Gamified AI for Fostering Vocabulary Retention and Motivation: A Phenomenological Study of Uzbek EFL Learners

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ABSTRACT

The increasing integration of gamified artificial intelligence (AI) platforms in English as a Foreign Language (EFL) education offers promising prospects for vocabulary development, yet their cognitive and motivational impacts remain inadequately explored in culturally distinct contexts. While these platforms employ adaptive algorithms and game mechanics to customize learning experiences and sustain engagement, they may also generate disparities between design assumptions and the actual socio-technological contexts of learners, particularly in resource-constrained, teacher-centric educational systems like that of Uzbekistan. This research addressed a gap by doing a phenomenological inquiry grounded on Cognitive Load Theory (CLT), analyzing the engagement of 24 Uzbek female EFL learners with a gamified AI vocabulary platform across four weeks of casual use. Data were collected using digital reflective diaries including prompts designed for language retention and motivation, and were analyzed using Interpretative Phenomenological Analysis (IPA). Findings identified three interconnected categories: (1) Enhancing cognitive architecture through gamified scaffolding (e.g., minimizing extraneous load via micro-task sequencing and augmenting germane load through adaptive feedback loops), (2) Regulating motivation through intrinsic gamification cues (e.g., fostering autonomy through meaningful choices and sustaining engagement through mastery-oriented progression), and (3) Navigating socio-cultural and technological ambiguities (e.g., tension between gamified simplicity and academic complexity and digital literacy disparities exacerbating extraneous load). The results demonstrate that the efficacy of gamified AI systems depends not

Keywords: Gamified AI platforms; Vocabulary retention; Motivation; Cognitive Load Theory; Interpretative Phenomenological Analysis; Uzbek EFL learners

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just on algorithmic customization but also on its alignment with learners' cognitive capacities, emotional needs, and contextual constraints.

Introduction

Developing a strong and adaptable vocabulary is generally acknowledged as essential for effective communication and serves as an important indicator of proficiency in learning a second language (L2) (Nation & Nation, 2001). Understanding vocabulary goes beyond simply knowing definitions; it involves breadth (the variety of words one recognizes), depth (the intricate grasp of collocations, connotations, and grammatical features), and the essential skill of effectively retrieving and using words in both receptive and productive language abilities (Read, 2000). Recent research has consistently demonstrated a significant link between vocabulary skills and both reading comprehension and overall academic success (Perfetti & Hart, 2001; Qian, 2002). Even though its significance is widely recognized, acquiring vocabulary can be quite challenging for EFL learners, especially when conventional teaching approaches do not promote lasting retention and ongoing interest (Ellis, 1997). The complexities of vocabulary acquisition further complicate this issue, as they involve polysemy, challenges in recognizing subtle semantic distinctions, and the necessity for repeated exposure in appropriate contexts (Schmitt, 2008). Moreover, the emotional states of learners, including their self-perceptions of talent, levels of anxiety, and general motivation significantly influence their performance (MacIntyre & Gardner, 1991). Studies indicate a distinct relationship between the strategies learners use to acquire vocabulary and their levels of motivation (Fatikhah et al., 2018).

The educational landscape in Uzbekistan faces particularly pressing challenges. In recent decades, the field of EFL education has made remarkable strides, largely due to government initiatives designed to enhance English proficiency as a means of fostering economic and social growth. Nonetheless, enduring structural obstacles continue to exist. Classrooms that are overcrowded, frequently with more than 30 students, limit the chances for personalized attention and constructive feedback (Nazirova et al., 2023). Even in urban regions such as Tashkent, the availability of genuine resources such as graded readers or real-world texts is scarce, resulting in a significant dependence on decontextualized textbook teaching (Nazirova et al., 2023). Additionally, the grammar-translation method leaves a legacy that emphasizes grammatical precision at the expense of communicative fluency and the practical use of vocabulary (Savignon, 2018). This focus may hinder lexical flexibility and the creative use of words (Littlemore, 2019). Recent studies advocate for a shift towards interactive, learner-centered strategies in Uzbek EFL contexts (Hasanova & Shadieva, 2008), highlighting the limitations of traditional approaches. Consequently, Uzbek EFL learners often find themselves without the necessary vocabulary for effective communication across academic, professional, and social contexts, which hinders their ability to fully participate in a globalized environment.

Motivation stands out as a fundamental element in achieving success in language learning. Dörnyei (2001) differentiates between integrative motivation, which is the desire to become

part of the target language community and its culture, and instrumental motivation, which is centered on achieving practical objectives such as career or academic progress. Both elements are crucial for sustaining effort and attaining proficiency. Recent studies emphasize the importance of intrinsic motivation, as crucial for achieving lasting success in L2 acquisition (Deci & Ryan, 2013; Ushioda, 2011). This type of motivation flourishes in activities that strike a balance between challenge and achievability, promote independence, and encourage social collaboration. Research indicates that gamified learning environments significantly enhance intrinsic motivation within language contexts (Hamari et al., 2014). Therefore, it is essential to create environments that foster intrinsic motivation, particularly in urban contexts limited by external influences and strict teaching methods that diminish the autonomy of learners.

Recent developments in artificial intelligence (AI) present encouraging opportunities to overcome these challenges. Gamified AI platforms—digital ecosystems that integrate game elements like points, badges, leaderboards, and narratives with adaptive algorithms—emerge as effective instruments for personalized vocabulary instruction (Kirschner, 2002). Gamification engages fundamental psychological factors that drive involvement, such as the desire for mastery, the need for autonomy, and the importance of social connections, ultimately enhancing motivation and encouraging active participation (Deterding et al., 2011). The adaptive capabilities of AI enhance vocabulary exposure and practice, tailoring them to meet the unique needs of each learner. This approach provides targeted support and fine-tunes learning pathways (Tan et al., 2025; Zou et al., 2020). However, simply merging gamification with AI does not guarantee the best results. CLT (Sweller, 1988) provides a fundamental framework for understanding the cognitive challenges of learning and the influence of instructional design on the effectiveness of knowledge acquisition. The CLT posits that working memory has a limited capacity. Therefore, it is essential to minimize extraneous cognitive load, which refers to the unnecessary effort spent on non-essential components such as complex interfaces or irrelevant details. At the same time, it is important to enhance germane load, which involves the effort dedicated to developing and automating schemas (Sweller, 1998).

This research explores the impact of gamified AI platforms on vocabulary retention and motivation in urban Uzbek female learners of English as a Foreign Language (EFL). Using a phenomenological approach, this study explores the lived experiences and interpretations of participants regarding these platforms, highlighting the interconnected cognitive and emotional processes involved. The analysis focuses on how these platforms improve vocabulary learning by applying principles of CLT, while also identifying the factors that facilitate or hinder this process within the distinct techno-cultural context. The emphasis on female perspectives arises from an exploration of the gendered aspects of language learning through technology, highlighting how sociocultural factors can influence both participation and outcomes (Bass-Dolivan, 2011).

This study enhances our understanding of gamified AI, CLT, and the dynamics of motivation within a specific cultural context. Through the application of phenomenology, this approach goes beyond simple outcome metrics to explore the subjective experiences of learners, providing qualitative insights that enhance theories of L2 acquisition. The contributions

enhance the conversation surrounding technology-enhanced language learning in less examined regions such as Uzbekistan. Additionally, the focus on gender addresses gaps in the literature and reveals unique challenges and opportunities for female EFL users of AI tools, reflecting the call for intersectional EFL research. The study provides essential insights for stakeholders in Uzbekistan's EFL context, including educators, curriculum developers, and policymakers. Insights have the potential to refine vocabulary strategies by leveraging the strengths of gamified AI, all while avoiding the pitfalls of cognitive overload. They specifically recommend tailoring and refining AI solutions to ensure they resonate culturally, capture linguistic subtleties, and align with the profiles of local learners. Recognizing the factors that facilitate or hinder the adoption of platform-based vocabulary can enhance educator training programs, equipping teachers with the necessary skills to integrate AI effectively as technology continues to evolve rapidly and professional development becomes increasingly important (Yang et al., 2024). Ultimately, this study aims to enhance Uzbek EFL pedagogy by providing learners with essential vocabulary necessary for success in dynamic global environments and fostering more engaging and effective learning environments. The findings could guide national curricula and policies to incorporate innovative technology, thereby enhancing language outcomes.

Literature Review

Despite its initial use in the 1970s to enhance the writing skills of L1 learners (Hyland & Hyland, 2006), the effectiveness of peer feedback remains a contentious topic, particularly within the EFL academic context. In Japan, for instance, while group work is utilized in oral class instruction, there has been insufficient emphasis from teachers on peer feedback activities (Hirose, 2009). In exploring the role of peer feedback, the researchers identify several key points: (1) students' perceptions of the feedback process, (2) the caliber of comments provided by peers, and (3) the effects of peer feedback on subsequent revisions and overall writing performance.

This study draws upon CLT, which offers a framework for enhancing learning through the effective management of cognitive resources (Sweller et al., 2011). CLT delineates three distinct forms of cognitive load: intrinsic load, which relates to the inherent complexity of a task; extraneous load, which encompasses unnecessary cognitive effort; and relevant load, which focuses on the cognitive resources dedicated to the development of schemas. In Uzbekistan's EFL environment, where students often have minimal interaction with authentic English and the focus is predominantly on teacher-led instruction, gamified AI systems help alleviate pressure through organized, game-oriented tasks such as "vocabulary quests" or "word challenges." These exercises present lexical elements, like "resilient," in clear and engaging segments, allowing learners to concentrate their cognitive efforts on retention instead of dealing with complex systems. This method is in harmony with the principles of CLT, which emphasize reducing cognitive strain, especially for Uzbek students navigating a challenging academic curriculum (van Merriënboer & Ayres, 2005).

Cognitive Load Theory (CLT) posits that gamified AI-based systems enhance language retention by optimizing cognitive load, thereby supporting the formation and consolidation of long-term schemas. In the Uzbek context, female EFL learners often face challenges in accessing consistent and contextualized English practice. Gamified platforms that employ

spaced repetition, adaptive feedback, and real-time correction—such as detecting the inappropriate use of "persistent" in a narrative task—expand learners' cognitive resources by embedding vocabulary within meaningful and goal-relevant contexts, including academic achievement and professional communication. Research indicates that engaging, personalized activities increase germane load by maintaining participation and reducing cognitive fatigue, a particularly important factor for learners in resource-constrained environments (Kalyuga, 2011). By aligning task complexity with learners' cognitive capacities, gamified systems promote durable vocabulary retention, reinforcing core CLT principles in technology-enhanced language learning (Molina et al., 2024).

Moreover, CLT emphasizes that reducing extraneous load is essential for sustaining motivation—an aspect especially relevant for Uzbek female learners who may encounter socio-cultural and technological barriers. User-friendly gamified interfaces featuring progress dashboards, simplified navigation, and culturally meaningful visual elements (e.g., Uzbek patterns) help diminish unnecessary cognitive effort, making platforms more accessible for learners with limited digital literacy. At the same time, external constraints such as unstable internet connectivity, even in urban areas, can increase cognitive burden, underscoring the importance of thoughtful, resilient interface design. When cognitive load is carefully regulated, gamified AI environments enable learners to focus their mental resources on vocabulary learning with minimal strain, ultimately boosting both retention and motivation. Thus, CLT provides a robust theoretical basis for understanding how well-designed gamified AI systems can support effective vocabulary acquisition within Uzbekistan's EFL landscape (Hubbard, 2013; Huang et al., 2023).

The exploration of gamified and technology-enhanced language learning has expanded considerably, providing valuable insights into vocabulary acquisition and motivation that are pertinent to our study of Uzbek female EFL learners. Initial research established a foundation for comprehending the effects of gamification. Godwin-Jones et al. (2023) emphasized the promise of mobile-assisted language learning (MALL) technologies, especially those with gamified elements, in enhancing motivation and vocabulary retention among EFL learners, while also underscoring the importance of timely feedback. Fithriani (2021) showed that mobile-assisted gamification, particularly through platforms such as Quizizz, enhanced vocabulary outcomes, learner engagement, and motivation in Indonesian EFL contexts, although the research primarily concentrated on formal classroom environments. The findings indicate that gamified platforms could improve vocabulary learning through interactive exercises, a concept relevant to Uzbekistan's EFL context, where engaging resources might help mitigate limited exposure to English.

Recent studies have enhanced our comprehension of how gamification influences motivation and cognitive functioning. Rasti-Behbahani andShahbazi (2022) discovered that the use of digital games for vocabulary acquisition led to a notable enhancement in productive word knowledge among Persian EFL learners, as these games provided contextualized practice that improved retention. According to Temel and Cesur (2024), the integration of Web 2.0 technologies, such as Kahoot!, plays a crucial role in enhancing motivation and academic success in Turkish EFL environments, especially through the incorporation of competitive and collaborative features. Zou et al. (2020) carried out an in-depth study that showed how digital

game-based learning enhanced vocabulary retention and engagement across various EFL contexts. Their findings highlighted the effectiveness of adaptive features, such as spaced repetition, in alleviating cognitive load. Reynolds and Kao (2021) explored the effects of Duolingo, finding that it improved learners' preparedness for speaking and writing in English, while also increasing motivation through gamified progress tracking. The study highlights the promise of gamified AI platforms in enhancing vocabulary recall and motivation. However, it primarily concentrates on formal learning settings, leaving casual contexts, especially for Uzbek learners, significantly underexplored.

Despite these advancements, there remains a notable gap in the research regarding the application of gamified AI platforms for casual vocabulary acquisition among Uzbek female EFL learners. Although research conducted by Fithriani (2021), Rasti-Behbahani and Shahbazi (2022), and Zou et al. (2020) highlights the effectiveness of gamified tools in improving vocabulary acquisition and motivation, these studies primarily focus on formal classroom environments or contexts outside of Central Asia. This oversight leaves unaddressed the distinct socio-cultural and technological challenges encountered in Uzbekistan, including restricted digital access and teacher-centered teaching methods. The transition of vocabulary gained through gamified platforms to practical applications in real-world contexts remains underexplored, especially in informal environments where Uzbek learners could take advantage of opportunities for self-directed learning. Furthermore, existing research does not adequately address phenomenological studies regarding the experiences of female EFL learners in Uzbekistan who utilize gamified AI platforms, particularly through the lens of CLT. This study aims to shed light on the ways these tools enhance cognitive processing and motivation in settings with limited resources (Chapelle, 2019). This study explores the experiences of Uzbek female EFL learners, focusing on how gamified AI platforms influence vocabulary retention and motivation in informal settings. This approach encourages a deeper comprehension of technology-enhanced language learning in Central Asia. As a result, the following research question was explored:

Research Question: How do gamified AI platforms affect vocabulary retention and motivation in Uzbek female EFL learners?

Method

Research Design

This research utilized a phenomenological approach through Interpretative Phenomenological Analysis (IPA) to achieve the study's goals. IPA was chosen for its ability to reveal the subjective meanings that participants associate with their interactions, shedding light on their views regarding motivation, cognitive effort, and learning progress. This approach is particularly fitting for underrepresented contexts such as Uzbekistan, where the perspectives of learners regarding educational technology frequently go unnoticed. It emphasizes the importance of participant voices and responds to the demand for qualitative, context-sensitive research that questions the assumptions of universal technology effectiveness (Chapelle, 2019). By combining the empathic perspective of IPA with the framework of CLT, a comprehensive examination of both subjective and cognitive dynamics was achieved.

Participants

This study engaged 24 female undergraduate EFL learners from a public university in Tashkent, Uzbekistan. They were chosen through purposive sampling to provide in-depth, contextually relevant insights into their experiences with gamified AI vocabulary platforms. Participants utilized tools such as Duolingo or Memrise for a minimum of six weeks before and throughout the study, completing at least three vocabulary units each week. This approach ensured that their reflections were based on consistent engagement, leading to meaningful insights. Participants were aged between 18 and 22 years, with a mean age of 19.7 years (SD = 1.1). They pursued majors in various non-English disciplines, including economics, education, and international relations, all of which included English as a mandatory foreign language component. Without formal training in linguistics or educational technology, they embodied the typical end-users, thereby enriching the authenticity of the perspective.

Recruitment took place through announcements in classrooms and emails sent out by the department. Students who expressed interest were provided with comprehensive information sheets outlining the study's aims, procedures, the voluntary nature of participation, and the safeguards in place. All participants provided electronic informed consent, with assurance of their right to withdraw without facing any repercussions. To ensure confidentiality, pseudonyms were utilized (P1–P24), and all data, including journal entries, were securely stored on encrypted devices that were password-protected and accessible solely to the authors

Data Collection Tools and Procedures

The primary method employed for data collection in this study was the use of digital reflective journals. Journals capture the continuous involvement of learners with gamified AI technologies in an organic manner. Users have the opportunity to capture their thoughts and feelings right after engaging with the app. This approach has been useful to uncover the interplay between cognitive and emotional factors in the process of language acquisition (Barkhuizen et al., 2013). Journals offer deeper insights compared to interviews, which depend solely on recollection. The duration of the trial extended over a period of four weeks. Each participant submitted two entries weekly through a secure university portal. To build on their pre-study engagement (minimum six weeks prior), prompts encouraged reflections on both recent sessions and how prior use shaped current experiences, such as evolving perceptions of vocabulary retention over time. Prompts played a crucial role in steering the writing process, highlighting the importance of language retention and fostering motivation. A retention prompt asked: "Consider a word from the application this week." Will you be able to remember it later on? What were the beneficial aspects, such as games or images? Motivational prompts included: "Can you recall a moment when you felt excitement or apprehension about using the app?" What factors played a role in your choice to continue or stop? These inquiries prompted candid responses regarding both positive and negative experiences. Participants engaged in writing sessions lasting between 15 to 25 minutes for each entry, resulting in an average output of 200 to 350 words. The introductory session outlined the method and included illustrative examples. Consistent engagement was maintained through regular reminders. The authors offered brief acknowledgments, like "Thank you for sharing your insights," to build rapport while maintaining neutrality on the topic. All data has been anonymized and stored securely.

Data Analysis

The data analysis utilized an iterative and inductive approach through IPA approach (Smith et al., 2009) to explore the subjective experiences of participants engaging with the gamified AI platform. Immersion commenced with an in-depth analysis of personal reflective journal entries, resulting in detailed notes on emotional responses (such as frustration and enthusiasm), cognitive challenges (like difficulties with vocabulary retention), fluctuations in motivation (including changes in engagement), and striking metaphors (for instance, “the app as a teacher” and “words disappearing like fog”). Special attention was given to how pre-study platform use (minimum six weeks) influenced reflections, such as codes for "evolving retention strategies" or "cumulative motivation buildup" to capture longitudinal effects. The initial codes developed here reflect recurring themes or distinctive expressions. For example, frustrations stemming from the use of basic vocabulary in contrast to academic needs were initially labeled as “lexical mismatch.” This was then refined through an iterative process into the phrase “tension between gamified simplicity and academic requirements.” Every entry was analyzed independently to ensure rigor, with codes being cross-referenced to uncover both similarities and differences. This process anchored the emerging themes in the data and highlighted patterns across the entire dataset. Through cross-case integration, we synthesized individual insights, leading to the emergence of three core themes via constant comparison: (1) cognitive development facilitated by gamified scaffolding, (2) the navigation of technical and socio-cultural challenges, and (3) ambivalence in fostering engagement. The validity of the study was maintained through several key processes: two specialists in applied linguistics conducted peer debriefing to review the codes and underlying assumptions; six participants engaged in member verification by evaluating the summaries of themes; a thorough audit trail documented the analytical decisions, changes in codes, and theoretical reflections; and continuous reflexivity from the authors examined their positional influences as language educators and technology users.

Results and Discussion

This section presents and discusses the findings of the data analysis. Three principal categories emerged: (1) Enhancing cognitive architecture through gamified scaffolding (e.g., minimizing extraneous load via micro-task sequencing and augmenting germane load through adaptive feedback loops), (2) Regulating motivation through intrinsic gamification cues (e.g., fostering autonomy through meaningful choices and sustaining engagement through mastery-oriented progression), and (3) Navigating socio-cultural and technological ambiguities (e.g., tension between gamified simplicity and academic complexity and digital literacy disparities exacerbating extraneous load). They are detailed below.

Enhancing Cognitive Architecture through Gamified Scaffolding

Minimizing Extraneous Load through Micro-Task Sequencing

Participants often emphasized the importance of the platform's micro-task sequencing as a crucial tool for alleviating cognitive fatigue. This feature is especially beneficial for Uzbek EFL learners who are used to rote memorization in resource-limited and overcrowded classroom settings. In contrast to conventional approaches that inundate students with extensive lists of vocabulary, the platform offered manageable segments of language learning: engaging timed word-matching exercises, contextual gap-fills accompanied by immediate feedback, and concise quizzes focusing on only five to seven terms. This method simplified vocabulary

acquisition by reducing the demands on working memory, which aligns perfectly with the principles of CLT that emphasize minimizing unnecessary strain to enhance learning results (Sweller et al., 2011). For Uzbek learners balancing demanding academic responsibilities with limited opportunities for authentic English exposure, it offered a practical and engaging route to vocabulary development. Participant 7 shared their thoughts:

> *Back then, a list of fifty English words was enough to send me into a tailspin, particularly when it was homework. This app gives me six words at once, along with pictures and sound. I can squeeze in practice sessions on the subway or whenever I find a moment to myself. The task seems simple, almost effortless, and I'm using those phrases in my current writing.*

This sequencing approach not only reduces the burden on memory but also utilizes dual coding theory, which suggests that the combination of verbal and nonverbal elements enhances retention (Paivio, 2014). The platform's multimodal design integrated target words with visuals, such as object images, and native audio, providing valuable support for Uzbek students who are navigating the complexities of English's phonological and orthographic features. Participant 12, hailing from Samarkand, remarked:

> *The word "radiant" comes to mind when I see a bright sun and hear its name. This word is more than just a sound; it also has a visual meaning. For example, when my teacher said, "Her smile was radiant," I immediately thought of the sun.*

This integration reflects Mayer's (2002) cognitive theory of multimedia learning, suggesting that dual-channel processing in well-crafted materials reduces unnecessary load and enhances understanding. In the context of Uzbekistan's resource-limited EFL environment, it provided crucial opportunities for authentic English interactions. Gamification enhanced this through engaging, goal-oriented activities: timers improved concentration, and immediate feedback boosted confidence—essential in the context of learners' fear of making mistakes (Hasanova & Shadieva, 2008). Consequently, it positioned gamification as a supportive structure that emphasizes profound lexical involvement, sensitive to the educational and cultural specifics of Uzbekistan.

Augmenting Germane Load via Adaptive Feedback Loops

A prominent theme in the reflections of participants was the platform's AI-driven adaptive feedback, which facilitated a more profound lexical processing experience for Uzbek EFL learners. In contrast to the static textbooks commonly found in Uzbek classrooms, it provided immediate, customized feedback: when errors occurred, it offered structured support such as contextual examples, simplified synonyms, or explanations tailored to the learner's proficiency level. This approach fostered reflection and adjustments in understanding, helping to mitigate the demotivation often associated with a fear of mistakes in the exam-focused culture of Uzbek EFL (Hasanova, 2007). This encouraged a thoughtful examination of errors, turning challenges into opportunities for development. Participant 4 illustrated:

"Can I borrow your notebook?" the app prompted. "Sure, but bring it back tomorrow!" was the response. Next, it instructed me to compose a sentence mirroring the original. My grammar book never quite clarified the distinction between "borrow" and "lend."

In a similar vein, Participant 15 expressed:

I was constantly confusing "affect" and "effect." The application presented two scenarios. The first illustrated how a sudden downpour could spoil a perfectly planned picnic. The second example focused on the impact of a policy shift within a school system. Then, it prompted me to select the correct word for each item. I got it, and it felt like a puzzle to solve, not a setback.

Participant 22 contributed:

The feedback adapts as I improve. When I'm struggling, it offers simpler examples or even an Uzbek translation. Conversely, if I'm progressing, the sentences become more challenging, similar to those found in a newspaper. It's almost like having a personal tutor.

This mechanism enhanced cognitive load by facilitating the creation of lasting schemas (Sweller, 1998) through the integration of corrections within gamified rewards such as points or level unlocks. This approach aligns with the idea of constructive failure, which suggests that guided challenges can enrich understanding (Kapur, 2015). In Uzbekistan, the dominance of rote learning, characterized by limited interactivity, has led to significant engagement with vocabulary. Evidence supporting this includes the work of Zou and Xie (2018), who showed that adaptive digital feedback enhances vocabulary retention in EFL learners, as well as Godwin-Jones (2025), who highlighted the importance of individualized and context-rich support within intelligent systems. Through the integration of culturally relevant and practical prompts, the platform enhanced retention and transferability, effectively addressing the limited access to practical English for Uzbek learners and enriching the field of EFL pedagogy.

Regulating motivation through intrinsic gamification cues

Fostering Autonomy through Meaningful Choice

A common theme in the comments made by participants was that motivation stemmed not from external incentives like badges or points, but rather from the chance to have significant control over their personal language learning paths. The platform powered by AI allows learners to select themed wordlists that correspond with their individual, academic, or professional goals. For example, students might select topics such as "women in STEM," "terminology for academic presentations," or "everyday interactions with host families." Users have the option to engage with interactive modes, including "story quest," "dialogue builder," and "self-review." This level of agency stands in stark contrast to the predominantly teacher-centered approach that is common in many Uzbek EFL courses. In these classes, the material is typically uniform for all students, and their feedback is rarely requested (Hasanova, 2022). For these female students, the chance to select information relevant to their everyday lives and future goals

represented a rare and significant way to assert control over their own educational journeys. As noted by P15:

> *In school, we often memorize information, even if it's about things we might not use, like farming or car engines. However, I chose to study "women in science" because I'm interested in biology. This subject feels like it's directly related to my future, not just a way to get a good grade. For the first time, I feel like my learning is truly my own.*

This perspective embodies a fundamental principle of Self-Determination Theory (SDT; Ryan & Deci, 2020), suggesting that motivation is internalized when individuals perceive activities as personally significant and aligned with their sense of self. The options offered were not merely superficial or whimsical additions (such as avatar customization); instead, they were deeply relevant to the evolving L2 identities of learners (Ushioda, 2011). Research indicates that the relationship between content and identity significantly boosts critical thinking and ongoing engagement, especially when the viewpoints of learners are not taken into account (Saito et al., 2025). The significant influence of allowing learners to choose their own content was particularly noticeable among those from under-resourced communities. P8 expressed:

> *I chose "job interview vocabulary" because I'm hoping to apply for an exchange program next year. My teacher thinks I should focus solely on grammar, especially since my parents don't speak English. But I figured I could learn what I needed right here. I practiced the "Tell me about yourself" question until I nailed it, and then I sent it to my cousin in Tashkent. She replied, "You sound like a real pro!" That little boost of confidence was something I really needed.*

Her narrative demonstrates how digital autonomy can help address structural imbalances in EFL education, providing both lexical proficiency and improved self-efficacy and social validation (Norton, 2013). In Uzbekistan, the presence of gender and regional disparities frequently limits educational opportunities (Hasanova, 2022), making these platforms potentially vital for the empowerment of individuals. Gamification acted not merely as a source of entertainment but as a tool to enhance student learning by enabling them to take charge, imagine their future selves, and participate in role-playing that extends beyond their usual classroom identities. This viewpoint aligns with current efforts in computer-assisted language learning (CALL) that prioritize designs centered around the learner, highlighting their agency, identity, and voice (Huang et al., 2023).

Sustaining Engagement through Mastery-Oriented Progression

The gamified AI platform prominently featured a purposeful transition from competitive metrics to a focus on mastery as a means of advancement. This approach was especially beneficial for female EFL learners in Uzbekistan. Instead of showcasing leaderboards or contrasting user performance, which could heighten anxiety and reduce engagement among female students in collectivist educational settings (Piniel & Zólyomi, 2022). Narrative and symbolic feedback demonstrated progress: finishing a set of academic vocabulary led to the growth of a "knowledge tree"; successfully completing a dialogue challenge moved a

character's story forward; and regular review uncovered thematic "word constellations" that showcased the development of vocabulary over time. The characteristics identified were linked to comprehension and memory retention, rather than the ability to perform quickly or accurately under pressure, which supports the claims made by Webb and Nation (2017) regarding effective vocabulary learning. A considerable number of participants in this design conveyed a sense of neglect in traditional classrooms, where recognition was primarily reserved for the most outstanding children. P3, a student in their second year, reflected on the issue at hand:

> *If you're not among the top three in my university class, it's as if you're invisible. But my progress bar only moves when I truly grasp a word, not just when I happen to get it right. Last week, I picked up fifteen new words related to climate change, and my tree sprouted new leaves. My little sister exclaimed, "You're growing your brain!" when I showed it to her. That made me happy. I'm not concerned with outdoing anyone; I just want to keep improving.*

Her account highlights a key principle in motivation research: learners who embrace mastery goals, focusing on personal understanding and gradual improvement, typically demonstrate greater persistence, enhanced cognitive processing, and more robust responses to challenges compared to those who focus on performance or social comparison (Madjar et al., 2017). In Uzbekistan, the educational landscape is characterized by large class sizes and curricula that emphasize examinations, often favoring rote memorization rather than deep conceptual understanding. This transition towards self-referenced achievement provides a psychologically safer and more sustainable approach to student engagement. The cumulative effect of small, noticeable successes played a vital role in maintaining motivation throughout the duration. P14 indicated that the platform's recognition mechanism provided support during times of self-doubt

> *I used to dread vocabulary drills, knowing I'd lose it all within a week. Now, though, I get a little certificate, my name printed on it, each time I complete a "word pack." I know it's silly, but I snap pictures of them and file them away. When things get rough, I think about my progress: fifty words in January, two hundred by March. It reminds me that even the tiniest advancements are still advancements. And that keeps me moving.*

This technique illustrates the concept of narrative self-regulation as described by Mercer and Dörnyei (2020), which involves utilizing personal records to create a cohesive narrative of progress that enhances agency and consistency in the learning process. The platform addressed the essential psychological need for competence, a central idea in Self-Determination Theory (Ryan & Deci, 2020), by transforming abstract effort into something tangible and cumulative. It is important to highlight that this was accomplished without activating the social comparison pressures that frequently diminish motivation for female language learners, particularly in environments where cultural norms of modesty and group cohesion hold great importance. This issue has been underscored in research focusing on EFL learners throughout Central and South Asia (Hiver et al., 2020).

Navigating Socio-Cultural and Technological Ambiguities

Tension Between Gamified Simplicity and Academic Complexity

Although numerous participants indicated a strong level of engagement, some became distinctly aware of a significant disparity between the vocabulary used in the gamified AI platform—mainly consisting of high-frequency, emotionally charged words such as "happy," "angry," or "fast" in informal or irrelevant contexts—and the accuracy required for university-level academic assignments. The terms helped establish initial recognition and an emotional bond, yet they often fell short in expressing the semantic depth, appropriate register, or complex collocations needed for formal writing and discourse. This mismatch led to a misalignment in cognitive load: instead of incorporating new information into their academic frameworks, learners redirected their efforts towards replacing simple terms with more complex ones, a process that the platform did not support. Participant 6 illustrated this divide with a striking metaphor:

> *In academic writing, the word "happy" is often replaced with more precise terms like "elated," "content," or "sanguine." These words help to show the exact meaning and tone of the writing. The game, however, doesn't include these more complex levels of expression. It's like being told to paint with oil paints after only using crayons. While I know how to write at a college level, my professor's comment about the lack of sophistication in my writing made me realize that the game didn't prepare me for this kind of writing.*

This reflects a longstanding criticism in the realm of digital vocabulary instruction: a tendency to prioritize breadth while neglecting depth (Webb & Nation, 2017). In the context of Uzbek higher education, the rise of English-medium writing at the post-secondary level is notable, yet it is met with insufficient preparation (Hasanova, 2022), highlighting significant challenges. During a policy review assignment, Participant 11 provided a clear example of this.

> *Last semester, I was assigned to review a policy paper. My writing was limited to using "good" and "bad," the only words I had learned from the app. My teacher, noticing this, told me to be more specific, circling those words. However, the app didn't give me other options, like "effective," "flawed," or "problematic," during my schoolwork. As a result, it felt like I was using a new language, one that was only for talking and not for understanding.*

These instances exemplify the challenges associated with CALL: Engaging gamified interfaces pose the danger of becoming "edutainment," leading to interfaces that provide linguistically superficial input (Godwin-Jones et al., 2023). Mayer (2014) cautions against "lexical minimalism" in technology-based vocabulary applications, which emphasize quick recognition at the expense of contextual understanding. This approach ultimately leaves learners unprepared for the complexities of academic semantics and pragmatics. Uzbek female undergraduates face challenges in developing their vocabulary as they transition from exam-oriented secondary English to specialized writing at the tertiary level. Even the most engaging platforms limit their complexity without a clear emphasis on understanding register, collocations, and choices specific to different genres. For gamified training to be truly effective,

it should go beyond mere engagement and incorporate a rich academic vocabulary, blending enjoyment with a strong foundation in scholarly principles.

Digital Literacy Disparities Exacerbating Extraneous Load

The gamified AI platform sought to reduce cognitive load by using adaptive scaffolding and user-friendly interfaces. However, many participants reported that technical and navigational challenges unintentionally increased extraneous load, which in turn drained their working memory and diminished their engagement. This posed significant challenges for students who were not familiar with adaptive digital tools—a prevalent issue within Uzbekistan's education system, characterized by pronounced differences in access to reliable internet, modern devices, and digital literacy between urban centers such as Tashkent and rural a across urban socio-economic groups (Hasanova, 2022). For these users, navigating the platform turned into a challenging cognitive task, diverting their focus from learning vocabulary to dealing with interface issues, resolving errors, or interpreting ambiguous prompts. Participant 2 expressed this frustration in a compelling manner:

> *Sometimes, I find myself stuck on the opening screen of a level longer than it takes me to actually learn anything new. My phone is ancient; it's practically a relic by modern standards, not even worthy of the "smart" label. The app crawls. When the quiz freezes mid-question, a cold sweat breaks out because I know I could lose all my progress. Last week, I was on a roll, a seven-day streak, and I felt like a champion. I woke up early, hoping to get my words done before my siblings commandeered the phone. Then, while we were playing a matching game, the screen went dark. I poked at everything, restarted the app, and even rebooted the phone, but my progress vanished. There was nothing to be done: no "try again" button, no error message, just a sad little icon that resembled a broken heart.*
>
> *I felt tears welling up, but I held them back. It wasn't just the streak, though that stung. It was the early mornings; the focus I'd managed to maintain despite the distractions at home. And then, just like that, it was over, erased. I didn't even look at the app for three days. I didn't want to learn anymore, convinced I'd failed. It felt like the machine didn't give a damn about my victories or defeats. At least in class, the teacher sees my effort, even when I stumble. But here? Silence.*

Her account illustrates the ways in which technological failures can interrupt and alter the course of learning experiences. Similar reports have pointed out issues with erratic connectivity, inconsistent feedback, and unintuitive controls, which have increased cognitive demands. In environments with low digital literacy, such shortcomings place an unfair strain on learners who lack resources, turning what should be empowering tools into discouraging barriers. Hockly (2023) offers a critical examination of CALL applications, highlighting their assumption of a baseline digital proficiency that is often lacking in various global contexts, particularly in light of the uneven distribution of technology. This challenges the fundamental goal of intelligent tutoring, which is to reduce unnecessary cognitive load through engagement

and personalization (Bahari et al., 2023). Students navigating interface decoding, troubleshooting issues, and grasping vocabulary often miss out on the system's claimed efficiencies. In the end, the design of the platform failed to take into account the unique needs of Uzbekistan, whether they be linguistic, infrastructural, or experiential, diminishing its cognitive advantages.

Conclusions and Implications

The findings of the study indicate that gamified scaffolding, which includes micro-task sequencing, adaptive feedback, and spaced repetition, significantly lowers extraneous cognitive load while enhancing germane processing, leading to improved retention. Students engaged with the concept of "resilient" through immersive "story quests," making the learning experience both captivating and approachable. However, the discrepancies between academic English requirements and technical obstacles, like unreliable internet access in urban settings, created significant barriers. These issues intensified the difficulties faced by female students in teacher-led classrooms with limited authentic resources. The platform excelled in activities that aligned with individual identities, connecting language content to academic and professional goals, which fostered independence and sustained motivation even in situations of limited control. The findings highlight that the effectiveness of gamification relies on the alignment of digital designs with the cognitive abilities and real-life experiences of learners, moving beyond mere superficial increases in motivation (Godwin-Jones et al., 2023).

The study offers specific recommendations aimed at Uzbek EFL educators, curriculum designers, and policymakers, particularly in the context of the intersection of digital inequities and gender barriers. Educators should view gamified platforms as a complement to traditional classroom practices rather than a replacement. It is essential to integrate vocabulary derived from these apps, such as "resilient," into reflective essays or debates focused on culturally significant figures, like Uzbek women leaders. This approach helps to connect digital input with meaningful output, fostering deeper understanding and enhancing communication skills (Nation & Nation, 2001). Promote the use of platform vocabulary in essays or presentations to enhance students' educational and global ambitions, addressing the constraints of a teacher-centered approach. It is essential for designers and policymakers to advocate for digital equity and cultural awareness. This can be achieved by incorporating register-sensitive instruction through the use of collocations (such as "highly resilient") and field-specific terminology (like "resilient communities" in the social sciences) to meet academic requirements (Webb & Nation, 2017). Addressing infrastructural challenges such as urban connectivity is essential to reduce cognitive strain and guarantee access (Chapelle, 2019). Implement bilingual peer-mentored workshops aimed at clarifying platforms for users with low digital literacy, thereby reducing technology-related anxiety. Integrate culturally rich visuals, such as Uzbek motifs and landscapes, along with multilingual resources in Uzbek and Russian. Incorporate optional social elements, peer challenges, or discussion forums to foster collaboration while maintaining a focus on personalization. Ultimately, incorporate metacognitive strategies to engage with advanced content, thereby enhancing autonomy. By integrating cognitive optimization, cultural sensitivity, and agency, these strategies can create robust EFL environments that empower urban Uzbek female learners to achieve both linguistic and vocational success.

Limitations and Recommendations for Further Studies

This phenomenological study of gamified AI's impact on vocabulary retention and motivation among 24 urban Uzbek female EFL learners offers valuable insights but has notable limitations. The sample is restricted to urban participants from Tashkent, limiting applicability to rural or other regional contexts where access to technology and educational resources may differ significantly; thus, findings should be interpreted as context-specific to urban settings. Its findings are not generalizable to male or rural learners, highlighting a need for comparative studies to address Uzbekistan's socio-cultural and technological divides. Methodologically, the reliance on retrospective journals risks memory bias, suggesting future research should employ real-time methods like think-aloud protocols, platform analytics, and direct cognitive load assessments. While the analysis accounted for pre-study platform use in shaping long-term reflections (e.g., through codes for cumulative effects), future studies could incorporate pre- and post-study assessments to more explicitly quantify its influence. Longitudinal designs with delayed post-tests are recommended to verify long-term lexical gains. Finally, integrating AI with collaborative activities could mitigate reported isolation and foster more inclusive, effective learning environments.

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