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Generative AI-Based Interactive Storytelling for English Language Development

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Abstract: A new technology called Generative AI is a promising solution to boost personal language learning; however, there is still insufficient empirical evidence about its impact on improving measurable English language skills using interactive storytelling. In this research, an attempt was made to test and develop a generative AI-based framework for creating interactive stories for intermediate English as a second language (ESL) learner. A one-group pretest-post-test quasi-experiment design was utilized with the involvement of 60 intermediate ESL learners who took part in the six-week intervention and completed two 40-minute interactive storytelling sessions per week. Speaking fluency, vocabulary use, narrative comprehension, and learner confidence were measured before and after the intervention by means of the paired-sample t-test and the calculation of effect sizes (Cohen's d). A survey of engagement was also performed after the intervention to assess students' attitudes toward the proposed framework. Significant gains in all skills were observed – speaking fluency increased from 58.4% to 74.6%, vocabulary use increased from 61.2% to 78.3%, narrative comprehension increased from 60.5% to 77.1%, and confidence increased from 55.8% to 73.9%. All improvements turned out to be highly significant ($p < .001$) and very large (Cohen's $d = 2.59–2.95$). Also, 86% of students stated that the storytelling tasks were fun, 81% were ready to continue using the AI-powered tool, and 79% noted their increased self-confidence in speaking English. Thus, the preliminary results of a one-group pilot experiment show that generative AI-based interactive storytelling can be considered a promising methodological approach that is learner-centered and effective in helping students learn English; however, due to the lack of a control group in the experiment, further research needs to be done to verify these results.

***Key Words*:** generative artificial intelligence, interactive storytelling, english as a second language (ESL), language learning, speaking fluency, personalized learning, educational technology

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Introduction

The process of storytelling has historically been a natural means of language learning, where learners can obtain meaning through contextualization and repetition, while getting emotionally engaged at the same time. Over the past years, the practice of digital storytelling based on artificial intelligence has added new dimensions to this process by letting learners create stories in collaboration with adaptive systems (Compagnoni, 2025). With the help of generative AI algorithms, stories, dialogues, and feedback can be created in real time, making an otherwise passive process of storytelling an active one (Tarigan & Hasibuan, 2024). The development of generative storytelling techniques is especially pertinent for English language learning classes where the learners need to practice speaking and writing repeatedly in a stress-free environment.

The generative AI software is being incorporated into language learning platforms where personalized content creation, immediate feedback, and adjustable difficulty are provided Creely, (2024). While earlier

ISSN: 2278-4012, Volume:15, Issue:2, June 2026

versions of computer-assisted language learning were not able to react contextually to input, the use of generative AI allows for contextual reactions that keep the conversation flowing like in real life (Tai & Chen, 2025). Moreover, the incorporation of such technologies in daily gadgets and connected classrooms has increased the scope of generative AI, where learners can practice English outside the physical boundaries of the classroom (Dong et al., 2024; Li, 2025). In this regard, it is safe to say that generative AI does not just serve as an assistant but also as a participant in the language learning process.

Although there have been numerous developments in using AI technology to support storytelling, the current practice of teaching English still involves the usage of static non-adaptive story materials, restricting the learner's engagement and agency. Learners tend to lose interest in story-based exercises due to the lack of variation and personalization, while teachers experience problems designing new and relevant stories for their students. Besides, there is no existing empirical research on how the implementation of an AI-based interactive storytelling system affects measurable language performance (such as speaking fluency and vocabulary memorization), rather than learner engagement. The aforementioned gap is what this study attempts to address.

There are three distinct research questions this paper intends to answer. First of all, the purpose is to create and implement a story-based activity using the generative AI tool that would be suitable for intermediate English learners. The second goal of the study is to assess the changes in speaking fluency, vocabulary, comprehension, and self-assessment of confidence before and after the experiment. Finally, this research is aimed at collecting data about the learner attitudes to the interactive storytelling experience with the help of the engagement survey. Combining these objectives helps assess both the instructional efficiency and perceived value of generative AI-based storytelling as an instructional method, which in turn provides data for proper implementation of the method in English language classes.

Findings of the current study are important for language instructors, curriculum developers, and creators of educational technology who are interested in implementing generative AI in their teaching process. Providing practical data rather than theoretical assumptions about the instructional value of the method, the study adds knowledge to the current debate about personalized English language instruction (Vergara et al., 2024; Kannadhasan, 2025). It also helps add to the insufficient amount of data regarding the influence of generative AI storytelling on speaking and vocabulary development.

The rest of this paper is structured as follows. In Section 2, review the relevant literature in the context of generative AI, interactive storytelling, and English language learning. In Section 3, present the methodology of the research, which includes the research design, the participants, the intervention procedure, data collection, and analysis methods. In Section 4, present experimental results and analyze the engagement of the learners in this study. In Section 5, discuss the main findings and Section 6 conclusions, as well as the limitations and further directions for research.

Literature Review

AI-Enhanced Digital Storytelling in EFL

Research has demonstrated that the use of digital storytelling using artificial intelligence helps to transform the role of teachers in pedagogical practice in English as a foreign language classroom from providers of the content to the facilitators of the stories created by the learners (Compagnoni, 2025). In this process, learners are able to become the constructors of the stories that they make while being provided with linguistic support. Reviews on digital storytelling technologies have found that AI-assisted digital

ISSN: 2278-4012, Volume:15, Issue:2, June 2026

storytelling technologies help learners in developing skills related to speaking, writing, listening, and vocabulary; however, there are several implementation issues related to the technology itself Tarigan & Hasibuan, (2024). The above results suggest the importance of thoughtful and contextual integration of new tools rather than their straightforward implementation.

Storytelling for Early Childhood Language Development

Systematic studies of AI-based applications of storytelling in early childhood education reveal positive effects in terms of vocabulary development, listening skills, and literacy in cases where the stories have been modified to match the level of the child's development (Chen, 2024). Parents of preschoolers indicated that they prefer the use of AI storytelling technologies that are centered on the child, safe, and consider the child's tempo rather than entertainment (Sun et al., 2024). Likewise, the use of AI technology to help preserve the heritage languages in young children has been studied, and it revealed the ability of generative tools to be not only educational but cultural as well Sabrina & Rusyadi, (2025). These studies collectively highlight storytelling's flexibility across age groups and learning goals.

Interactive Narratives and Learner Agency

The creation of interactive stories through AI systems poses several interesting issues about learner agency and the new dynamics between the learners and technology. There have been calls from scholars that learners who are using AI systems in generating interactive narratives should be regarded as agents whose decisions impact the story being formed, not passive consumers of a fixed product (Shah et al., 2025). There are educational ramifications of such an understanding in that interactive narrative software should be developed in a manner that will ensure the learners' agency is preserved instead of having language learning being reduced to stimulus-response activities.

Generative AI Chatbots and Speaking Proficiency

Empirical investigations that include AI-generated chatbots indicate an increase in the speaking skills of EFL learners in their adolescence, especially in cases where the mode of interaction provides an opportunity for longer conversations instead of shorter Q&A formats (Tai & Chen, 2025). Similarly, a case study that traces one entire year of use of generative AI technology in English language education indicates a gradual improvement in the students' confidence and ability to speak, as well as changes in the strategies employed by teachers to facilitate classes (Hınız, 2024). This indicates that sustained exposure to generative AI conversation could bring positive results.

Inclusion and Accessibility through AI Storytelling

Generative AI-driven storytelling has also been considered as a means of promoting inclusion among students with disabilities, where the use of adaptive narration and multimodal generation helps minimize obstacles to participation (Vergara et al., 2024). Relevant studies on inclusive language teaching in English, in this case, have pointed out that the generative AI technologies mentioned above can be adapted to meet the needs of diverse learners with regard to their different levels of proficiency, sensory abilities, and paces of learning (Kannadhasan, 2025). Relevant research on skill-building with the help of generative AI has, in turn, shown how to scaffold writing and speaking exercises so that they can be accessible to diverse students (Ashrafova, 2025). Collectively, these studies highlight the potential of storytelling as an effective mode of language teaching and learning that is inclusive of all learners.

ISSN: 2278-4012, Volume:15, Issue:2, June 2026

IoT and Generative AI Integration

The combination of the Internet of Things and generative AI technology has led to the emergence of smart connected technology that can provide personalized English language learning through various devices (Dong et al., 2024). Recent advances in this area show that by leveraging the power of generative AI technology along with the Internet of Things, it is possible to provide transformative English language education for learners that connects classroom learning with ambient learning opportunities (Li, 2025). While neither of these research studies deals specifically with storytelling, they do show a trend towards technological connectivity and adaptability that includes interactive storytelling tools.

Collaborative Creativity in Digital Story Creation

The experimental studies on the collaborative digital story composition reveal the positive effect of generative AI on enhancing creativity and problem-solving within collaborative teams while composing a joint story (Wei et al., 2025). Teams that use generative AI tools create more diverse stories and show better cooperation in their joint writing activities than those who do not use generative AI tools. Thus, it becomes evident from this research direction that interactive storytelling should not be an individual process, but it can be a mediating partner for collaboration within the classroom.

Opportunities and Challenges of Generative AI

General evaluations of the use of generative AI in language learning highlight the following possibilities: personalized feedback, limitless source of practice material and decrease of teachers' workload when it comes to material preparation (Creely, 2024). Nevertheless, the very same research warns about possible difficulties such as nonuniformity of the results, possible overreliance on automated error correction, as well as the danger of disengagement from real human interaction (Tarigan & Hasibuan, 2024; Creely, 2024). All of that makes it clear that tools for creating generative stories should be used in addition to teacher-led classes.

Research Gap

Even though there is sufficient empirical evidence in existing literature about how generative AI storytelling enhances engagement, inclusiveness, and overall language experience, there are not enough studies that focus on quantifiable gains in fluency, vocabulary acquisition, and understanding of the narrative provided through a storytelling intervention. Most of the information is based on early childhood or perceptual data, but not quantitative data about skills development of older participants. This research bridges the gap between existing knowledge and practice by including both structured pre- and post-tests and a survey of learners' engagement.

Methodology

Research Design

This research used a quasi-experimental design that utilized the one-group pretest-posttest design approach, complemented with a learner engagement survey that was conducted after the intervention process. The reason for choosing this design was due to the fact that it allows the assessment of learners' performance before and after using the generative AI-based interactive storytelling approach. In addition, the survey would be useful in collecting information about learners' attitudes, which is not captured through the scores obtained in the tests. However, the limitation associated with this single-group pre-test/post-test approach is the lack of a control group.

ISSN: 2278-4012, Volume:15, Issue:2, June 2026

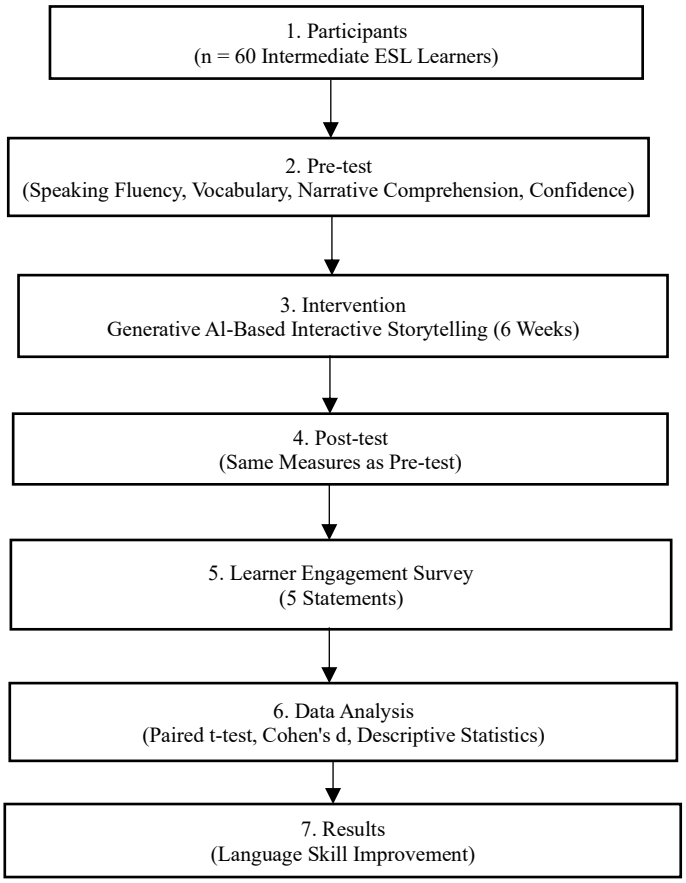

Figure 1: Research Methodology of the Proposed Generative AI-Based Interactive Storytelling Framework

Figure 1 shows the research methodology used in this study to analyze the proposed generative AI-based interactive storytelling framework for ESL learning. This research methodology is divided into four parts; first, 60 intermediate ESL learners were selected, after which a pretest was conducted to measure the participants' speaking fluency, vocabulary usage, narrative comprehension, and confidence. Subsequently, an AI-based interactive storytelling intervention was conducted on the participants for six weeks, after which a post-test was conducted along with a participant engagement questionnaire. In the end, the collected data were analyzed through the use of paired sample t-tests and Cohen's d.

Participants

The participants in the research were sixty English language learners at the intermediate proficiency level who belonged to two intact groups at a secondary level language institute. The participants were in the age group of 14–16 years old and had four years of experience studying English formally. All the participants had some familiarity with the use of technology; thus, technical illiteracy was not expected to interfere with the results obtained. Participation in the research was voluntary, and the participants were informed that use of the tool for telling stories was a part of the classroom task and not an additional one for tests.

The Interactive Storytelling Tool

This intervention employed a story-writing application based on generative artificial intelligence technology where the next part of the story is generated through learner inputs. In this case, the learners would select their responses, and the system would generate another part of the story together with

ISSN: 2278-4012, Volume:15, Issue:2, June 2026

vocabulary clues and grammar feedback. This tool offered options for learners to narrate orally, enter the responses through typing or multiple-choice branches, depending on learners' level of confidence in using English. The topics of the stories were chosen depending on learners' interest, including adventures, mysteries, and day-to-day life situations.

Procedure

All participants were first subjected to a pre-test of speaking fluency, vocabulary usage, and comprehension of narratives, together with a self-rating of confidence. For a period of six weeks, participants used the storytelling application twice a week for about forty minutes per session, under the supervision of the teacher. The session included navigating the stories individually as well as some discussion of the stories chosen among the group members to facilitate verbal communication. Finally, at the end of the intervention period, all participants underwent a different but equivalent version of the post-test to assess the same set of variables.

Data Collection and Analysis

Speaking fluency was evaluated using a two-minute monologue scored activity, vocabulary knowledge using a gap-fill and word recall activity, and narrative comprehension by short-answer questionnaires after reading a novel excerpt. The identical version of these tests was administered during the pre-test and post-test phases of the experiment to eliminate the possibility of score bias as a result of familiarity with the instrument, while ensuring consistency between pre-test and post-test measures. Confidence levels were evaluated using a five-point self-assessment scale. Pre-test and post-test scores were then translated into percentages and analyzed using the paired-sample t-test at a significance level of 0.05, with the effect size for each of the three skills estimated using Cohen's d. Engagement levels were evaluated as a percentage agreement to five statements. All statistical analyses were done using spreadsheet software.

Results

Pre-test and Post-test Score Comparison and Skill-wise Improvement

Effectiveness of the suggested approach to the interactive storytelling process based on generative AI technologies was assessed by comparing the test performance of the learners before and after taking part in the intervention in four areas important for English proficiency: speaking fluency, vocabulary usage, narrative understanding, and overall confidence. The results of such assessment are presented in figure 2.

Figure 2 depicts the pre-test and post-test results of the performance of the learners in all four tested language skills. All skills performed better following the six weeks of the intervention through interactive storytelling using the generative AI method. Speaking fluency scored 58.4% on the pre-test and 74.6% on the post-test, resulting in a mean gain of 16.2%; vocabulary usage rose from 61.2% to 78.3% (mean gain = 17.1); narrative comprehension from 60.5% to 77.1% (mean gain = 16.6); and confidence recorded the best results with a rise from 55.8% to 73.9% (mean gain = 18.1). The standard deviations obtained after the test (5.8-7.0) show that the results have been consistent among participants.

ISSN: 2278-4012, Volume:15, Issue:2, June 2026

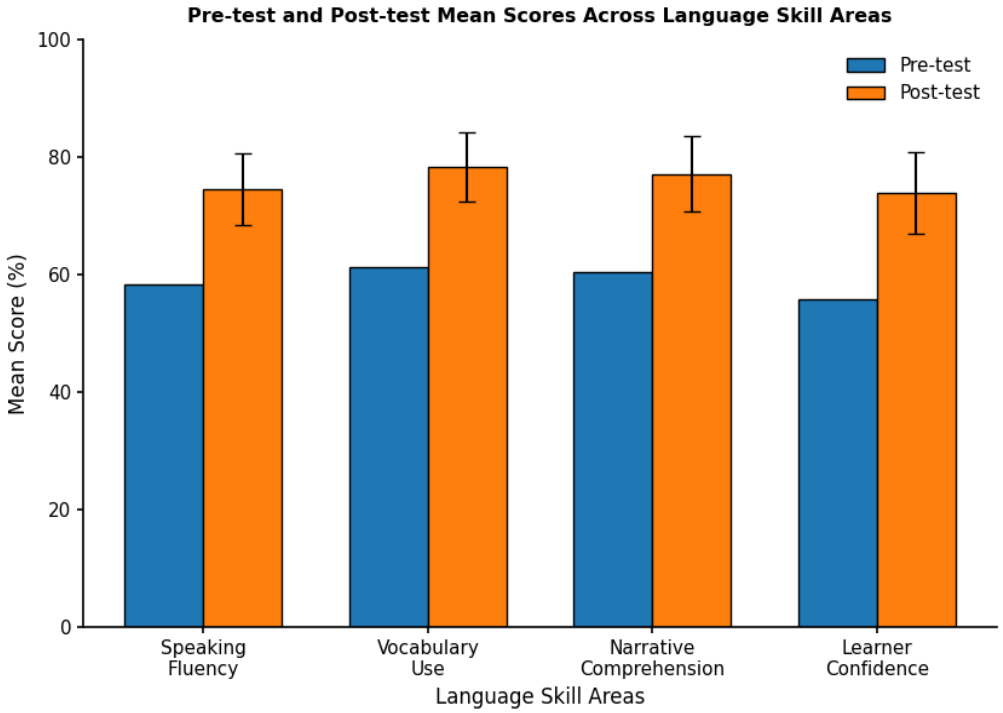

Figure 2: Pre-Test and Post-Test Performance Comparison Across English Language Skill Areas

Statistical Analysis of Pre-test and Post-test Scores

In order to determine whether the gains were achieved by chance or not, a paired sample t-test was performed for each of the skill areas using the individual pre-test and post-test scores at a significance level of 0.05. Table 1 displays the results obtained: degrees of freedom, t-value, p-value, and the effect size according to Cohen's d measure. In all four cases, the p-values were less than .001, which means that the difference between pre-test and post-test results was statistically significant for all of the skill areas. The effect sizes were all greater than 2.0, which means that the effect is considered to be very large.

Table 1: Paired-Sample t-Test Results for Pre-test and Post-test Comparisons (n = 60)

Skill Area	df	t-value	p-value	Cohen's d	Significance
Speaking Fluency	59	20.54	< .001	2.65	Significant
Vocabulary Use	59	22.81	< .001	2.95	Significant
Narrative Comprehension	59	20.08	< .001	2.59	Significant
Learner Confidence	59	20.02	< .001	2.59	Significant

Learner Engagement and Feedback

Table 2 provides a summary of learner responses from the engagement survey post-intervention. Almost all learners enjoyed the storytelling exercise and were interested in using the application again. The positive sentiments toward speaking confidence and AI feedback also confirm the statistically significant increase in scores highlighted in table 2. Significantly, almost half of all respondents, 42%, admitted that they sometimes leaned on the AI's recommendations a little too much, which shows the genuine concern about the dependence issue that needs to be addressed in future use of the tool.

ISSN: 2278-4012, Volume:15, Issue:2, June 2026

Table 2: Learner Engagement Survey Results (n = 60)

Engagement Survey Statement	Agree (%)	Disagree (%)
The storytelling activity felt enjoyable	86	6
I felt more confident speaking after the sessions	79	9
The AI feedback helped me correct my mistakes	74	12
I would like to continue using the tool	81	8
I sometimes relied too much on the AI's suggestions	42	31

Discussion

The results show that the suggested generative AI-based interactive storytelling approach was highly effective for improving ESL learners' performance in the English language. Over the course of the six-week intervention period, learners have shown significant gains in four skills. The increase in speaking fluency was reported to be 16.2 points (from 58.4% to 74.6%), an increase in the vocabulary use – 17.1 points (from 61.2% to 78.3%), an improvement in the narrative comprehension skills – 16.6 points (from 60.5% to 77.1%), and the most significant progress was seen in the learners' confidence level (18.1 points, from 55.8% to 73.9%). According to the statistical analysis, the obtained improvements were statistically and practically significant because all paired sample t-tests showed a p-value < .001 and a very large effect size (Cohen's d = 2.59 – 2.95). Moreover, the results of learner engagement also showed that 86% of participants found storytelling activities fun and 81% were ready to continue using the AI platform.

From these findings, it is evident that personalized AI-generated storytelling serves as an effective means of facilitating language acquisition due to the provision of interactive practice, timely feedback, and content tailored to the needs of the learner. The continuous increase in language competencies implies that the integration of generative AI into storytelling activities provides a holistic method of improving communicative competencies as opposed to language elements in isolation.

There are a number of implications for the application of generative AI to ESL education based on the results of the study. The research reveals that AI technology can serve as a supplement to traditional teaching through personalized learning activities. It should be noted that the research was conducted among 60 learners and lasted for six weeks only. Therefore, the findings of the research cannot be generalized due to the restricted sample and timeframe and also because of the possible response bias in the self-reported engagement levels. Further research should consider more diverse learner groups, intervention duration, comparison with different methods of teaching, and ways to limit reliance on AI technologies among learners.

Conclusion

The issue of enhancing the proficiency of the English language was dealt with in this research through the development of a personalized and interactive instructional method for intermediate ESL learners using a generative AI-based interactive storytelling framework. Traditional storytelling methods have always been non-adaptive and non-personalized, thus failing to engage learners and develop their language skills. In order to solve these problems, generative AI was used to design an interactive and personalized storytelling experience that promotes speaking, vocabulary building, narrative understanding, and confidence of the learners. It has been found that the developed framework helped boost the language skills of the learners significantly within the period of six weeks. Specifically, speaking fluency went up from 58.4% to 74.6%, vocabulary usage from 61.2% to 78.3%, narrative understanding from 60.5% to 77.1%, and confidence from 55.8% to 73.9%. The statistical analysis showed that all improvements were

statistically highly significant ($p < .001$) with very large effect sizes (Cohen's $d = 2.59$-2.95). Moreover, the results of the learner engagement questionnaire revealed that 86% of the students were pleased with storytelling activities and 81% said that they would like to use this AI-supported system in the future. Thus, generative AI storytelling can effectively improve different aspects of English language learning as well as motivate learners to participate in the process. In general, this paper reveals that generative AI storytelling can be an interesting addition to traditional ESL classes offering an interactive and personalized learning experience. The suggested framework can be used as a guide for teachers who want to improve the language skills of their students with the help of technological tools but also want to keep control over the educational process.

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