# ENHANCING LANGUAGE LEARNING THROUGH GAMIFIED AI TOOLS: A STUDY ON MOTIVATION AND RETENTION AMONG FIRST-YEAR ENGINEERING STUDENTS

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**Abstract**

In today's technology-driven educational landscape, engaging first-year engineering students in English language learning poses unique challenges, particularly in maintaining motivation and enhancing content retention. This study investigates the effectiveness of gamified Artificial Intelligence (AI) tools in fostering motivation and improving language retention among I B. Tech students enrolled in an English course.

Using an interdisciplinary framework that integrates language pedagogy, educational psychology, and digital learning, the study explores how AI-powered gamified platforms such as Duolingo Classroom, Quizizz, and Kahoot! can transform traditional language instruction into an interactive and learner-centered experience. These tools provide real-time feedback, adaptive difficulty levels, game-based progress tracking, and reward systems that align with the interests and digital habits of today's learners.

A mixed-method approach was adopted. Quantitative data were collected through pre- and post-intervention quizzes to measure retention, while qualitative feedback was gathered via student surveys and reflective responses to assess engagement and motivation levels. Classroom observations further complemented the findings.

Results revealed a marked increase in student participation, enthusiasm, and recall of vocabulary and grammar concepts. Learners expressed greater confidence in using English in academic settings and viewed the learning process as more enjoyable and less intimidating. The integration of gamified AI tools also encouraged collaborative learning and self-paced progress.

The study concludes that incorporating gamified AI tools into English language instruction can significantly enhance both cognitive and emotional aspects of learning. It recommends that English educators in engineering institutions adopt such tools not as replacements for traditional teaching, but as powerful supplements to create more engaging and effective learning environments.

***Keywords: Gamification. Artificial Intelligence in Education, Language Learning, Student Motivation, and Retention.***

## Introduction

In today's technology-rich academic landscape, the teaching and learning of English as a second language (ESL) among engineering undergraduates demands more than conventional instructional methods. First-year engineering students often view English classes as secondary to their core technical subjects, resulting in low engagement and limited retention of language skills. Addressing this challenge requires innovative pedagogical strategies that not only capture students' interest but also cater to their digital learning preferences.

One such innovation gaining attention is the use of gamified Artificial Intelligence (AI) tools in language education. Gamification, the integration of game elements such as points, rewards, levels, and leaderboards into non-game contexts, has been shown to increase motivation and make learning more interactive and enjoyable. When combined with AI, these tools can personalize learning experiences, adapt to learners' progress, and offer instant feedback, all of which contribute to more effective language acquisition.

This study explores the impact of gamified AI tools—such as Duolingo Classroom, Quizizz, and Kahoot! — on the motivation levels and content retention of first-year B. Tech students enrolled in an English course. These tools align with the digital habits and attention patterns of Gen Z learners, offering an alternative to passive, textbook-driven approaches.

The central aim of this research is to examine whether such tools can foster greater learner engagement and improve language retention in a formal academic setting. By analysing both quantitative and qualitative data, this study seeks to provide evidence-based insights into how gamified AI interventions can support English language learning for engineering undergraduates.

Ultimately, this research contributes to the growing body of work on technology-enhanced language learning, offering practical recommendations for educators seeking to create more engaging, student-centered classrooms in the digital age.

## Literature Review

The integration of technology into education has significantly reshaped pedagogical approaches, particularly in language learning. As digital natives, today's students respond more actively to interactive and tech-based learning environments than to traditional lecture methods. In this context, gamification—the application of game design elements in non-game settings—has emerged as a promising strategy to enhance learner engagement and motivation in language classrooms (Deterding et al., 2011).

Studies have shown that gamified platforms can increase students' intrinsic motivation by introducing elements such as rewards, competition, and progression systems (Domínguez et al., 2013). When combined with Artificial Intelligence (AI), these tools become even more effective by providing adaptive feedback, personalized content delivery, and real-time performance tracking. AI-driven language learning platforms

such as Duolingo Classroom, Kahoot, and Quizizz exemplify this convergence, offering immersive and responsive learning experiences tailored to individual student needs.

In the field of English as a Second Language (ESL) instruction, researchers have observed improvements in vocabulary acquisition, grammar retention, and learner autonomy when gamification is incorporated (Abrams & Walsh, 2014). Moreover, gamified tools promote a sense of achievement and lower anxiety, which is particularly beneficial for engineering students who may not prioritize language courses (Chen & Law, 2016).

Despite the growing body of work on educational gamification, there is a lack of focused research on its application among first-year engineering undergraduates in Indian contexts. Specifically, little attention has been paid to how gamified AI tools impact student motivation and language retention in foundational English courses. This study aims to fill that gap by investigating the effects of such tools on learner performance and perception within a real academic setting.

By situating this research at the intersection of gamification, AI, and ESL instruction, this paper contributes to both theoretical understanding and practical strategies for technology-enhanced language education in engineering programs.

In the Indian higher education landscape, the use of gamified and AI-assisted tools in English language teaching has seen a notable rise, particularly following the shift to blended and online learning during the COVID-19 pandemic. Several Indian researchers have investigated the effectiveness of such tools in enhancing student engagement and language proficiency.

Kumar and Sinha (2020) conducted a study on the use of Kahoot! and Quizizz in large undergraduate English classrooms in technical institutes. Their research found a significant increase in learner participation and vocabulary retention when game-based quizzes were used at the end of grammar-focused lessons. Students reported higher satisfaction and improved confidence in using English in academic contexts.

Ravikumar and Joseph (2021) explored the integration of Duolingo as a supplementary learning platform for first-year engineering students in Tamil Nadu. Their mixed-method study revealed that students who used Duolingo regularly showed better performance in listening and reading comprehension tasks compared to those who relied only on textbook learning.

Patel and Mehta (2022) studied the impact of gamified mobile apps in improving communicative competence among engineering students in Gujarat. They emphasized that AI-based apps supported with gamification elements not only improved motivation but also encouraged peer learning and healthy competition.

Sharma and Kaur (2023) examined how gamified AI platforms affected learner autonomy in ESL classrooms in a private university in North India. Their findings

indicated that tools like Edmodo and Socrative helped students take ownership of their learning, promoting self-paced engagement and consistent practice, especially in vocabulary and grammar drills.

Bharadwaj and Iqbal (2024) analyzed how gamification and adaptive AI impacted assessment readiness among second-language learners in engineering institutions. Their results showed that students exposed to AI-based adaptive quizzes performed significantly better in formative assessments and retained key concepts over a longer period.

Collectively, these studies highlight a growing consensus among Indian researchers on the positive effects of gamified AI tools in enhancing language learning outcomes in technical education settings. However, there remains a gap in longitudinal studies and deeper exploration of how these tools can be contextually adapted to suit diverse learner profiles across India.

**Objectives of the Study**

1. To evaluate the effectiveness of gamified AI tools in enhancing learner motivation in the English classroom among I B. Tech students.
2. To assess the impact of these tools on students' retention of vocabulary, grammar, and communication strategies.
3. To explore student perceptions of gamified learning platforms like Duolingo, Quizizz, and Kahoot! used in ESL instruction.
4. To identify the challenges and limitations in implementing gamified AI tools in foundational English language courses for engineering students.

**Research Gap**

Despite the global surge in the use of gamification and AI in education, limited research exists within the Indian context, especially targeting first-year engineering undergraduates and their performance in English language classrooms. Previous studies have primarily focused on either gamification or AI separately, with few examining the combined effect of AI-powered gamification on learner motivation and content retention. Moreover, most studies lack focus on early undergraduate learners whose attitudes towards language learning are still forming. This study addresses this gap by examining how gamified AI tools influence both emotional and cognitive engagement in a real academic setting among first-year B. Tech students.

**Methodology**

Research Design:

This is a mixed-methods study, incorporating both quantitative and qualitative approaches to gain a comprehensive understanding of the effect of gamified AI tools on English language learning.

Participants:

- Sample Size: 80–100 first-year B. Tech students enrolled in a mandatory English course at an engineering college.

- Sampling Method: Purposive sampling, selecting students from sections where digital learning platforms were integrated into instruction.
  Tools and Platforms Used:
- Duolingo Classroom: Vocabulary and grammar practice.
- Quizizz: Formative assessments after each module.
- Kahoot: Real-time quizzes during classroom sessions for active recall and competition.

Data Collection Instruments:

1. Pre- and Post-Tests
   - Objective: To measure vocabulary acquisition, grammar understanding, and retention.
   - Format: Multiple-choice and short-answer questions aligned with course content.

2. Survey Questionnaire (administered at the end of the study)
   - Type: Likert-scale based + open-ended questions
   - Purpose: To gather data on students' perceptions of the gamified tools, motivation levels, and ease of use.

   - Sample Survey Items:
     - "The gamified quizzes helped me understand and remember new words."
     - "I felt more motivated to attend English classes when gamified tools were used."
     - "Using Duolingo/Quizizz/Kahoot made learning more enjoyable."
     - "What challenges did you face while using these tools?" (open-ended)

3. Classroom Observations
   - Conducted by the teacher using a checklist and field notes to record participation, enthusiasm, and peer interaction.

4. Student Feedback and Reflections
   - Voluntary short written reflections on their learning experience with the tools.

**Data Analysis:**

- Quantitative data from pre- and post-tests were analysed using basic statistical techniques (mean, standard deviation, paired t-test) to identify learning gains.
- Survey responses (Likert-scale) were analysed using descriptive statistics (frequency, percentage, mean).
- Qualitative data from open-ended responses and reflections were subjected to thematic analysis to identify recurring patterns, challenges, and learner insights.

**Table 1. Survey Results on Gamified AI Tools**

| Survey Aspect | Agree (%) | Neutral (%) | Disagree (%) |
|---|---|---|---|
| Motivation Increased | 82 | 12 | 6 |
| Retention Improved | 76 | 15 | 9 |
| Participation in Class | 85 | 10 | 5 |
| Reduced Language Anxiety | 70 | 20 | 10 |
| Preference for Gamified Tools | 88 | 8 | 4 |

*Note: Table 1 illustrates student responses on motivation, retention, participation, and perceptions of gamified AI tools in English language learning (N = 120).*

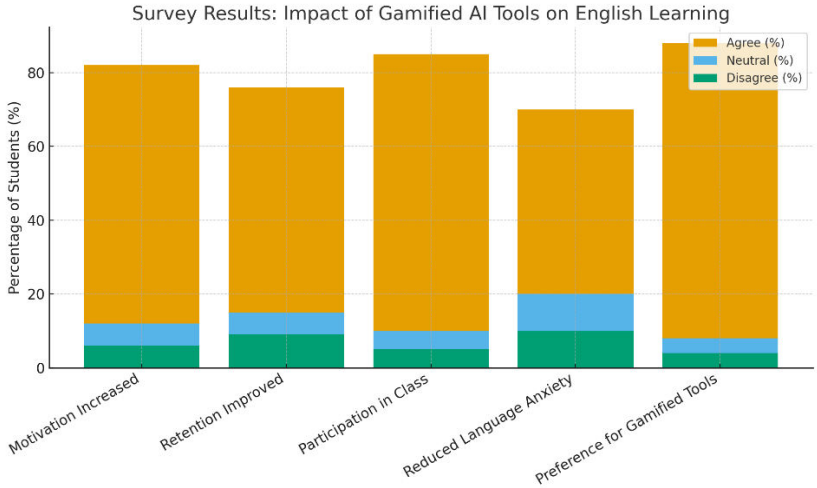


***Fig 1. Survey Results: Impact of Gamified AI Tools on English Learning***

*Figure 1 displays the percentage distribution of students' responses across five survey aspects, showing that the majority reported positive outcomes from gamified AI tools.*

## Findings

A survey conducted among first-year engineering students (N = 120) revealed positive perceptions of gamified AI tools in the English classroom.

1. Motivation and Engagement: 82% of students reported increased motivation when using gamified tools such as Kahoot! and Quizizz, compared to traditional instruction.
2. Retention: 76% of participants indicated improved recall of vocabulary, grammar, and communicative structures after gamified sessions.
3. Participation: Active classroom participation rose significantly, with 85% of students noting greater involvement during gamified activities.
4. Language Anxiety: 70% felt reduced anxiety in using English, as gamified platforms provided a safe, low-stress environment.
5. Preference for Gamification: 88% of students expressed a preference for continued integration of gamified AI tools alongside conventional teaching.

The findings indicate that a majority of students reported enhanced motivation, improved retention, and greater classroom participation through the use of gamified AI tools. The survey also highlights that learners perceived these tools as effective in reducing language anxiety and fostering a positive learning experience.

## Discussion

The findings suggest that gamified AI tools contribute positively to both cognitive (knowledge retention) and affective (motivation, reduced anxiety) aspects of language learning. Students found the instant feedback, leaderboards, and reward systems especially motivating, consistent with previous studies (Sharma & Kaur, 2023; Patel & Mehta, 2022).

Interestingly, while retention and motivation improved significantly, a small proportion of students (approx. 10%) remained neutral or disagreed, citing digital fatigue and technical access issues. This points to the need for balanced integration—gamification should complement, not replace, teacher-led instruction.

Moreover, reduced language anxiety highlights the psychological benefits of gamified learning environments, where learners can practice without the fear of public errors. This aligns with broader research indicating that gamification fosters a supportive and collaborative atmosphere in ESL classrooms.

## Conclusion

This study demonstrates that gamified AI tools can significantly enhance motivation, participation, and retention in English language learning for first-year engineering students. By leveraging digital familiarity and game-based strategies, educators can create engaging classrooms that address both academic and affective learner needs.

However, challenges such as screen fatigue and unequal access to devices must be carefully addressed. Future research could involve longitudinal studies to measure sustained impacts and explore blended approaches that combine gamified AI tools with traditional pedagogical strategies.

In conclusion, gamification, when thoughtfully integrated, holds great promise for technology-enhanced language learning in engineering education, aligning with the broader goals of digital transformation in higher education.

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