, with participants providing informed consent for the anonymized use of their data for scientific purposes

3.3 Instruments and Procedure

The research utilized a mixed-methods design over six weeks, incorporating pre- and post-tests alongside class discussions to assess participants' engagement and learning. The initial phase involved introducing the project and gauging participants' baseline knowledge and attitudes towards AI in language education through the Technology Acceptance Model (TAM). Following this, a comprehensive training module on AI in EFL was delivered, consisting of audiovisual materials and practical sessions on AI tools for digital storytelling and EFL activities creation.

Participants then applied their learning by developing a short digital story and related EFL activities, utilizing the AI tools discussed. This hands-on experience culminated in presentations to the class, fostering peer feedback and further discussion. The final phase involved completing a post-test to measure changes in participants' perceptions and satisfaction with the AI tools and training received. Data from tests and discussions were analyzed using SPSS for quantitative insights and thematic analysis was performed through QDA Miner for qualitative feedback.
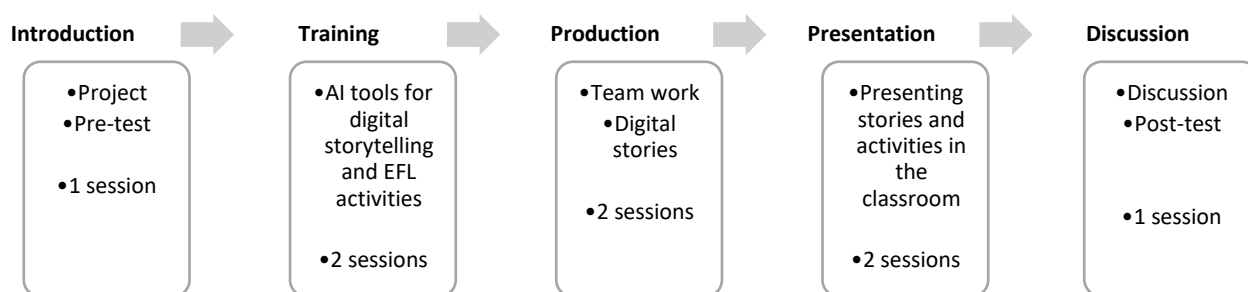
Introduction		Training		Production		Presentation		Discussion
•Project •Pre-test •1 session	➡	•AI tools for digital storytelling and EFL activities •2 sessions	➡	•Team work •Digital stories •2 sessions	➡	•Presenting stories and activities in the classroom •2 sessions	➡	•Discussion •Post-test •1 session

Figure 1. Research stages (1 session= 2 hours)

4. Results and Discussion

The teams produced 16 digital stories based on AI and aimed at learning English as Table 1 illustrates. In this series of digital stories aimed at enhancing EFL learning, various AI tools were utilized to create engaging and interactive content. Canva.ai, Fliki, Invideo AI, Animoto, and Jasper AI were among the AI tools employed for different storytelling objectives, such as teaching animal vocabulary, verb tenses, past participles, phrasal verbs, adjectives, prepositions, etc. While these tools offer affordances like user-friendly interfaces, customizable templates, and multimedia integration, participants also encountered limitations, as pointed out in previous studies (Taringa et al., 2024). Some found Canva.ai's options limiting for advanced design customization, while Fliki's storytelling capabilities were praised but limited in language learning contexts. Invideo AI was appreciated for its video editing features but faced challenges in integrating complex language learning content seamlessly. Animoto's simplicity was both praised and critiqued for its limitations in accommodating diverse storytelling needs, and while Jasper AI offered conversational interactions, some participants noted its limitations in handling nuanced language learning scenarios. In line with Dhanapal et al., (2024), while these AI tools offer promising opportunities for innovative language learning experiences, participants' experiences highlighted the importance of considering both affordances and limitations in their implementation.

Table 1. Digital stories created through AI tools.

Title	EFL learning objectives	AI tool
The Magical Forest	Animal Vocabulary	Canva.ai
Adventure in Space	Verb Tenses	Fliki
The Mystery Mansion	Past Participles	Invideo AI
Lost in Time	Phrasal Verbs	Animoto
The Enchanted Castle	Adjectives	Canva.ai
Under the Sea	Prepositions	Jasper AI
Into the Wild	Comparatives	Canva.ai
The Secret Garden	Present Perfect	Fliki
A Journey to the Past	Irregular Verbs	Invideo.AI
Mystery at the Museum	Conditional Sentences	Canva.ai
The Haunted House	Reported Speech	Invideo AI
The Pirate's Treasure	Idioms	Animoto
Magical Kingdom	Articles	Canva.ai
Exploring the Jungle	Present Continuous	Jasper AI
The Superhero Squad	Modal Verbs	Animoto
Time Traveler's Tales	Future Simple	Canva.ai

In the process of creating the digital stories, participants exhibited adaptability and creativity by selecting various video styles and narratives tailored to both the chosen AI tool and the specific needs of their target students as illustrated in Figure 2. For instance, teams producing content for younger learners often opted for animated styles using tools like Animoto and Canva.ai to captivate their audience's attention and facilitate comprehension of basic language concepts. On the other hand, teams designing content for older or more advanced learners tended to employ sophisticated storytelling techniques and visuals through platforms like Invideo AI and Fliki to delve into complex grammar structures and idiomatic expressions. Moreover, participants demonstrated a keen interest in maximizing the potential of each tool by integrating multiple functionalities. Many teams explored the synergy between different AI tools, seamlessly combining image creation, video editing, and audio enhancement features to create multimedia-rich narratives that catered to diverse learning preferences. Consistent with previous results (Tanrıkulu, 2020; Azis et al., 2020), this collaborative approach not only expanded participants' technical skills but also enriched the learning experiences offered by their digital stories, fostering deeper engagement and understanding among their target student audiences.

Figure 2. Samples of digital stories. The Magical Forest (Left) using Canva.AI and The Haunted House (Right) using Invideo.io
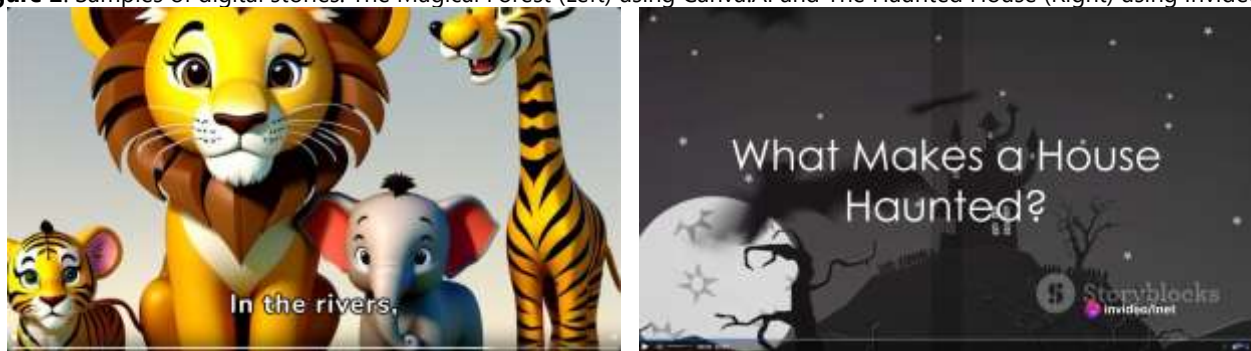
In the second part of the training session, participants learned how to utilize AI-powered platforms specifically designed for educational purposes and language learning to create two EFL activities based on the digital stories they had developed. Platforms such as Twee, Magic School, and Curipod offered a diverse array of features tailored to support language instruction. These features ranged from customizable content creation tools to adaptive learning functionalities, covering various types of activities and skills. By integrating these tools into their pedagogical practices, participants were able to adapt the activities to the linguistic needs and proficiency levels of their target audience, thus fostering a dynamic and immersive learning environment, as pointed out in previous works (Moulieswaran & Kumar, 2023). Figure 3 illustrates two of these activities created with Twee.

Table 2. EFL activities created by participants using AI platforms

Digital story: 'Adventure in Space'	**Digital Story:** 'Under the Sea'
Activity: Match the two halves of a sentence	**Activity:** Can you find the right word form?
AI tool: Twee	**AI tool:** Twee
Left: 1. Right now, he feels happy and eager 2. He doesn't know yet that 3. The countdown to launch begins, 4. In the vastness of space, Right: a. as he gets ready to start his journey. b. an astronaut goes on a special trip. c. and soon he'll be off on his amazing space adventure. d. he will visit faraway planets and meet strange creatures.	1. The _____(peir) stretches out into the ocean, providing a beautiful view of the waves. 2. I love listening to the sound of crashing _____(wave) on the shore. 3. The _____(oceanic) is vast and mysterious, with depths that are yet to be explored. 4. _____(whale) are magnificent creatures that migrate long distances every year. 5. _____(shark) are often misunderstood predators that play an important role in maintaining the balance of marine ecosystems.
Correct answers: 1. a 2. d 3. c 4. b	Correct Answers: 1. pier 2. waves 3. ocean 4. Whales 5. Sharks

Regarding the pre-test results, participants' prior knowledge of AI tools was generally limited as illustrated in Table 3, primarily focusing on ChatGPT, Jasper, and Copy.ai. A small percentage of respondents have used AI tools before (12.3%) or engaged with AI for learning activities (11.3%), indicating limited direct experience. Even fewer are familiar with AI applications in education (8.3%) or can identify AI tools designed for language education (6.4%). Participation in training sessions on AI tools is notably low (2.4%), as is the creation of content using AI tools (2.2%). Awareness of AI's potential to personalize learning experiences stands at 9.5%, suggesting some recognition of AI benefits despite limited practical engagement. However, a significant majority (74.5%) believe in AI's capacity to enhance language education, showing a positive outlook on the potential integration of AI in future teaching and learning despite current low usage and familiarity rates.

Table 3. Prior knowledge of AI tools

Item	M	SD
Have you ever used any AI tools before?	12.3%	0.98
Are you familiar with AI applications in educational contexts?	8.3%	0.79
Have you used AI tools for any learning activities?	11.3%	1.24
Do you know any AI tools designed specifically for language education?	6.4%	0.83
Have you participated in any training sessions on AI tools for education?	2.4%	0.93
Can you identify AI-powered language learning platforms?	3.2%	0.69
Have you ever created content with AI tools?	2.2%	0.76
Are you aware of AI's potential to personalize learning experiences?	9.5%	1.15
Have you used AI for assessment or feedback in learning?	6.2%	0.95
Do you believe AI can enhance language education?	74.5%	1.12

Before the treatment, students displayed low attitudes towards AI integration in education, likely due to their minimal knowledge and experience with AI tools, as reflected in the low pre-test scores across various dimensions in Table 4. The perceived usefulness of AI in enhancing language learning efficiency and resource discovery was modest, with scores not exceeding 2.9. Similarly, perceived ease of use and actual system use indicated a lack of familiarity and comfort with AI tools, with scores around the mid-2 range. Behavioral intention and trust also showed moderate levels, reinforcing the notion of limited exposure to and understanding of AI's potential in education.

Table 4. Attitudes towards the use of AI in language learning and education. TAM Pre-Post-test results.

Construct	Code	Item N= 115. Cronbach's alpha = 0.84	Pret		Post	
			M	SD	M	SD
Perceived usefulness	PU1	Using AI in language learning (language learning apps and tools) allows me to find good resources.	2.3	0.87	3.4	0.92
	PU2	The use of AI in language learning enhances the effectiveness of learning new languages.	2.8	1.12	3.1	1.05
	PU3	The use of AI in language learning is useful .	2.7	1.09	3.6	0.97
	PU4	The use of AI in language learning saves time	2.9	1.12	3.8	0.91
Perceived ease of use	PEU1	AI-powered language learning apps and tools are easy to use.	2.6	1.06	3.1	1.12
	PEU2	Learning a new language is easier if supported by AI	2.5	0.91	3.2	0.78
	PEU3	Learning a new language is simple if AI suggests materials to me.	2.4	0.93	3.3	0.73
	PEU4	Becoming skillful at using AI-powered language learning tools is easy.	2.7	0.94	3.2	0.84
Behavioural intention	BIU1	I intend to use language learning apps and tools that are powered by AI more frequently.	2.6	0.83	3.5	1.10
	BIU2	I am willing to spend more time on language learning with the help of AI tools.	2.8	1.05	3.7	1.04
Actual system use	AU1	I am experienced in using AI-driven language learning platforms.	2.2	0.76	3.1	0.86
	AU2	I have already used AI-driven language learning tools (chatbots, etc.).	2.1	1.06	3.3	0.82
Attitude	AT1	Using AI tools in education is a good idea.	2.7	1.13	3.7	0.97
	AT2	Learning a language with AI tools is a good idea.	2.6	0.97	3.8	0.74
	AT3	I am positive about using AI tools in education and language learning	2.6	0.99	3.7	0.86
Trust	T1	I am convinced that AI in language learning is used to provide learners with the best resources.	2.5	0.97	3.1	1.15
	T2	I trust apps and tools that use AI for language learning.	2.6	1.14	3.1	1.08

The comparison between pretest and posttest scores reveals several noteworthy findings regarding participants' perceptions and attitudes towards AI integration in language learning. The most significant changes occurred in the constructs of perceived usefulness and behavioral intention. Specifically, participants reported a substantial increase in their perceptions of the usefulness of AI tools for language learning, as evidenced by higher posttest scores across all items in the perceived usefulness dimension. This shift suggests that participants became more aware of the benefits associated with AI integration, such as improved access to quality resources, enhanced effectiveness in language learning, and time-saving capabilities.

One possible explanation for these notable changes could be attributed to the experiential learning provided during the intervention. Through hands-on engagement with AI-powered language learning tools and activities, participants gained firsthand experience of the practical advantages offered by these technologies, leading to a more positive perception of their utility and effectiveness. Additionally, exposure to various instructional strategies and pedagogical approaches during the intervention may have contributed to participants' increased confidence and intention to utilize AI tools more frequently in their language-learning endeavors.

Furthermore, the observed improvements in participants' attitudes towards AI integration in education and language learning indicate a notable shift towards greater acceptance and positivity. This change could be attributed to a combination of factors, including increased familiarity with AI technologies, positive learning experiences, and exposure to stories or examples of effective AI implementation in educational contexts. In line with previous findings (Tarigan et al., 2024), as participants became more convinced of the potential benefits of AI in language learning, their trust in AI-driven tools also exhibited a notable increase, reflecting a growing confidence in the reliability and efficacy of these technologies for facilitating language acquisition and instruction.

In terms of participants' satisfaction, Table 5 shows generally high levels with both the AI training session and the session focused on AI tools for digital storytelling. Participants rated the training session positively in terms of covering concepts and applications of AI in language learning, providing practical knowledge and skills for integrating AI tools, and effectively addressing their questions and concerns regarding AI usage. This suggests that the training session was well-designed and effectively delivered, meeting the expectations and needs of the participants. One of the most significant findings is the high rating for the training

session's ability to encourage active participation and engagement from the participants. This indicates that the session was engaging and interactive, fostering an environment conducive to learning and collaboration. The emphasis on practical knowledge and skills development likely contributed to this high level of engagement, as participants were actively involved in hands-on activities and discussions. Another notable finding is the positive feedback regarding the session on using AI tools for digital storytelling. Participants rated this session highly in terms of providing practical guidance, equipping them with necessary skills, and fostering creativity and innovation in digital narrative creation. This suggests that participants found value in learning how to incorporate AI tools into digital storytelling activities, recognizing the potential of these tools to enhance creativity and engagement in the EFL classroom. Overall, the high levels of satisfaction with both the AI training session and the session on digital storytelling reflect a positive perception of AI integration in language learning among participants. The practical nature of the sessions likely contributed to this positive perception, as participants gained hands-on experience and concrete skills that they could apply in their teaching practice. Additionally, the emphasis on fostering creativity and innovation resonated with participants, highlighting the potential of AI tools to enhance the learning experience for both teachers and students in the EFL classroom.

Table 5. Participants' level of satisfaction with the AI training session (5-point Likert scale)

	Item N= 115. Cronbach's alpha = 0.81	M	SD
1	The training session adequately covered the concepts and applications of AI in language learning.	3.8	0.92
2	The training session provided me with practical knowledge and skills for integrating AI tools into language education.	3.9	0.85
3	The training session effectively addressed my questions and concerns regarding the use of AI in language learning.	3.8	0.93
4	The training session encouraged active participation and engagement from the participants.	4.1	1.12
5	Overall, I am satisfied with the quality and effectiveness of the training session on AI integration in language learning.	3.9	0.89
6	The session on using AI tools for digital storytelling provided practical guidance on leveraging technology to enhance storytelling experiences.	3.7	0.76
7	The session on using AI tools for digital storytelling equipped me with the necessary skills to effectively utilize technology for storytelling purposes in the EFL classroom.	3.6	0.91
8	The session on using AI tools for digital storytelling fostered creativity and innovation in the creation of digital narratives.	4.1	1.05

The qualitative results from Table 6 reveal several key benefits and challenges associated with using AI tools for digital storytelling in the EFL classroom. Participants highlighted engaging content, personalized learning, enhanced creativity, and efficiency as the main benefits. Consistent with previous research (Tarigan et al., 2024), they expressed that AI allows for the creation of more interactive and visually appealing stories tailored to individual learning styles and pacing, ultimately saving time and effort in content creation and organization. These benefits are likely attributable to the diverse functionalities offered by AI tools, which enable educators to customize content and activities according to the needs and preferences of their students, thereby fostering a more dynamic and engaging learning environment (Fang et al., 2023).

On the other hand, participants also identified several challenges, including technical issues, the learning curve associated with mastering new AI tools, the lack of human touch in AI-generated content, and the potential dependence on technology (Son et al., 2023). Technical problems and the initial learning curve may hinder the seamless integration of AI tools into classroom practices, while the absence of human interaction in AI-generated materials could diminish the emotional connection and warmth typically associated with traditional storytelling methods. Moreover, participants expressed concerns about overreliance on technology potentially stifling their own creativity and problem-solving skills. These challenges underscore the importance of providing adequate training and support to educators in effectively leveraging AI tools while emphasizing the complementary role of technology in enhancing, rather than replacing, traditional teaching methods (Dhanapal et al., 2024).

Table 6. Qualitative results (QDA Miner). Benefits and challenges of using AI tools for Digital Storytelling in the EFL classroom**.**

Benefits	Theme	Freq.	Comment
	Benefits	55.5%	´Using AI to create our digital story helped us make it more engaging´
	Personalized Learning	52.5%	´With AI, learning can bebetter adapted to individual styles and students' levels´
	Enhanced Creativity	61.0%	´We can create more imaginative and visually appealing stories using AI.´
	Efficiency	75.5%	´AI saves time and effort in creating and organizing storytelling materials.´
Challenges	Theme		Comment
	Technical Issues	57.5%	´Sometimes AI platforms have glitches or technical problems.´
	Learning Curve	48.5%	´Learning to use new AI tools can be challenging at first.´
	Lack of Human Touch	52.0%	´AI may lack the personal touch and warmth of human interaction.´
	Dependence on Technology	50.5%	´Relying too much on AI may hinder our own creativity and problem-solving skills.´

5. Conclusion

This research paper aimed to achieve three main objectives. Firstly, it sought to analyze pre-service teachers' existing knowledge of AI tools for EFL material creation, aiming to identify their initial competence and familiarity with digital tools that can enhance language learning through innovative methods. The findings revealed that while some participants had basic familiarity with AI tools, overall, their knowledge and competence in this area were limited. This suggests a need for targeted training and professional development programs to enhance pre-service teachers' proficiency in utilizing AI tools effectively for language education.

Secondly, the study aimed to examine pre-service teachers' attitudes towards the use of AI tools in language education, focusing on their perceptions, openness, and potential concerns through the Technology Acceptance Model (TAM). In line with previous research (Moulieswaran & Kumar, 2023), the results indicated that participants exhibited a generally positive attitude towards the integration of AI tools in language education, albeit with some reservations and concerns, particularly regarding technical issues and the potential loss of the human touch in educational interactions. These findings underscore the importance of addressing teachers' concerns and providing adequate support and resources to facilitate the smooth integration of AI tools into pedagogical practices (Koh et al., 2023).

Lastly, the research sought to evaluate the impact of employing AI tools in the creation of collaborative digital storytelling narratives on pre-service teachers' attitudes and perceptions. The hands-on experience with AI-driven storytelling resulted in a significant shift in participants' perspectives, with many expressing increased confidence about the utility and effectiveness of AI tools for language education. This highlights the potential of experiential learning opportunities to reshape teachers' attitudes and enhance their willingness to incorporate innovative technologies into their teaching practices (Yuliani et al., 2022).

The conclusions drawn from this research hold significant implications for teacher education and the practice of language instruction in the EFL classroom. Firstly, addressing pre-service teachers' limited knowledge and competence in AI tools highlights the pressing need for comprehensive training programs in teacher education curricula. Integrating modules on AI tools and digital technologies into teacher training programs can better prepare future educators to leverage these innovative tools effectively for language instruction. By equipping teachers with the necessary skills and knowledge early in their careers, educational institutions can ensure that educators are well-prepared to meet the evolving needs of 21st-century learners.

Moreover, the positive shift in pre-service teachers' attitudes towards AI tools following hands-on experience with AI-driven storytelling underscores the transformative potential of experiential learning in shaping educators' perspectives. As such, educational institutions should prioritize opportunities for practical, immersive experiences with AI-based tools, and digital storytelling platforms, within teacher training programs. By providing educators with direct experience using these technologies in the classroom, institutions can foster a culture of innovation and adaptability, empowering teachers to embrace new pedagogical approaches and enhance learning outcomes for their students. Additionally, promoting collaboration and professional learning communities focused on AI integration can facilitate knowledge sharing and peer support, further strengthening educators' capacity to harness the benefits of AI tools in language education.

6. Study Limitations and Future Research

While this study provides valuable insights into pre-service teachers' attitudes and experiences regarding the integration of AI tools in language education, it is essential to acknowledge certain limitations. Firstly, the study was conducted within a specific context, involving third-year college students from a single university, which may limit the generalizability of the findings to other

educational settings or teacher populations. Additionally, the relatively small sample size of 115 participants may affect the robustness and representativeness of the results. Further research could explore the long-term effects of AI tool integration on language learning outcomes, investigate the effectiveness of different AI-driven pedagogical approaches, and examine the role of teacher training programs in facilitating the successful adoption of AI tools in language education. Additionally, comparative studies across diverse educational contexts and longitudinal research designs could provide deeper insights into the complex dynamics of AI integration in language instruction.

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers.

References

[1] Almelhes, S. (2023). A Review of Artificial Intelligence Adoption in Second-Language Learning. *Theory and Practice in Language Studies, 13(5),* 1259-1269.

[2] AteŞ, M. (2022). Using Digital Storytelling in Language Education: A Systematic Review Study. P*amukkale Üniversitesi Eğitim Fakültesi dergisi*. (*4)* 34-41.

[3] Aydemir, M. & Fetah, V.. (2023). The use of artificial intelligence in digital storytelling and scenario design: a short film applied research. *Pamukkale University Journal of Social Sciences Institute. (1)* 25-31.

[4] Azis, Y. A., S. Hu, & Husnawadi, A.. (2020). Collaborative Digital Storytelling-based Task for EFL Writing Instruction: Outcomes and Perceptions. *The Journal of AsiaTEFL, 17(2),* 562-579.

[5] Belda-Medina, J. (2022). Promoting inclusiveness, creativity and critical thinking through digital storytelling among EFL teacher candidates. *International Journal of Inclusive Education*, *26(2),* 109-123.

[6] Dhanapal, C., Asharudeen, N. & Alfaruque, S.. (2024). Impact of Artificial Intelligence Versus Traditional Instruction for Language Learning: A Survey. *World Journal of English Language. 14 (2), 182-193.*

[7] Fang, X., Ng, D. T. K., Leung, J. K. L., & Chu, S. K. W. (2023). A systematic review of artificial intelligence technologies used for story writing. *Education and Information Technologies*, 1-37.

[8] Kahanurak, S., Dibyamandala, D. & Mangkhang, C.. (2023). Digital Storytelling and Intercultural Communicative Competence through English as a Foreign Language for Multilingual Learners. *Journal of Curriculum and Teaching*, *12(1),* 14-14.

[9] Koh, J., Cowling, M., Jha, M. & Sim, K.. (2023). The Human Teacher, the AI Teacher and the AIed-Teacher Relationship. *Journal of Higher Education Theory and Practice*, *23(17)*.

[10] Moulieswaran, N. & Kumar, P. (2023). Investigating ESL Learners' Perception and Problem towards Artificial Intelligence (AI) -Assisted English Language Learning and Teaching. *World Journal of English Language*, 1*3(5),* 290-290.

[11] Nair, V., & Yunus, M. (2021). A systematic review of digital storytelling in improving speaking skills. *Sustainability*, *13(17)*, 9829.

[12] Nisi, V., James, S., Bala, P., Del Bue, A. & Nunes, N.. (2023). Inclusive Digital Storytelling: Artificial Intelligence and Augmented Reality to Re-centre Stories from the Margins. I*nternational Conference on Interactive Digital Storytelling,* 117-137.

[13] Rahman, N. F. N. A., and Bakar R.A. (2020). Digital storytelling: A systematic review. *JELTIM (Journal of English Language Teaching Innovations and Materials), 2(2)*, 97.

[14] Raffone, A. (2022). Gamifying English Language Learning through Interactive Storytelling and MALL Technologies. *Language Teaching Research*, pp. 136216882211102-136216882211102.

[15] Sabari, N. & Hashim, H.. (2023). Sustaining Education with Digital Storytelling in the English Language Teaching and Learning: A Systematic Review. *International Journal of Academic Research in Business and Social Sciences*, *13(4).*

[16] Son, J. Ružić, N. & Philpott, A.. (2023). Artificial intelligence technologies and applications for language learning and teaching. J*ournal of China Computer-Assisted Language Learning*, *0(0).*

[17] Tanrıkulu, F. (2020). Students' perceptions about the effects of collaborative digital storytelling on writing skills. *Computer Assisted Language Learning, 1-16.*

[18] Tarigan, F. Hasibuan, S. & Nurmayana, S.. (2024). Application and Challenges of Digital Storytelling Based Artificial Intelligence for Language Skills: A Narrative Review. *SALTeL Journal (Southeast Asia Language Teaching and Learning)*.

[19] Torku, E., Akey, B. C. A., Mustafa, T. & Adu, E. (2017). Digital Story Telling and Second Language Teaching: A Review from the China-Taiwan-Hongkong Triangle. *Journal of Applied Science and Technology*, *5(2).*

[20] Yuliani, S., Hartanto, D., & Hartanto, D. (2022). Digital online Learning by Using Digital Storytelling for Pre-Service Teacher Students. *IJoLE (International Journal of Language Education)*, *6(3),* 221-221.