

AI-SUPPORTED GAMIFICATION IN ENGLISH GRAMMAR LEARNING: ITS EFFECTS ON DEEP AND SURFACE LEARNING APPROACHES AMONG UZBEK UNIVERSITY STUDENTS

Moxira Kasimova

Department of Theory and Methodology

"Tashkent Institute of Irrigation and Agricultural Mechanization Engineers"

National Research University. Tashkent Uzbekistan

m_kasimova@tiame.uz

ORCID: 0009-0003-2591-1556

<https://doi.org/10.5281/zenodo.20312216>

Abstract: The integration of artificial intelligence (AI) and gamification into English language education has significantly transformed contemporary teaching methodologies. In higher education, AI-supported gamified learning environments are increasingly utilized to improve learner motivation, engagement, and academic performance in grammar instruction. This article examines the effects of AI-supported gamification on deep and surface learning approaches among Uzbek university students studying English as a Foreign Language (EFL). The study is based on existing empirical research, theoretical frameworks, and current scholarly discussions concerning gamification, AI-assisted language learning, and cognitive learning approaches. Research findings demonstrate that AI-supported gamification contributes positively to deep learning by encouraging critical thinking, active participation, self-regulation, and long-term grammar retention. At the same time, some studies indicate that poorly designed gamification systems may reinforce surface learning behaviors focused mainly on rewards, competition, and memorization. In Uzbekistan, the growing implementation of digital education technologies and AI-based language platforms has created new opportunities for grammar learning in universities. However, infrastructural limitations, digital inequality, and insufficient teacher preparation remain major challenges. The article concludes that AI-supported gamification can significantly enhance grammar acquisition among Uzbek university students when pedagogical objectives prioritize meaningful learning rather than purely external motivation.

Keywords: Artificial intelligence, gamification, English grammar learning, deep learning approach, surface learning approach, EFL, Uzbek university students, digital education, language acquisition, higher education

Introduction

The rapid development of digital technologies has substantially influenced educational systems worldwide. Among the most significant innovations in language education are artificial intelligence (AI) and gamification technologies, which are increasingly integrated into English as a Foreign Language (EFL) instruction [1]. AI-supported gamification combines adaptive learning algorithms, automated feedback systems, and game-like educational elements such as badges, points, leaderboards, and challenges to improve student engagement and learning outcomes [2].

In higher education institutions of Uzbekistan, English language learning has become an important academic priority due to globalization, international cooperation, and labor market demands. The government of Uzbekistan has also emphasized the importance of foreign language education and digital transformation in higher education [3]. As a result, universities are gradually introducing AI-powered educational technologies and gamified learning platforms into English language classrooms.

Grammar learning remains one of the most difficult areas for EFL students. Traditional grammar instruction often relies on memorization, repetitive exercises, and teacher-centered

methods, which may lead to low motivation and passive learning behaviors [4]. Gamification has emerged as an alternative pedagogical strategy capable of transforming grammar learning into a more interactive and student-centered process.

Educational psychology distinguishes between deep and surface learning approaches. Deep learning refers to meaningful understanding, critical analysis, and the integration of knowledge into broader conceptual frameworks. Surface learning, in contrast, involves rote memorization, minimal engagement, and short-term retention mainly aimed at passing examinations [5]. The effectiveness of AI-supported gamification depends largely on whether it encourages deep cognitive engagement or merely reinforces superficial reward-oriented behavior.

Recent studies suggest that gamified AI environments can support personalized learning experiences and increase learner autonomy [6]. AI systems can analyze student performance, provide adaptive grammar exercises, and offer immediate feedback tailored to individual needs. Such features may enhance deep learning processes by encouraging reflection, problem-solving, and self-regulated learning [7].

However, researchers also warn that excessive emphasis on points, rankings, and external rewards may reduce intrinsic motivation and encourage surface learning approaches [8]. Therefore, the relationship between AI-supported gamification and learning approaches remains an important topic for investigation, particularly in developing educational contexts such as Uzbekistan.

Methodology

This article employs a qualitative analytical methodology based on secondary data analysis. The study synthesizes findings from peer-reviewed journal articles, conference papers, systematic reviews, educational reports, and theoretical studies related to AI-supported gamification, English grammar learning, and learning approaches in higher education.

The selected literature focuses primarily on:

- AI-assisted language learning systems;
- Gamification in EFL education;
- Cognitive theories of deep and surface learning;
- Digital education in Uzbekistan and similar educational contexts.

Sources published between 2011 and 2025 were prioritized because this period reflects the rapid growth of AI technologies and educational gamification research. Databases and academic platforms containing educational research were examined to identify relevant scholarly materials.

The theoretical foundation of the study is based on constructivist learning theory, self-determination theory, and cognitive load theory. Constructivist theory emphasizes active learner participation in knowledge construction [9]. Self-determination theory explains how intrinsic and extrinsic motivation influence learning engagement [10]. Cognitive load theory is particularly relevant for AI-supported learning environments because effective gamification design must balance engagement with cognitive processing capacity [11].

The article also incorporates findings from studies conducted in Central Asian and Uzbek educational contexts where digital language learning technologies are increasingly implemented. No fictional or fabricated experimental data were included in this article.

Results

Research findings indicate that AI-supported gamification has several positive effects on English grammar learning among university students. One major outcome is increased learner engagement. Studies consistently demonstrate that gamified learning environments improve participation rates, attention span, and classroom interaction compared to traditional grammar instruction [12].

AI-powered platforms such as Duolingo, Quizlet, Grammarly, and adaptive tutoring systems provide instant corrective feedback and personalized grammar tasks [13]. This immediate feedback mechanism helps learners identify grammatical errors more efficiently and encourages

continuous practice. Research also shows that adaptive AI systems can reduce learner anxiety by allowing students to progress according to their individual proficiency levels [14].

Another significant result is the improvement of deep learning behaviors. Gamified grammar activities that involve problem-solving, contextualized language tasks, collaborative missions, and reflective feedback tend to promote conceptual understanding rather than simple memorization [15]. Students become more actively involved in the learning process and demonstrate greater autonomy in managing their grammar development.

Studies conducted in EFL contexts reveal that students using gamified learning systems often exhibit improved grammar retention and higher academic performance [16]. A quasi-experimental study on gamification and grammar learning reported statistically significant improvement in post-test scores among students exposed to gamified instruction [17].

In the Uzbek educational context, recent research demonstrates growing interest in gamified and AI-assisted language learning. Uzbek university students reported higher motivation and increased vocabulary retention when using AI-supported gamified platforms [18]. Researchers also observed that gamification aligns well with the learning preferences of digitally oriented university students in Uzbekistan [19].

Despite these positive outcomes, some findings indicate potential negative consequences. Competitive leaderboard systems may encourage learners to focus excessively on rewards rather than meaningful understanding [20]. Some students prioritize obtaining points or completing tasks quickly instead of analyzing grammatical structures deeply. This tendency may reinforce surface learning behaviors characterized by memorization and short-term performance orientation.

Additionally, technological inequalities remain a challenge in Uzbekistan. Urban universities generally possess better digital infrastructure than rural institutions, creating unequal access to AI-supported educational technologies [21]. Teacher training also remains insufficient in many institutions, limiting the effective pedagogical implementation of gamification systems.

Analysis and Discussion

The relationship between AI-supported gamification and learning approaches can be understood through educational psychology and cognitive learning theories. Deep learning occurs when students seek meaning, connect concepts, and actively engage in critical thinking processes [5]. AI-supported gamification can facilitate such learning when game elements are integrated with pedagogically meaningful activities.

One important factor contributing to deep learning is personalization. AI technologies analyze learner performance data and adapt grammar exercises according to student needs [15]. Personalized learning paths allow students to focus on problematic grammatical areas while progressing at their own pace. This individualized approach promotes metacognitive awareness and self-regulated learning, both of which are essential components of deep learning.

Gamified systems also increase learner motivation. According to self-determination theory, intrinsic motivation develops when learners experience competence, autonomy, and relatedness [10]. AI-supported grammar platforms often incorporate these motivational dimensions through adaptive challenges, progress visualization, and collaborative learning tasks. When learners perceive grammar activities as enjoyable and meaningful, they become more cognitively invested in learning.

Furthermore, immediate AI-generated feedback contributes significantly to grammar acquisition. Traditional grammar instruction frequently delays corrective feedback due to classroom limitations. AI systems, however, provide instant responses that help students recognize and correct grammatical mistakes immediately [13]. This process strengthens learning efficiency and promotes active cognitive engagement.

Collaborative gamification activities may also support deep learning. Team-based grammar challenges encourage communication, negotiation, and peer learning. Through social interaction,

students develop deeper conceptual understanding of grammatical structures and language use [22].

However, the effectiveness of gamification depends greatly on instructional design. Superficial gamification that relies mainly on points, badges, and competition may undermine deep learning objectives [8]. When students focus primarily on external rewards, they may adopt surface learning strategies aimed at rapid task completion rather than meaningful understanding.

This concern is particularly important in examination-oriented educational systems. In some university contexts, students prioritize grades and certification outcomes over conceptual mastery. If gamified systems reinforce performance-oriented behaviors without encouraging reflection and analysis, surface learning approaches may become dominant.

Cognitive load theory also provides important insights into AI-supported gamification. Well-designed gamification reduces extraneous cognitive load by organizing learning activities efficiently and maintaining learner attention [11]. However, excessive animations, notifications, or competitive elements may overwhelm students cognitively and distract them from grammar learning objectives.

In Uzbekistan, AI-supported gamification presents both opportunities and challenges. The increasing digitalization of higher education creates favorable conditions for technology-enhanced language learning. Many Uzbek students actively use mobile learning applications and online educational resources. Gamification therefore corresponds to their digital habits and learning preferences.

Nevertheless, infrastructural and pedagogical barriers remain significant. Unequal internet access, insufficient digital devices, and limited teacher training may reduce the effectiveness of AI-supported learning environments [21]. Teachers must possess not only technological skills but also pedagogical competence in integrating gamification meaningfully into grammar instruction.

Another important consideration involves cultural and educational traditions. Uzbek higher education has historically emphasized teacher-centered instruction and memorization-based assessment practices. Transitioning toward student-centered, gamified, and AI-supported learning requires institutional adaptation and methodological reform.

Overall, the analysis suggests that AI-supported gamification can effectively promote deep learning approaches when designed carefully and aligned with educational objectives. Meaningful grammar tasks, adaptive feedback, collaborative interaction, and reflective activities are essential for maximizing educational benefits. Conversely, excessive reliance on competitive rewards and superficial engagement mechanisms may encourage surface learning behaviors.

Conclusion

AI-supported gamification represents a significant innovation in English grammar learning within higher education. Research demonstrates that gamified AI environments can enhance learner engagement, grammar retention, motivation, and academic performance among EFL students. In the context of Uzbek universities, these technologies offer promising opportunities for modernizing English language education and increasing student participation.

The findings indicate that AI-supported gamification has the potential to foster deep learning approaches by promoting critical thinking, self-regulated learning, personalization, and meaningful interaction with grammatical concepts. Immediate feedback, adaptive learning systems, and collaborative activities contribute positively to long-term grammar acquisition.

However, the effectiveness of gamification depends heavily on instructional design and pedagogical implementation. Poorly designed reward systems may encourage surface learning focused mainly on points and competition rather than conceptual understanding. Therefore, educators should prioritize meaningful learning objectives over purely motivational mechanics.

For Uzbek higher education institutions, successful implementation of AI-supported gamification requires improved digital infrastructure, teacher training, and pedagogical

innovation. Universities should ensure that AI technologies support student-centered learning and cognitive development rather than simple task completion.

Future research should examine empirical classroom-based evidence concerning the long-term effects of AI-supported gamification on grammar acquisition and learning approaches among Uzbek university students. Comparative studies between traditional and AI-enhanced grammar instruction would also contribute valuable insights to the field of EFL education.

References

1. Deterding S., Dixon D., Khaled R., Nacke L. From Game Design Elements to Gamefulness. 2011. pp. 9–15.
2. Kapp K. The Gamification of Learning and Instruction. New York: Wiley, 2012. pp. 45–78.
3. Ministry of Higher Education of Uzbekistan. Digital Transformation Strategy in Higher Education. Tashkent, 2023. pp. 12–26.
4. Richards J., Rodgers T. Approaches and Methods in Language Teaching. Cambridge University Press, 2014. pp. 90–110.
5. Biggs J., Tang C. Teaching for Quality Learning at University. McGraw-Hill Education, 2011. pp. 18–39.
6. Woo J., Choi H. Systematic Review for AI-based Language Learning Tools. 2021. pp. 4–11.
7. Salmanova S. Gamification and AI in Language Learning – A New Era of Digital Education. 2025. pp. 1–9.
8. Nicholson S. A User-Centered Theoretical Framework for Meaningful Gamification. 2012. pp. 223–230.
9. Vygotsky L. Mind in Society. Harvard University Press, 1978. pp. 79–91.
10. Deci E., Ryan R. Intrinsic Motivation and Self-Determination in Human Behavior. Springer, 1985. pp. 31–56.
11. Sweller J. Cognitive Load Theory. Psychology of Learning and Motivation, 1998. pp. 37–76.
12. Noori A. Gamification and Social Media: Transforming English Grammar Learning in EFL Classrooms. 2025. pp. 85–94.
13. Belda-Medina J., Calvo-Ferrer J. Using Chatbots as AI Conversational Partners in Language Learning. 2022. pp. 1–15.
14. Hubbard P. Making a Case for Learner Training in Technology Enhanced Language Learning Environments. 2013. pp. 163–178.
15. Zou D., Huang Y., Xie H. Digital Game-Based Vocabulary Learning: A Meta-analysis. 2020. pp. 1–18.
16. Reynolds B., Kao C. The Effects of Duolingo on EFL Learners. 2021. pp. 56–70.
17. Rahmi R., et al. Gamification in EFL Grammar Instruction. 2025. pp. 70–88.
18. Yangibayeva B. Teaching English Using AI Assistants: Impact on Student Motivation. 2025. pp. 1–8.
19. Salisheva Z. Gamification Techniques in Teaching Uzbek Vocabulary and Grammar. 2025. pp. 53–60.
20. Domínguez A., et al. Gamifying Learning Experiences: Practical Implications and Outcomes. 2013. pp. 380–392.
21. Yusupova M. ICT Integration in Uzbekistan Higher Education. 2021. pp. 22–35.
22. Chapelle C. Technology and Second Language Acquisition. Wiley-Blackwell, 2019. pp. 144–169.