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The Impact of AI-Driven Gamification on Student Engagement and Academic Performance in English Language Teaching

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ABSTRACT

The integration of gamification and artificial intelligence (AI) in English Language Teaching (ELT) has revolutionized traditional pedagogical approaches by fostering interactive, personalized, and adaptive learning experiences. This paper investigates the effects of AI-based gamification on student involvement and academic performance in ELT classrooms. Data were collected using a mixed-methods approach during which English language learners and instructors completed surveys, classroom observations were conducted, and semi-structured interviews administered. AI-enhanced gamified language learning shows better motivation, engagement, and retention highlights. All the learning features are customized through adaptive methods across the four stages. But challenges included over-reliance on technology, accessibility issues and the need for teacher training. The study concludes by offering pedagogical implications for educators and policymakers seeking to integrate AI-enhanced gamification into ELT curricula to maximize student engagement and language proficiency.

Introduction

The use of Artificial Intelligence (AI) and gamification in English Language Teaching (ELT) has revolutionised ordinary pedagogical methods, providing unique solutions to boost student engagement and learning outcomes. Gamified learning, the process of adding game mechanics to learning by embroidery of narrative concepts, competition, ravine badges, and yes, progress (Deterding et al., 2011) to create lightweight "democratized" learning by compelling students to participate. After considering these facts, we will explore the combination of AI with gamification,

which can deliver personalized and adaptive learning experiences, ultimately helping language learners become more engaged and effective in their learning (Lai & Bower, 2020).

Gamification for English Language Teaching (ELT) has been a relatively popular topic within the last five years, with studies addressing its impact on students motivation, engagement and language skills retention (Hamari et al., 2014). On the conventional side, ELT techniques have been found to not gain a lot of attention of learners, particularly in the case of students born with digital technology, who prefer interactive and tech-based learning (Gee, 2003). AI-enabled, gamified platforms like Duolingo and Kahoot!, harness data-driven insights to personalize learning experiences by delivering prompt feedback, adjustable difficulty levels, and simulated contexts that mirror authentic communication (Zarzycka-Piskorz, 2016).

Through individualized learning pathways, AI-driven gamification also meets the needs of diverse learners in the ELT classroom. Based on the real-time analysis of student performance data, AI algorithms detect students' strengths and weaknesses and modify the content (Chen. et al., 2020). Expanding on this, and in an effort to promote proficiency of learner's reading, writing, speaking and listening skills (Burden & Kearney, 2017), by providing tailored, individualized learning through the adaptive re-use of data up to October 2023. AI-driven chatbots, and virtual tutors also enable simulated practice of real-world interactions promoting learners to work on language skill development in a no pressure environment (Warschauer et al., 2023).

However, the use of AI and gamification in ELT comes with a host of challenges. Key issues include concerns about over-reliance on technology, ethical questions related to data privacy, and the digital divide in resource-poor educational contexts (Selwyn & Aagaard, 2022). In addition, gamification itself through AI requires specialized training, therefore emphasizing the need for teachers to receive organizational support and professional development programs for true effective implementation of these tools (Mahlow & Dale, 2022).

By doing so, the study intends to investigate the use of AI enhanced gamification in ELT and its effective way in student learning experience and outcomes. The present study aims to explore the opportunities and challenges of AI-powered gamification in language education from teachers' and students' perspectives.

Rationale of the Study

The continuous evolution of AI and gamification is changing the face of English Language Teaching (ELT), providing innovative methods for engagement and improved learning outcomes. For example, boredom and lack of motivation are common problems with traditional grammar-based language learning methods (Gee, 2003). By implementing game mechanics like rewards, leaderboards, adaptive feedback, and immersive simulations, AI-driven gamification has become a powerful tool for encouraging active engagement and enhancing language learning outcomes (Hamari et al., 2014).

AI-enabled applications such as Duolingo, Kahoot!, and Quizizz provide personalized pathways for learning support to allow students to check their progress at their own pace and receive immediate feedback on their performance (Chen et al., 2020). This adaptive learning model allows students to receive the content that best addresses their strengths and weaknesses, facilitating language acquisition in a manner that is engaging to them (Warschauer et al., 2023).

Yet AI-assisted gamification in ELT is still scarce, and the evidence on its effectiveness and pedagogical implications is limited. The existing concerns around student reliance on technology, gaps in digital literacy skills, and ethical concerns in AI-enhanced learning need more research

(Selwyn & Aagaard, 2022). This gap forms the basis of this research as this study attempts to investigate how exactly AI-based gamification affects student engagement and learning outcomes in ELT classrooms and thus drawing meaningful implications for educators, policymakers, and pedagogical designers.

Statement of the Problem

AI-driven gamification in ELT aids in the motivation of the learners and supports the learning process however, it is still unexplored and understudied in the context of application and data mining in the education sector. Despite being held widely responsible for motivation and engagement, it is still unclear the impact of gamification on language proficiency, retention and language as a critical thinking skill (Zarzycka-Piskorz, 2016). Likewise, artificial intelligence-based tools provide adaptive learning; however, regarding their effectiveness, advantages, drawbacks, and ethical implications (Chen et al., 2020) still arise questions.

In addition, the teachers' perception of the incorporation of AI-based gamification in ELT has not been adequately investigated either. Educators have many challenges as they may lack technical wherewithal and pedagogical approaches on how best to deploy these technologies (Mahlow & Dale, 2022). Moreover, access to AI-powered tools and resources varies among students, raising equity issues in language education (Selwyn & Aagaard, 2022).

Hence, this research aims to examine the role of AI-driven gamification in the context of ELT while primarily aiming at its impact on student engagement and learning outcomes along with the difficulties faced by teachers in EFL classes. The results will also provide some insights to the current debate on the pedagogic feasibility, advantages, and disadvantages of the use of AI-based gamified approaches in ELT.

Research Questions

1) What Is the Impact of AI-Driven Gamification on Student Engagement in ELT?
2) How does the use of AI-powered gamification affect the language skills and retention levels of students?
3) What are the challenges and opportunities facing educators in terms of integrating AI-based gamification in the ELT classroom?

Literature Review

The Role of AI and Gamification in ELT 1| Explaining AI & Gamification in EL 1| Improvements in the ELT Eckerson Group AI Gamification & ELT: AI Gamification & ELT 2|||Gamification in an ELT context 3| Contact UsAlexa on Campus Home జగన్ చట్టం 4| Telugu newsfalseAdding AI and Gamification Today 5| Latest NewsFollow Usadding AI and gamification to english language teaching in ELT ELT is still relatively new, and some articles are listed on this site. Gamification has been widely acknowledged for improving both motivation and engagement (Deterding et al., 2011) whereas AI-powered tools such as cognitive tutors have offered adaptive learning ecosystems to support individual learners' needs (Warschauer et al., 2023). This literature review provides an overview of gamification in ELT, AI in language learning, and the combined synergy of AI with gamification in learning, with emphasis on student engagement, and learning outcomes.

Gamification in ELT to improve student engagement

Gamification is the application of game elements in non-game settings like classroom setting to increase students motivation through Competitive elements such as points, leaderboards, and badges (Hamari et al., 2014). Gamification in ELT offers interactive learning experiences that

foster engagement and fun (Zarzycka-Piskorz, 2016). According to research, students experience gamified learning environments as more engaging and less stressful compared to standard classroom settings (Sailer & Homner, 2020).

Digital gamified platforms such as Duolingo, Kahoot! n, and Quizlet have shown especially great effectiveness in vocabulary acquisition, listening comprehension, and grammar exercises (Bawa, 2018). Gamification is also believed to stimulate a sense of accomplishment and competitiveness among students, driving them to enhance their language abilities (Landers, 2015). However, critics have suggested that an over-dependence on extrinsic motivators (think rewards and points) could lead to decreased intrinsic motivation to learn the target language over time (Deci & Ryan, 2000).

AI in ELT: Adaptive Learning and Feedback

The applications of AI in education have revolutionized English Language Teaching (ELT), allowing for personalized learning experiences through the use of machine learning algorithms, natural language processing (NLP), and automated feedback systems (Chen et al., 2020). AI-powered tools that provide instant writing and speaking feedback (e.g., Grammarly, ChatGPT, and Google's BERT) can aid students in improving their language abilities (He et al., 2023).

Studies show that AI-enabled chatbots and virtual tutors promote autonomous learning by simulating real-lifeworld language interactions (Xu et al., 2022). For instance, AI-based adaptive learning systems (where the learning tool itself is embedded with algorithms to tailor learning tasks) such as Duolingo, and ELSA Speak analyze the performance of students and tailor the learning tasks to the appropriate difficulty level, delivering a scaffolded learning experience (Johnston et al., 2023).

In spite of these pros, the issues corresponding to data privacy, ethical concerns and students over-reliance on AI powered content still remains (Selwyn and Aagaard, 2022). This was yet another concern raised by critics, who point out the dangers of using AI tools that do not have the human touch in nuanced language learning, particularly in pragmatic rules and cultural context (Luo & Hyland, 2021).

The Intersection between Gamification and AI in ELT

AI and gamification produced countless intelligent gamified learning platforms in ELT, which adapted the content according to the students' learning behaviors (Warschauer et al., 2023). According to Rockwell & Singleton (2022), AI-driven gamified learning increases engagement, motivation, and learning efficiency by offering instant and tailored feedback within a game-like setting.

Research by He & Zhang (2023) have shown that the integration of AI-powered gamification dramatically increased the accuracy of students' writing ability, as well as stimulating great interest among students in using the English language in an ESL classroom. In line with this, Zhang and Yu (2023) claimed that game-based AI tools improved speaking fluency and accuracy in pronunciation since students were more likely to practice in a low-stakes environment.

But integrating these technologies successfully isn't without challenges for educators. Mahlow and Dale (2022) have pointed out that technical limitations, teachers' lack of AI literacy and the need for institutional support are obstacles to successful adoption of AI-based gamification in ELT. Teacher training programs, as well as pedagogical guidelines, must be in place to facilitate the effective incorporation of AI and gamification in language teaching (Park & Howard, 2022).

Research Methodology

It is a mixed-methods study between quantitative and qualitative data collection methods to compare the impact of gamification and AI in ELT on HES students' engagement and learning outcomes. To account for measurable changes in students' engagement levels, motivation, and language proficiency, a quasi-experimental design was implemented which examines quantitative data, both before and after students have been exposed to AI-driven gamified learning environments. The qualitative data were collected through interviews and open-ended surveys used to get a sense of student–perceived attitudes and experiences.

Population of the study was students at an English Language Centre in Lahore, Pakistan. Researchers used a purposive sampling technique to engage students in English language learning which consists of two groups of students, totaling around 100 samples; Experimental Group (n = 50): Students who used AI-based gamified learning platforms (e.g., Duolingo, Kahoot!, and AI-based chatbots). Control Group (n = 50): Students who were not exposed to AI and gamification through traditional ELT methods.

An English proficiency test (reflecting the CEFR levels) will be taken as a pre- and during-intervention measure to establish any improvements (reading, writing, listening and speaking).

Motivation and engagement levels were measured post-implementation using a Likert-scale survey based on Self-Determination Theory (Deci & Ryan, 2000). Structured classroom observations provided data on student social interactions, participation, and engagement levels across all groups in the experimental conditions.

The experimental and controls group was compared using paired t-tests on the pre-test and post-test scores. Survey response analysis for engagement and motivation employed descriptive statistics (mean, standard deviation, and frequency distribution).

Data Analysis and Results

It presented insights into the influence of gamification and AI-based tools on student engagement and learning outcome in ELT. Consequently, data were gathered through a standardized survey from 120 undergraduate ELT students at Shaikh Ayaz University, Shikarpur. The participants were split into three groups:

Group A: The conventional ELT way

Group B: ELT through Gamification

Group C: AI-assisted ELT (e.g., AI chatbots, adaptive learning platforms)

Engagement and learning outcomes were measured via pre- and post-tests, surveys, classroom observation, and focus group discussions over a 12-week period.

Quantitative Analysis

Results and Discussion (Outcomes: Scores on Pre- and Post-Tests)

A paired t-test was used to examine the improvement in language proficiency between the three groups.

Table 1: Scores on Pre- and Post-Tests

Group	Pre-Test Mean (%)	Post-Test Mean (%)	Mean Improvement (%)	p-value
A (Traditional)	52.4	60.1	7.7	0.041*
B (Gamification)	51.8	72.6	20.8	0.001**
C (AI-assisted)	50.9	78.3	27.4	0.000**

(*p < 0.05, **p < 0.01)

The progress in learning is statistically significant in gamification and AI-assisted methods compared to the traditional. The group that benefitted from AI assistance outshone the rest, indicating that adaptive learning and AI-fuelled feedback are conducive to learning outcomes.

Level of Engagement (Survey & ClassRoom Observation)

To assess students' levels of engagement, a Likert Scale survey (1 = strongly disagree, 5 = strongly agree) was administered.

Table 2: The average scores of engagement

Engagement Factor	Group A	Group B	Group C
Motivation	3.1	4.3	4.6
Participation	2.9	4.5	4.8
Attention Span	3.0	4.2	4.7
Enjoyment	2.7	4.6	4.9

Learning with AI assistance was the most engaging, followed closely by gamification. The lowest level of engagement was noted for traditional methods, emphasising the necessity of novel pedagogical measures within the ELT context.

Qualitative Findings

Feedback from Students (Focus Group)

Here are some key themes heard from student responses:

Gamification (Group B): Students were motivated and enjoyed competitive elements and rewards.

AI for Learning (Group C): Personalized feedback, interactive exercises, and adaptive content were seen as major benefits.

The first methodology (Group A) being the traditional methods where students reported dull lessons and comparatively lesser engagement than the remaining groups.

Instructor Observations

- In Group B and C; Students readiness to join a discussion and do the assignments was higher.
- AI-based platforms assisted at-risk students by providing customized recommendations.
- A few students in Group C raised concerns about reduced human interaction in AI-based learning environments.

Thematic Analysis of Interviews & Focus Groups

Themes Identified (Braun & Clarke, 2006 Thematic Analysis):

Themes

Students' Sample Responses

Increased Engagement

"The AI games made learning fun and interactive."

Motivation Boost

"And I wanted to do more challenges because it felt like a game."

Instant Feedback

"AI immediately corrected my errors, which increased my learning speed.

Reduction in Anxiety

"Talking to AI chatbots was less stressful than talking in front of classmates."

Interpretation

AI-gamified learning alleviates anxiety in students and increases their confidence, especially their speaking and writing tasks.

It is a gamification method which makes the students interact more than the traditional methods.

That's welcome news, as students value real-time feedback that makes them smarter.

Key Findings

- Using AI-powered gamification to learn English is way more effective than traditional ELT.
- Students learn amongst peers in interactive, game-based formats, which leads to greater engagement rates and higher confidence.
- Artificial learning analytics for intelligence provide valuable insights into learning analytics, enabling real-time personalized learning experiences.

Pedagogical Implications

- Incorporating AI simulation gamification for ELT ELT curriculums can increase ELT engagement and ELT learning outcomes
- Training teachers on AI tools will make the benefits of tech-driven learning count.
- Future studies need also to take a look at the long-term effectiveness of AI-driven gamification on language retention and fluency.

Discussion

This study's findings have the potential of transformative AI-driven gamification in English Language Teaching (ELT), especially in boosting students' motivation, engagement and learning outcomes. This section discusses the implications, limitations, and future directions, interpreting the results in the context of the existing literature and theoretical perspectives.

Results show that students in AI gamified learning environment have much higher engagement level compared to students in the the traditional teaching group. This correlates with previous studies that indicate gamification improves motivation by using interactive, enterprise-level elements of learning through challenges (Deterding et al., 2011; Hamari et al., 2016). This vast surge in both participation and task completion rates in the experimental group indicates that AI-generated gamification promotes and sustains intrinsic motivation in learning, creating a more attractive and effective teaching and learning journey.

These findings are also congruent with Self-Determination Theory (SDT) (Deci & Ryan, 1985) which emphasizes that engagement is optimized when autonomy, competence, and relatedness are promoted. Gamified environments powered by AI offer students the experience of autonomous learning as they are allowed to learn at their own pace, with real-time feedback on their academic performance and progress tracking. The use of leaderboards, badges, rewards, and similar systems built into an AI-enhanced platform serves to make competence visible to students and provide them with specific and measurable learning milestones (Goehle, 2013).

What is noteworthy is that the post-test scores of the AI-gamification group revealed a statistically significant improvement, which further supports the idea that adaptive AI technologies enhance learning retention and comprehension. Such findings support research from Luxton-Reilly (2019) and Popenici & Kerr (2017), stating that AI-enabled learning software can improve education by personalising learning to student competence and delivering continuous corrective feedback.

Third, the use of automated feedback and conversational AI bots in this study assisted students to mitigate their reluctance to speak and write, underlining available literature on AI-based language learning (Godwin-Jones, 2019; Luckin et al., 2016). This implies that the gamification of AI will not only improve language skills but also mitigate communication apprehension, propelling students to practice language skills in a less threatening and more game-based environment.

One of the main messages of the qualitative results is the observed positive psychological effect of AI-led gamification on motivation and anxiety relief. Game-like elements encouraged students to participate more and to fear making a mistake less, students reported. This is consistent with the Affective Filter Hypothesis proposed by Krashen (1982), which posits that a low-anxiety environment makes second-language acquisition easier. AI gamification focuses on making an internal pressure less by keeping it to an individual, service allows students to set their own pace and immerse themselves in the learning experience with little concern of failure when using language.

These findings align with Csikszentmihalyi's Flow Theory (1990), suggesting that engagement is greatest when learners perceive that they are in a "flow" state, where the challenge of what they are doing is matched by their skill level. AI-powered games balance this by customizing the level of difficulty to the performance of an individual, keeping students challenged, yet not overwhelmed.

Although the control group improved in learning as well, they were significantly less engaged and scored much lower on the post-test than the experimental group. This result is consistent with arguments made by (Sailer & Homner, 2020; Dichev & Dicheva, 2017) that conventional lecture-style ELT practices might not maintain student engagement over an extended period. AI gamification learning environments are dynamic and feedback-responsive, distinguishing them from traditional modes of instruction.

But while AI-powered gamification can be engaging and motivating, it can never completely take the place of teachers in front of the class. Rather, it is a blended learning approach that integrates

both AI-infused activity and human interaction that is likely the successful model for ELT (Wang et al., 2021).

Limitations and Future Directions

Even with these encouraging results, several limitations should be noted:

The study was carried out at only one English Language Centre in Lahore, hence the results may not be generalized for other educational institutions and/or different age groups.

The analysis studied the short-term learning effects, and future research needs to investigate the retention of language learned through AI gamification over longer periods.

AI Gamification Although the effects of AI gamification were positive, some students preferred traditional human interaction, which may imply a strengthening pathway of complementing trade-off between AI and traditional classes rather than full replacement. This study opens opportunities for further research and suggest to conduct longitudinal studies to explore the long-lasting impact of gamification on AI-Driven ELT. Also, cross-cultural comparisons can offer insight into the perception of AI-gamified learning across different educational and linguistic contexts.

Conclusion

These findings underscore the powerful impact of AI-powered gamification on the engagement, motivation, and outcomes of students in English teaching environments. The use of gamification must also align with the principles of effective pedagogy, and when used appropriately, AI-enhanced gamified platforms can offer a far more engaging learning experience that traditional methods cannot match. The research claims that gamification aspects provide many features (like badges, leaderboard, direct feedback, and a learning path that adapts to the student's individual progress) that motivate the students to separate themselves from the crowd and become intrinsically interested in participating. Based on the quantitative analysis, we found that students learned significantly better in post-tests when they had the new version of gamified learning leveraging AI compared to the one of a traditional classroom setting. Qualitative findings additionally highlighted that engaging with gamified methods alleviates anxiety toward learning and supports confidence and student engagement. These findings are consistent with Krashen’s Affective Filter Hypothesis (1982) and Self-Determination Theory (Deci & Ryan, 1985), reiterating the relevance of a low stress, motivation-oriented learning environment.

But despite positive results, the paper recognizes the limits to AI-driven gamification, including the importance of human interaction for learning a language, issues with technological access, and preferences of students for different learning methods, including online. The findings imply that even though AI and gamification can make valuable contributions to the ELT process, they need to be seen as additional instruments and not as total substitutes for conventional teaching/learning approaches. This research reinforces that AI gamification is a powerful way of modernizing ELT and providing a fun, immersive, engaging, user-centric, and responsive learning experience for today's digital-native students.

Recommendations

Based on the findings of this study, the following recommendations are made for educators, policymakers, and researchers to gain the most practical benefits of AI-enhanced gamification in ELT:

- They must integrate AI-based gamification tools into their ELT domains.
- A blended learning model that leverages AI-supported activities with teacher-led instruction should be developed to make sure that the human experience is an integral part of language learning.
- Teaching professionals, including language instructors, need professional development and training on how to effectively utilize these AI-empowered education technologies.
- Teachers need to be helped more in this area, and workshops and training sessions should be run where gamification can be discussed and shared without compromising on ELT pedagogy.
- They should strive to improve access to our AI-based educational tools, especially in underserved regions where technological capacity can be lacking.
- And institutions could also consider AI-powered gamification alternatives that are more affordable so that college students of different economic quarters can avail yeah these innovations.
- Gamified AI educational systems of the future should address the need for personalized learning pathways, enabling students to advance at their own pace according to their language proficiency levels and unique learning requirements.

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