Elmi İş Oktyabr 2026, Cild: 20, Sayı: 6, s. 93−102
Scientific Work October 2026, Volume: 20, Issue: 6, pp. 93−102
DOI: https://doi.org/10.36719/2663-4619/130/93-102

Gamification and Immersive Technologies: Transforming Engagement in Language Learning

Aida Jalilzada[1*], Turkan Hasanzada[1], Fatima Ismayilli[1], Kovser Abbasova[1], and Efsane Orujlu[1]

Abstract. *This study explores the effects of combining gamification and immersive virtual reality (VR) technologies on university students' engagement and learning outcomes in English as a foreign language (EFL). The aim was to determine whether integrating game elements and immersive tools can enhance motivation and performance in online EFL learning environments. Sixty university EFL students participated in an eight-week quasi-experimental study. They were divided into two groups: an experimental group learning through a gamified immersive VR environment and a control group using traditional online instruction. A pre-test/post-test design was used to measure language proficiency gains, and a post-intervention engagement survey assessed behavioral, emotional, and cognitive engagement. Findings indicated that the gamified immersive approach significantly increased engagement and learning performance. The experimental group reported higher engagement (M = 4.5/5) compared to the control group (M = 3.5/5) and achieved higher post-test scores (83% vs. 72%). The between-group differences in engagement and test performance were statistically significant, confirming the motivational benefits of combining gamification and immersion. Integrating gamification and VR can transform language learning by promoting motivation, interaction, and enjoyment while improving learning outcomes. The approach supports student-centered pedagogy and authentic language use, although attention to technical resources and teacher training remains essential. These results provide empirical evidence that gamified immersive learning environments represent a promising direction for enhancing engagement in higher education language courses.*

Keywords: *gamification, virtual reality, immersive learning, EFL, student engagement, language learning*

Nakhchivan State University, Nakhchivan, Azerbaijan
*Corresponding author. E-mail: E-poçt: aidejelilzade@ndu.edu.az
Received: 2 March 2026; Accepted: 23 June 2026; Published online: 22 October 2026
© The Author(s) 2026. This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0).

Oyunlaşdırma və immersiv texnologiyalar: Dil öyrənmədə cəlbediciliyin transformasiyası

Aidə Cəlilzadə[1*], Türkan Həsənzadə[1], Fatimə İsmayıllı[1], Kövsər Abbasova[1], Əfsanə Oruclu[1]

Xülasə. *Bu məqalə oyunlaşdırma və immersiv virtual reallıq (VR) texnologiyalarının birləşdirilməsinin universitet tələbələrinin xarici dil kimi ingilis dili (EFL) öyrənmədə cəlbediciliyinə və öyrənmə nəticələrinə təsirini tədqiq edir. Tədqiqatın məqsədi oyun elementləri və immersiv vasitələrin onlayn EFL təlim mühitlərində motivasiyanı və performansı artıra bilib-bilməyəcəyini*

müəyyən etməkdir. Səksən universitet EFL tələbəsi səkkiz həftəlik kvazi-eksperimental tədqiqatda iştirak etmişdir. Onlar iki qrupa bölünmüşdür: oyunlaşdırılmış immersiv VR mühiti vasitəsilə öyrənən eksperimental qrup və ənənəvi onlayn təlimdən istifadə edən nəzarət qrupu. Dil bacarıqlarındakı irəliləyişi ölçmək üçün ön-test/son-test dizaynı, davranış, emosional və koqnitiv cəlbediciliyi qiymətləndirmək üçün isə müdaxilədən sonra anketdən istifadə edilmişdir. Nəticələr göstərir ki, oyunlaşdırılmış immersiv yanaşma cəlbediciliyi və öyrənmə performansını əhəmiyyətli dərəcədə artırır. Eksperimental qrup nəzarət qrupu ilə müqayisədə daha yüksək cəlbedicilik (M = 4.5/5 və M = 3.5/5) və son-testdə daha yüksək nəticə (83% və 72%) bildirmişdir. Qruplar arasındakı fərqlər statistik baxımdan əhəmiyyətlidir və oyunlaşdırma ilə immersiyanın birləşdirilməsinin motivasiya faydalarını təsdiqləyir. Tədqiqat oyunlaşdırılmış immersiv öyrənmə mühitlərinin ali təhsildə dil kurslarında cəlbediciliyi artırmaq üçün perspektivli istiqamət olduğunu göstərir.

Açar sözlər: *oyunlaşdırma, virtual reallıq, immersiv öyrənmə, EFL, tələbə cəlbediciliyi, dil öyrənmə*

Naxçıvan Dövlət Universiteti, Naxçıvan, Azərbaycan
*Məsul müəllif. E-poçt: aidejelilzade@ndu.edu.az
Daxil oldu: 2 Mart 2026; Qəbul edildi: 23 İyun 2026; Onlayn dərc edildi: 22 Oktyabr 2026
© Müəllif(lər) 2026. Bu açıq girişli məqalə Creative Commons Attribution–NonCommercial 4.0 Beynəlxalq Lisenziyasının (CC BY-NC 4.0) şərtlərinə uyğun olaraq yayımlanmışdır.

Introduction

Engagement is a critical determinant of successful language learning, yet sustaining students' active involvement remains a persistent challenge in university-level EFL (English as a Foreign Language) contexts. Traditional online and classroom-based instruction often struggles to maintain attention and motivation, prompting increasing interest in technology-enhanced approaches designed to create more interactive and engaging learning environments. Two widely discussed strategies in this regard are gamification—where game design elements are integrated into educational activities—and immersive technologies such as virtual reality (VR), which enable experiential, context-rich learning.

Gamification incorporates points, badges, leaderboards, challenges, and narrative structures to stimulate motivation and support learners' psychological needs for competence, autonomy, and relatedness. Prior studies consistently report that gamification can enhance motivation, time-on-task, enjoyment, and willingness to participate in language learning activities (Kapp, 2012; Sailer et al., 2013). Similarly, immersive VR environments have been shown to promote presence, authenticity, and emotional involvement by situating learners in realistic communicative settings. Research indicates that VR can reduce foreign language anxiety, improve willingness to communicate, and support deeper cognitive engagement through experiential interaction (Lan, 2020; Reinders & Wattana, 2014).

Despite extensive research on gamification and immersive technologies as separate approaches, very few studies have examined their combined use as a unified pedagogical model in higher education language learning. Existing literature typically investigates one tool in isolation, leaving unclear whether the motivational affordances of gamification and the contextual benefits of VR produce additive or synergistic effects on student engagement. This gap is particularly relevant as universities increasingly rely on digital instruction and seek strategies capable of sustaining engagement in online EFL environments.

The present study addresses this gap by examining the effects of a gamified immersive VR platform on university students' engagement and English learning performance in an online EFL course. The guiding research question was: Does the integration of gamification and immersive VR technology lead to higher engagement and improved learning outcomes compared to a non-gamified, non-

immersive online course? We hypothesized that students using the gamified VR environment would demonstrate significantly greater engagement and larger gains in English proficiency than those receiving traditional online instruction (Castañeda & Cho, 2016).

Gamification and Learner Engagement in Language Learning

Gamification has gained considerable attention in language education due to its potential to increase motivation, enjoyment, and sustained engagement (Dehghanzadeh, Fardanesh, Hatami, Talaee, & Noroozi, 2021). Defined as the application of game elements such as points, badges, leaderboards, challenges, and narrative structures to non-game contexts, gamification aims to stimulate learners' intrinsic motivation through mechanisms associated with achievement, autonomy, and social interaction (Kapp, 2012; Sailer et al., 2013). Empirical studies consistently show that gamified environments can enhance participation and time-on-task. For instance, Buckley and Doyle (2016) reported that college students in a gamified online course demonstrated higher levels of engagement and motivation compared to those in non-gamified settings. Similarly, Bicen and Kocakoyun (2018) found that competitive quiz platforms such as Kahoot! improved vocabulary recall and increased students' enjoyment of language tasks.

Gamification has also been associated with affective benefits. Rachels and Rockinson-Szapkiw (2018) showed that gamified mobile applications increased vocabulary retention and reduced learners' anxiety, resulting in greater self-efficacy. In grammar learning, Hong et al. (2022) reported that gamified tasks improved performance through heightened curiosity and reduced language anxiety. However, despite its popularity, gamification research typically examines game elements as an isolated instructional strategy, without considering how they might interact with more immersive learning tools such as VR. Some researchers further note that poorly designed gamification may overemphasize extrinsic rewards, potentially distracting learners from meaningful learning processes and highlighting the need for thoughtful integration rather than standalone implementation (Hanus & Fox, 2015).

Immersive Technologies and Engagement in Language Learning

Immersive technologies, particularly virtual reality (VR) and augmented reality (AR), have shown strong potential to promote experiential, context-rich language learning. VR enables learners to enter simulated environments—such as cafés, city streets, or airports—where they can interact with objects and characters in real time, fostering authenticity, presence, and emotional engagement (Lan, 2020). Research indicates that immersion can significantly improve affective and behavioral engagement. For example, Reinders and Wattana (2014) demonstrated that VR-based interaction increased learners' willingness to communicate in English, while Reitz et al. (2016) found that VR-supported speaking practice reduced anxiety and improved oral fluency.

Cognitive benefits have also been documented. Allcoat and von Mühlenen (2018) reported higher engagement and improved learning performance when students learned content through VR rather than traditional media. A comprehensive meta-analysis by Chen et al. (2022) revealed that extended reality technologies (VR/AR) had substantial positive effects on vocabulary, speaking, and comprehension outcomes in language learning. Despite these advantages, most VR studies emphasize immersion, situational authenticity, and presence, but rarely incorporate structured motivational systems such as points, levels, or progression mechanics typically found in gamified learning. As a result, while VR environments foster active participation and contextual engagement, their motivational frameworks often remain underdeveloped compared to gamified systems (Cruz et al., 2023).

Research Gap: Limited Integration of Gamification and Immersive VR

Although both gamification and VR have individually demonstrated strong potential to enhance engagement, research that integrates these approaches remains limited. Existing studies often isolate one variable—either game mechanics or immersive simulation—making it difficult to determine whether combined use may produce additive or synergistic effects. A small number of studies have attempted integration; for example, Reitz et al. (2016) examined cooperative gameplay in a 3D environment to support speaking training, but this implementation did not employ fully immersive VR headsets nor a comprehensive gamification system. Current research lacks empirical investigations of fully immersive, headset-based VR environments that embed structured game elements such as challenges, levels, and reward systems, particularly in university-level EFL instruction. Given the rapid expansion of digital learning in higher education, understanding how immersive technologies and gamified structures function together is essential for designing effective online language instruction. This study responds directly to this gap by examining an integrated gamified VR learning platform and evaluating its impact on EFL students' engagement and learning outcomes compared to traditional online instruction.

Materials and Methods

Participants and Setting

The participants in this study were 60 undergraduate students (aged 18–21) enrolled in a compulsory English communication course at a public university. All participants were non-native speakers of English, primarily L1 Turkish and Azerbaijani, and their proficiency level was approximately B1 according to CEFR standards. Students were randomly assigned to either an experimental group (n = 30) or a control group (n = 30). The same instructor taught both groups to minimize instructor-related variability. To ensure baseline comparability, all students completed a proficiency pre-test before the intervention, confirming no significant difference between the two groups in initial English level. The study took place over an eight-week instructional period conducted through online and VR-supported sessions (Csikszentmihalyi, 1975).

Experimental Condition: Gamified Immersive VR Environment

The experimental group used a custom multi-user VR platform compatible with both head-mounted displays and desktop access. Students interacted through avatars in several virtual locations (e.g., café, office, airport, city street), completing communicative tasks embedded within the course units. The VR platform integrated several game design elements, including:

- Goals and narrative-based missions
- Points and experience levels
- Badges and rewards
- Collaborative and competitive challenges
- Immediate automated and instructor-led feedback

Each week, students completed VR missions aligned with the lesson themes, such as ordering food, navigating an airport, or participating in simulated interviews. These missions required real-time spoken interaction, decision-making, and the use of target vocabulary in authentic scenarios.

Control Condition: Traditional Online Learning

The control group covered identical course content using traditional online tools, including the university LMS, live video lectures, discussion forums, and text-based assignments. Students participated in pair-work activities through breakout rooms and completed standard quizzes and written tasks. Both groups received equal total instructional time and followed the same thematic

syllabus; the primary difference lay in the modality and level of interactivity provided by the learning environment.

Instruments

Language Proficiency Tests. All participants completed a pre-test at the beginning and a post-test at the end of the study. The tests assessed listening, reading, speaking, and writing skills aligned with the course curriculum. Listening and reading sections included comprehension items, while writing involved short thematic compositions and speaking consisted of individual interviews evaluated by two independent raters. Inter-rater reliability for speaking and writing scores exceeded $r = .85$, indicating strong scoring consistency.

Engagement Questionnaire. A 15-item engagement questionnaire adapted from established frameworks (Fredricks et al., 2004; Hiver et al., 2024) was administered post-intervention. Items assessed behavioral, emotional, and cognitive engagement using a 5-point Likert scale. Two open-ended prompts collected qualitative feedback. The instrument demonstrated high internal reliability in the present sample (Cronbach's $\alpha = .89$).

Procedure

The study spanned nine weeks, including pre-testing and post-testing. In Weeks 1–8, both groups met twice weekly. The experimental group attended one weekly session in VR and one weekly online debriefing and consolidation session; the control group attended two weekly sessions conducted via traditional online methods. In Week 9, participants completed the post-test and engagement questionnaire. VR usage logs (e.g., time spent, challenges completed) were collected as supplementary indicators of participation but were not used as outcome measures.

Data Analysis

Quantitative data were analyzed using SPSS (v26). Descriptive statistics were computed for all variables, and normality was confirmed using Shapiro–Wilk tests. Group comparisons were conducted using independent-samples t-tests (pre-test, post-test, engagement scores, gain scores) and paired t-tests (within-group improvement). Effect sizes were calculated using Cohen's d. Correlation analyses were conducted to examine the relationship between engagement and learning gains, both for the full sample and within the experimental group. Significance was set at $\alpha = .05$.

Results and Discussion

Preliminary Checks and Pre-test Equivalence

Pre-test results confirmed no significant difference between the experimental group ($M = 60.8\%$, $SD = 9.8$) and the control group ($M = 61.2\%$, $SD = 10.1$). An independent-samples t-test verified baseline equivalence ($t(58) = 0.15$, $p = .880$). Participation patterns showed consistently high engagement in both groups, with the experimental group demonstrating particularly strong involvement in weekly VR missions.

Engagement Outcomes

The experimental group reported significantly higher engagement ($M = 4.51$, $SD = 0.45$) compared to the control group ($M = 3.47$, $SD = 0.55$). This difference was statistically significant ($t(58) = 7.76$, $p < .001$), representing a large effect size ($d \approx 1.9$). A positive correlation emerged between VR usage (time spent and missions completed) and overall engagement scores ($r = .58$, $p < .01$), indicating increased voluntary participation corresponded with higher perceived engagement.

Language Learning Outcomes

Both groups improved significantly from pre- to post-test, but gains were considerably larger in the experimental group. Experimental group post-test scores averaged 83.4% (SD = 7.9), compared to 72.3% (SD = 8.7) in the control group ($t(58) = 5.63$, $p < .001$). Gain scores showed the experimental group improved by +22.6 points (SD = 6.2), while the control group improved by +11.1 points (SD = 5.0) ($t(58) = 7.88$, $p < .001$). Sub-skill analysis indicated the largest improvements occurred in speaking and listening, aligning with the communicative and interactive nature of VR participation.

Relationship Between Engagement and Learning Gains

Correlation analysis revealed a strong positive relationship between engagement and gain scores across participants ($r = .65$, $p < .001$). A similar pattern emerged within the experimental group ($r = .56$, $p < .01$). These results suggest that higher engagement—particularly within the VR environment—was associated with greater improvement in English proficiency. Table 1 summarizes the engagement and test performance results numerically for both groups.

Table 1
Engagement and test performance results by group

Measure	Control Group (Mean ± SD)	Experimental Group (Mean ± SD)	t (df)	p
Engagement Score (1–5)	3.47 ± 0.55	4.51 ± 0.45	7.76 (58)	< .001
Language Test – Pre (%)	61.2 ± 10.1	60.8 ± 9.8	0.15 (58)	.880
Language Test – Post (%)	72.3 ± 8.7	83.4 ± 7.9	5.63 (58)	< .001
Gain Score (Post – Pre, points)	+11.1 ± 5.0	+22.6 ± 6.2	7.88 (58)	< .001

Note. $p < .001$ indicates statistical significance at the 0.1% level.

This study investigated the effects of a gamified immersive VR learning environment on university EFL students' engagement and language learning outcomes. The findings demonstrated that students in the experimental group showed significantly higher levels of behavioral, emotional, and cognitive engagement, as well as substantially greater gains in English proficiency compared to those in the traditional online control group. These results contribute meaningful evidence to an emerging line of research on the integration of gamification and VR in language education.

The markedly higher engagement scores observed in the experimental group are consistent with prior research suggesting that immersive technologies foster presence, authenticity, and emotional involvement (Lan, 2020; Reinders & Wattana, 2014; Reitz et al., 2016). Immersion enables learners to interact with realistic environments, reducing anxiety and encouraging more confident communication. At the same time, game elements such as challenges, rewards, and progression systems support learners' intrinsic motivation through mechanisms described in self-determination theory, particularly the needs for competence and autonomy (Kapp, 2012; Sailer et al., 2013). The present study shows that when these two components—immersion and game-based motivation—are combined, they can produce robust engagement effects.

The strong emotional and behavioral engagement observed in the experimental group suggests that the gamified VR environment provided a sense of purpose and progression that supported students' continued involvement. VR usage data further indicated that students who spent more time voluntarily engaging with VR missions reported higher overall engagement, pointing to the motivational pull of interactive and immersive experiences.

The learning outcomes also demonstrated clear advantages for the experimental group. Although both groups improved from pre-test to post-test, the experimental group made significantly larger gains,

particularly in speaking and listening. These results align with earlier work showing that VR-based exposure to authentic communicative scenarios can strengthen fluency, comprehension, and lexical retrieval (Allcoat & von Mühlenen, 2018; Chen et al., 2022). The interactive nature of the VR missions likely facilitated deeper cognitive processing and more frequent language use, which are known to support long-term retention. Additionally, the significantly larger gain scores for the experimental group may reflect the combined impact of heightened engagement and repeated meaningful practice within the immersive environment (Dewaele & Alfawzan, 2018).

These findings also shed light on the potential synergy between gamification and VR. While gamification provides extrinsic and intrinsic motivators, VR enhances situational authenticity and emotional involvement. Previous research has typically examined these approaches separately, leaving unclear whether their integration would amplify learning effects. The present study provides initial evidence that fully immersive VR environments embedded with structured game elements can reinforce one another, producing stronger engagement and performance outcomes than either approach alone. From a theoretical standpoint, the results suggest that gamified VR environments may support both affective engagement (through presence, immersion, and reduced anxiety) and motivational engagement (through challenge, progression, and feedback), creating a comprehensive engagement system (Dewaele & Alfawzan, 2014).

These findings offer several practical implications for technology-enhanced language instruction. First, incorporating immersive mission-based tasks into curriculum design may help address declining motivation and participation in online learning environments. Second, game-like progression systems can provide structure, reward effort, and sustain long-term engagement. Third, VR-supported communicative tasks allow learners to practice speaking and listening in low-pressure environments that mimic real-life interactions. As digital learning continues to expand in higher education, integrating such tools may support more engaging and effective instructional models.

Despite these promising results, several limitations must be acknowledged. The duration of the intervention was relatively short, and long-term retention effects were not measured. Additionally, while VR offers unique benefits, it requires technological resources, training, and ongoing technical support. Some learners may initially experience discomfort, cognitive overload, or unfamiliarity with 3D interfaces. Individual differences such as prior gaming experience, learning styles, and technology readiness may have influenced engagement levels and outcomes, suggesting the need for more detailed learner profiling in future studies. Future research should explore individual difference variables that may moderate the effectiveness of gamified VR environments, such as motivation type, anxiety levels, and prior exposure to gaming technologies.

Conclusion

This study examined the impact of a gamified immersive VR environment on university EFL students' engagement and language learning outcomes. The findings provide clear evidence that integrating game-based motivational elements with immersive, context-rich VR activities can significantly enhance both engagement and proficiency development in online language learning settings. Students who participated in the VR-supported course demonstrated higher behavioral, emotional, and cognitive engagement, as well as substantially larger gains in speaking, listening, and overall proficiency.

The results indicate that the combination of immersion and gamification may create a more motivating and effective learning environment than traditional online instruction alone. By supporting authentic communicative practice and sustained involvement, gamified VR appears to address common challenges in digital EFL learning, such as reduced attention, limited interaction, and low participation. The study contributes to growing evidence that emerging technologies can meaningfully support language education when carefully designed and pedagogically grounded. It

also highlights the importance of aligning VR tasks with learning objectives and ensuring that game elements reinforce, rather than distract from, meaningful language use.

Several limitations must be acknowledged. The relatively short duration of the intervention, the reliance on a single institutional context, and the absence of long-term follow-up restrict the generalizability of the findings. Additionally, technological barriers and individual differences in students' comfort with VR may influence learning outcomes. Future research should explore longer-term implementations, examine learner characteristics that influence VR effectiveness, and investigate which specific game or VR features most strongly contribute to engagement and learning gains. Further comparative studies across diverse educational settings would also deepen understanding of how gamified VR can be adapted to different learner groups, proficiency levels, and instructional goals. Overall, the findings suggest that gamified immersive VR represents a promising direction for enhancing engagement and promoting more interactive, meaningful learning experiences in online and blended EFL courses.

Declarations

Author Contributions: Aida Jalilzada — Conceptualization, literature review, and supervision; Turkan Hasanzada — Methodology design, data collection, and analysis; Fatima Ismayilli — Experimental implementation and classroom observation; Kovser Abbasova — Statistical evaluation and data visualization; Efsane Orujlu — Review, editing, and final manuscript preparation. All authors have read and approved the final version of the manuscript.

Conflicts of Interest: The authors declare no conflict of interest.

Funding: This research received no external funding.

Ethical Approval: The study was approved by the Ethics Committee of Nakhchivan State University (Approval No. 2025/10-15). All participants gave informed consent prior to participation.

Data Availability: Data supporting the findings of this study are available from the corresponding author upon reasonable request.

References

Allcoat, D., & von Mühlenen, A. (2018). Learning in virtual reality: Effects on performance, emotion, and engagement. *Research in Learning Technology, 26*, Article 2140. https://doi.org/10.25304/rlt.v26.2140

Bicen, H., & Kocakoyun, S. (2018). Perceptions of students for gamification approach: Kahoot! as a case study. *International Journal of Emerging Technologies in Learning, 13*(2), 72–93. https://doi.org/10.3991/ijet.v13i02.7467

Buckley, P., & Doyle, E. (2016). Gamification and student motivation. *Interactive Learning Environments, 24*(6), 1162–1175. https://doi.org/10.1080/10494820.2014.964263

Castañeda, D. A., & Cho, M.-H. (2016). Use of a game-like application on a mobile device to improve accuracy in conjugating Spanish verbs. *Computer Assisted Language Learning, 29*(7), 1195–1204. https://doi.org/10.1080/09588221.2016.1197950

Chen, Y., Zhang, L., & Yin, H. (2022). A longitudinal study on students' foreign language anxiety and cognitive load in gamified classes of higher education. *Sustainability, 14*(17), Article 10905. https://doi.org/10.3390/su141710905

Cruz, K., Noa-Copaja, S., Turpo-Gebera, O., Montesinos-Valencia, C., Bazán-Velasquez, S., & Pérez-Postigo, G. (2023). Use of gamification in English learning in higher education: A systematic review. *Journal of Technology and Science Education, 13*(2), 480–497. https://doi.org/10.3926/jotse.1740

Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety: The experience of flow in work and play*. Jossey-Bass.

Dehghanzadeh, H., Fardanesh, H., Hatami, J., Talaee, E., & Noroozi, O. (2021). Using gamification to support learning English as a second language: A systematic review. *Computer Assisted Language Learning, 34*(7), 934–957. https://doi.org/10.1080/09588221.2019.1648298

Dewaele, J.-M., & Alfawzan, M. (2018). Does the effect of enjoyment outweigh that of anxiety in foreign language performance? *Studies in Second Language Learning and Teaching, 8*(1), 21–45. https://doi.org/10.14746/ssllt.2018.8.1.2

Dewaele, J.-M., & MacIntyre, P. D. (2014). The two faces of Janus? Anxiety and enjoyment in the foreign language classroom. *Studies in Second Language Learning and Teaching, 4*(2), 237–274. https://doi.org/10.14746/ssllt.2014.4.2.5

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*(1), 59–109. https://doi.org/10.3102/00346543074001059

Hamari, J., & Koivisto, J. (2015). Why do people use gamification services? *International Journal of Information Management, 35*(4), 419–431. https://doi.org/10.1016/j.ijinfomgt.2015.04.006

Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does gamification work? A literature review of empirical studies on gamification. In *Proceedings of the 47th Hawaii International Conference on System Sciences* (pp. 3025–3034). IEEE. https://doi.org/10.1109/HICSS.2014.377

Hanus, M. D., & Fox, J. (2015). Assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social comparison, satisfaction, effort, and academic performance. *Computers & Education, 80*, 152–161. https://doi.org/10.1016/j.compedu.2014.08.019

Hiver, P., Al-Hoorie, A. H., Vitta, J. P., & Wu, J. (2024). Engagement in language learning: A systematic review of 20 years of research methods and definitions. *Language Teaching Research, 28*(1), 201–230. https://doi.org/10.1177/13621688211001289

Hong, J.-C., Hwang, M.-Y., Liu, Y.-H., & Tai, K.-H. (2022). Effects of gamifying questions on English grammar learning mediated by epistemic curiosity and language anxiety. *Computer Assisted Language Learning, 35*(7), 1458–1482. https://doi.org/10.1080/09588221.2020.1803361

Kapp, K. M. (2012). *The gamification of learning and instruction: Game-based methods and strategies for training and education*. Pfeiffer.

Krashen, S. D. (1982). *Principles and practice in second language acquisition*. Pergamon.

Lan, Y.-J. (2020). Immersion into virtual reality for language learning. In K. D. Federmeier & H.-W. Huang (Eds.), *Adult and second language learning* (Vol. 72, pp. 1–26). Academic Press. https://doi.org/10.1016/bs.plm.2020.03.001

Lee, S.-M., Yang, Z., & Wu, J. G. (2024). Live, play, and learn: Language learner engagement in the immersive VR environment. *Education and Information Technologies, 29*, 10529–10550. https://doi.org/10.1007/s10639-023-12215-4

Li, C., Huang, J., & Li, B. (2021). The predictive effects of classroom environment and trait emotional intelligence on foreign language enjoyment and anxiety. *System, 96*, Article 102393. https://doi.org/10.1016/j.system.2020.102393

Li, X., Xia, Q., Chu, S. K. W., & Yang, Y. (2022). Using gamification to facilitate students' self-regulation in e-learning: A case study on students' L2 English learning. *Sustainability, 14*(12), Article 7008. https://doi.org/10.3390/su14127008

Qiao, S., Chu, S. K. W., Shen, X., & Yeung, S. S. (2022). The impact of an online gamified approach embedded with self-regulated learning support on students' reading performance and intrinsic motivation: A randomized controlled trial. *Journal of Computer Assisted Learning, 38*(5), 1379–1393. https://doi.org/10.1111/jcal.12684

Qiao, S., Chu, S. K. W., & Yeung, S. S. S. (2025). Understanding how gamification of English morphological analysis in a blended learning environment influences students' engagement and reading comprehension. *Computer Assisted Language Learning, 38*(4), 831–864. https://doi.org/10.1080/09588221.2023.2230273

Qiao, S., Yeung, S. S., Shen, X., Leung, K. L., Ng, T. K., & Chu, S. K. W. (2024). How competitive, cooperative, and collaborative gamification impacts student learning and engagement. *Language Learning & Technology, 28*(1), 1–19.

Rachels, J. R., & Rockinson-Szapkiw, A. J. (2018). The effects of a mobile gamification app on elementary students' Spanish achievement and self-efficacy. *Computer Assisted Language Learning, 31*(1–2), 72–89. https://doi.org/10.1080/09588221.2017.1382536

Reinders, H., & Wattana, S. (2014). Can I say something? The effects of digital game play on willingness to communicate. *Language Learning & Technology, 18*(2), 101–123.

Reitz, L., Sohny, A., & Lochmann, G. (2016). VR-based gamification of communication training and oral examination in a second language. *International Journal of Game-Based Learning, 6*(2), 46–61. https://doi.org/10.4018/IJGBL.2016040104

Sailer, M., Hense, J. U., Mandl, H., & Klevers, M. (2013). Psychological perspectives on motivation through gamification. *Interaction Design and Architecture(s), 19*, 28–37.

Xie, H., Liu, W., Bhairam, R., & Teo, T. (2020). Motivational and cognitive variables in gamified online learning environments: A review of the literature. *International Journal of Information and Education Technology, 10*(12), 890–898.

Zhang, S., & Hasim, Z. (2023). Gamification in EFL/ESL instruction: A systematic review of empirical research. *Frontiers in Psychology, 13*, Article 1030790. https://doi.org/10.3389/fpsyg.2022.1030790