

Integrating Technology in EFL Classrooms for Vocabulary Acquisition

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Abstract - This study explores the integration of technology in English as a Foreign Language (EFL) classrooms to enhance vocabulary acquisition. Drawing upon a literature review of empirical studies, it examines the effectiveness of various technological tools and approaches, including mobile-assisted vocabulary learning (MAVL) with spaced repetition systems, gamification for motivation, augmented reality (AR) for contextual learning, learner-created multimedia for active processing, and a pedagogical integration framework for cohesive instructional design. Findings indicate that while each technology offers unique benefits such as improved retention, increased learner autonomy, and contextual depth, their effectiveness depends on strategic pedagogical implementation. The synthesis of results suggests that combining MAVL for individual study, gamification for sustained engagement, AR for immersive contextualization, and multimedia production for output-focused tasks can create a multimodal, learner-centered vocabulary learning ecosystem. This integrative approach aligns with cognitive and sociocultural theories of language learning, offering a comprehensive model for technology-enhanced EFL vocabulary instruction.

Keywords: EFL, Vocabulary Acquisition, Technology Integration, Gamification, Mobile Learning, Augmented Reality

Abstrak - Penelitian ini membahas integrasi teknologi dalam pembelajaran Bahasa Inggris sebagai Bahasa Asing (EFL) untuk meningkatkan perolehan kosakata. Berdasarkan tinjauan pustaka dari berbagai studi empiris, penelitian ini mengkaji efektivitas beragam alat dan pendekatan teknologi, termasuk mobile-assisted vocabulary learning (MAVL) dengan sistem pengulangan bersela (spaced repetition), gamifikasi untuk meningkatkan motivasi, augmented reality (AR) untuk pembelajaran kontekstual, pembuatan multimedia oleh pembelajar untuk pemrosesan aktif, serta kerangka integrasi pedagogis untuk desain instruksional yang terpadu. Hasil temuan menunjukkan bahwa meskipun setiap teknologi memiliki manfaat unik seperti peningkatan retensi, kemandirian belajar, dan kedalaman konteks efektivitasnya sangat bergantung pada penerapan pedagogis yang strategis. Sintesis hasil mengindikasikan bahwa menggabungkan MAVL untuk pembelajaran individu, gamifikasi untuk mempertahankan keterlibatan, AR untuk kontekstualisasi imersif, dan produksi multimedia untuk tugas berbasis keluaran dapat menciptakan ekosistem pembelajaran kosakata yang multimodal dan berpusat pada peserta didik. Pendekatan integratif ini selaras dengan teori kognitif dan sosiokultural dalam pembelajaran bahasa, sehingga menawarkan model komprehensif untuk pembelajaran kosakata EFL berbasis teknologi.

Kata Kunci: EFL, Pemerolehan Kosakata, Integrasi Teknologi, Gamifikasi, Pembelajaran Mobile, Augmented Reality

1. INTRODUCTION

Vocabulary is widely acknowledged as one of the core components of second language proficiency, underpinning a learner's ability to comprehend texts, produce language accurately, and engage in meaningful communication (Nation, 2013). Without an adequate lexical repertoire, even learners with strong grammatical knowledge may struggle to convey meaning effectively. For EFL learners whose exposure to English is often confined to classroom interactions the process of acquiring and retaining vocabulary poses unique challenges. Limited opportunities for authentic language use, restricted input outside the learning environment, and the tendency toward rote memorization often lead to superficial retention and rapid forgetting.

In recent years, educational technology has emerged as a transformative force in addressing these challenges. Mobile devices, gamified platforms, augmented reality (AR), and learner-generated digital content have created opportunities for rich, personalized, and contextually meaningful vocabulary learning experiences. This shift aligns with broader trends in *technology-enhanced language learning* (TELL), where the integration of digital tools supports principles of autonomy, learner-centeredness, and multimodal input. The pedagogical rationale for technology

integration draws on several learning theories. Dual-Coding Theory (Paivio, 1991) suggests that presenting new vocabulary through both visual and verbal channels strengthens cognitive encoding and recall. In addition, constructivist approaches (Vygotsky, 1978) emphasize the role of social interaction in knowledge construction, which technology facilitates through collaborative platforms. Additionally, self-determination theory (Deci & Ryan, 2000) underlines the importance of intrinsic motivation, an area where gamification, interactive media, and personal goal-tracking can play a vital role.

This article examines the integration of technology in EFL classrooms for vocabulary acquisition by synthesizing empirical findings from recent journal studies. It focuses on four key strands:

1. Mobile-assisted vocabulary learning (MAVL) and spaced repetition systems.
2. Gamification and motivational design.
3. Augmented reality (AR) for immersive contextual learning.
4. Learner-generated multimedia as a form of active vocabulary processing.

2. LITERATURE REVIEW

2.1 Mobile-Assisted Vocabulary Learning (MAVL) and Spaced Repetition

Mobile-assisted vocabulary learning (MAVL) harnesses the portability, connectivity, and multimodal affordances of smartphones and tablets to extend learning opportunities beyond the confines of the classroom. As Lin and Lin's (2019) meta-analysis of 33 empirical studies reveals, MAVL interventions consistently produce significantly higher vocabulary gains compared to conventional paper-based methods, particularly when integrated with spaced repetition systems (SRS). SRS platforms such as Quizlet, Anki, and Memrise, employ adaptive algorithms that schedule vocabulary reviews at calculated intervals based on an individual learner's performance history. This scheduling leverages the spacing effect, a well-documented cognitive phenomenon in which information is more effectively consolidated into long-term memory when exposure is distributed over time rather than massed in a single session (Kornell, 2009).

From a pedagogical standpoint, MAVL addresses both cognitive and affective dimensions of vocabulary learning. Cognitively, it supports dual coding (Paivio, 1991) by integrating textual, auditory, and visual representations of words, thereby strengthening encoding pathways. Affectively, MAVL promotes learner autonomy and self-regulated learning (Stockwell, 2010) by enabling learners to choose when, where, and how frequently they engage in vocabulary practice. This flexibility is especially beneficial for EFL learners in contexts where classroom contact time is limited and exposure to English outside of school is minimal. The benefits extend to productive language use as well. Alamer and Al Khateeb (2021) found that Saudi EFL learners using mobile vocabulary apps not only improved their receptive vocabulary knowledge (recognition and comprehension) but also demonstrated enhanced ability to integrate newly learned words into speaking and writing tasks. This suggests that MAVL, when designed with interactive and contextualized exercises, can bridge the gap between *knowing* a word and *using* it fluently. Nonetheless, effective MAVL integration requires careful consideration of potential drawbacks, such as over-reliance on rote memorization and screen fatigue. Teachers must scaffold app use with communicative activities to ensure vocabulary moves beyond passive recognition into active competence.

2.2 Gamification and Motivation

Gamification, defined as the application of game-design elements (e.g., points, levels, badges, leaderboards, and challenges) in non-game contexts, has gained increasing prominence in language education for its potential to boost learner motivation (Deterding et al., 2011). In the EFL classroom, gamification can reframe repetitive vocabulary exposure traditionally perceived as tedious into an engaging and interactive experience. Through platforms like Kahoot!, Quizizz, and Wordwall, learners participate in competitive or collaborative activities that reinforce lexical

knowledge while lowering affective barriers to participation. Wu (2018) demonstrated that such gamified tools not only increased students' willingness to participate but also created a more relaxed classroom atmosphere conducive to risk-taking in language production. The motivational benefits of gamification can be understood through Self-Determination Theory (Deci & Ryan, 2000), which emphasizes the importance of satisfying learners' needs for competence, autonomy, and relatedness. Game elements like points and progress bars can enhance perceived competence, while choices in gameplay foster autonomy, and collaborative modes enhance social connectedness. However, sustaining these benefits is challenging. The so-called "novelty effect" (Clark, 1983) suggests that initial spikes in engagement often diminish once learners become accustomed to the game format, leading to reduced motivational impact over time.

This limitation underscores the need to design gamified vocabulary activities with pedagogical alignment in mind. Motivation should not be an end in itself but a means to support deep, meaningful vocabulary learning. For instance, integrating vocabulary challenges into story-based quests or problem-solving scenarios can promote contextualized usage, ensuring that the lexical items practiced within the game are subsequently applied in authentic communicative contexts. Additionally, adaptive gamification where difficulty levels, feedback, and rewards are tailored to individual learners' progress can sustain engagement while ensuring that motivation is grounded in genuine mastery rather than superficial reward-seeking.

2.3 Augmented Reality (AR) and Immersive Learning

Augmented Reality (AR) overlays digital information such as text, images, or audio onto physical environments in real time, offering learners an interactive blend of the real and the virtual. In vocabulary acquisition, AR provides an opportunity for *situated learning* by embedding lexical items in meaningful, context-rich scenarios. As Godwin-Jones (2016) observes, AR allows teachers to transform traditional classroom spaces or field trips into dynamic language-learning environments. For example, everyday classroom objects can be digitally "tagged" with target vocabulary, enabling learners to physically interact with the word in its semantic context rather than as an abstract entry on a word list. The pedagogical rationale for AR use aligns with Contextual Learning Theory, which posits that knowledge is more readily retained when learned in a relevant context (Brown, Collins, & Duguid, 1989). By linking words to tangible experiences, AR enhances semantic encoding and facilitates the transfer of vocabulary to authentic communicative situations. Research by Liu and Chu (2010) provides empirical support: Taiwanese EFL learners engaged in AR-based vocabulary tasks demonstrated significantly higher retention rates compared to peers using static print materials. The authors attribute these gains to the multisensory engagement (visual, auditory, and kinesthetic) and contextual anchoring inherent in AR applications.

2.4 Learner-Created Multimedia and Active Processing

Encouraging learners to produce their own digital artifacts such as videos, podcasts, interactive slideshows, and infographics integrates active processing into vocabulary learning, a process widely recognized as crucial for long-term retention. This approach aligns with Swain's Output Hypothesis (1985), which posits that language production compels learners to process linguistic forms more deeply than receptive tasks alone. When students are required to create meaningful content using target vocabulary, they engage in syntactic formulation, lexical selection, and semantic elaboration, all of which foster deeper cognitive encoding.

Empirical evidence supports the efficacy of this approach. In a flipped EFL classroom context, Hung (2017) found that students who produced short video projects incorporating newly learned vocabulary achieved significantly higher retention scores compared to those who completed only receptive comprehension exercises. Furthermore, these learners demonstrated greater willingness to use the target words spontaneously in subsequent speaking activities an indicator of improved lexical retrieval and confidence.

From a pedagogical perspective, learner-generated multimedia serves several functions:

1. Multiple Modalities of Encoding, Creating a video that integrates visuals, narration, and subtitles allows learners to engage with vocabulary in auditory, visual, and kinesthetic modes, thereby reinforcing memory through dual coding (Paivio, 1991).
2. Authentic Communicative Contexts Multimedia production simulates real-world language use. For instance, an EFL student group assigned to create a short travel guide video in English might use target vocabulary such as *itinerary*, *landmark*, *cuisine*, and *heritage* in meaningful, situationally appropriate ways.
3. Collaborative Knowledge Building Group based multimedia projects foster negotiation of meaning (Long, 1996) as learners discuss how best to present and integrate new lexical items. This peer interaction creates multiple exposures to target vocabulary in different contexts spoken planning sessions, written scripts, and the final multimedia product.
4. Reflective Learning. The process of drafting, editing, and reviewing a multimedia project encourages metacognitive reflection on word choice, pronunciation, and grammatical accuracy, further deepening lexical mastery.

The Example Application in the Classroom:

An advanced EFL class studying environmental issues could be tasked with producing a 3–5 minute awareness video on plastic pollution. Students would be required to integrate at least 15 new vocabulary items (e.g., *biodegradable*, *marine debris*, *sustainability*, *legislation*) into the script. They would record narration, add on-screen text with definitions, and use relevant imagery. Throughout the project, the teacher would facilitate peer feedback sessions where groups evaluate each other's use of vocabulary for accuracy, clarity, and contextual appropriateness. This iterative cycle of production and feedback ensures repeated encounters with the target vocabulary in varied, meaningful contexts. In addition to vocabulary gains, this approach fosters 21st-century digital literacy skills, empowering learners to operate in technology-rich communication environments. As multimedia creation inherently requires audience awareness, coherence, and creativity, it prepares learners for authentic communicative tasks beyond the classroom.

2.5 Pedagogical Integration Framework

The reviewed studies collectively indicate that the efficacy of technology in EFL vocabulary acquisition is contingent not merely on the sophistication of the tool itself, but on how strategically it is embedded within instructional design. As Mayer's (2009) Cognitive Theory of Multimedia Learning underscores, learning effectiveness hinges on the careful selection, sequencing, and presentation of information to optimize working memory capacity and prevent cognitive overload. Simply introducing a digital application or platform without a coherent pedagogical framework risks relegating technology to the role of novelty rather than sustained learning enhancement.

A robust integration framework involves purposeful orchestration of multiple technological modalities, each serving a complementary function in the vocabulary learning process:

1. MAVL for Individualized Spaced Learning Mobile-assisted vocabulary learning tools (e.g., Quizlet, Anki) can form the backbone of personalized study, leveraging spaced repetition algorithms to promote long-term retention while fostering learner autonomy.
2. Gamification for Engagement and Repeated Exposure Game-based elements can be interwoven into lessons to increase motivation, encourage competition or collaboration, and facilitate repeated encounters with target vocabulary, provided the novelty effect is mitigated through authentic communicative integration.
3. AR for Contextualized, Experiential Learning Augmented reality activities, such as labeling classroom objects or conducting virtual field trips, provide context-rich, multisensory exposure to vocabulary, enhancing semantic encoding and transferability to real-life contexts.
4. Learner-Created Multimedia for Deep Processing and Productive Use Assigning students to produce videos, podcasts, or infographics using new vocabulary compels active construction

of meaning, negotiation of usage, and application in communicative contexts, thereby bridging receptive and productive competencies.

When these modalities are sequenced intentionally, they can form a multimodal vocabulary learning ecosystem. For example, students might first acquire target vocabulary individually through MAVL (input and spaced repetition), then reinforce it via gamified in-class challenges (repeated exposure), experience it in authentic contexts through AR simulations (contextual depth), and finally consolidate learning through learner-generated multimedia projects (active production). This layered approach mirrors scaffolding principles (Vygotsky, 1978), where support is progressively withdrawn as learners internalize vocabulary. Moreover, it aligns with Nation's (2013) four strands of a balanced language course meaning-focused input, meaning-focused output, language-focused learning, and fluency development ensuring that technology is not an isolated add-on but an integrated driver of vocabulary mastery.

3. RESULT

The synthesis of studies on technology integration in EFL vocabulary acquisition reveals **consistent positive effects** across multiple modalities, albeit with varying degrees of impact depending on implementation.

1. Mobile-Assisted Vocabulary Learning (MAVL) and Spaced Repetition

Research demonstrates robust gains in both receptive and productive vocabulary knowledge when learners use mobile applications incorporating spaced repetition systems (Lin & Lin, 2019; Alamer & Al Khateeb, 2021). These tools promote autonomy, flexible learning schedules, and individualized pacing, which are especially beneficial for sustained retention.

2. Gamification

Gamified approaches increase learner motivation, participation, and repeated exposure to target vocabulary (Wu, 2018). However, the "novelty effect" (Clark, 1983) suggests that motivation may decline over time unless paired with authentic, communicative tasks that deepen engagement.

3. Augmented Reality (AR)

AR-based interventions situate vocabulary in rich, meaningful contexts, enhancing retention through multisensory engagement and contextual anchoring (Godwin-Jones, 2016; Liu & Chu, 2010). These benefits are particularly pronounced when AR activities are interactive and task-based.

4. Learner-Created Multimedia

Active production of digital artifacts (e.g., videos, podcasts, infographics) aligns with output hypothesis principles (Swain, 1985) and fosters deeper processing of vocabulary. Empirical evidence (Hung, 2017) shows that learners demonstrate higher willingness to use newly acquired vocabulary in communicative tasks after such projects.

5. Pedagogical Integration Framework

The most significant vocabulary gains occur when these technologies are **sequenced within an intentional pedagogical design**, balancing meaning-focused input, output, language-focused learning, and fluency development (Nation, 2013). Scaffolding strategies (Vygotsky, 1978) further enhance the transition from guided learning to independent vocabulary use.

Overall, the literature converges on the conclusion that technology, when used in isolation, has limited long-term effects, but when integrated purposefully and multimodally, it can substantially improve both the depth and durability of EFL vocabulary learning.

4. CONCLUSION

The reviewed body of research underscores a fundamental pedagogical insight: the power of technology in EFL vocabulary acquisition lies not in the tools themselves, but in the pedagogy that shapes their use. Mobile-assisted vocabulary learning, gamification, augmented reality, and learner-generated multimedia each contribute unique affordances autonomy, engagement, contextual richness, and deep processing, respectively. However, the strongest learning outcomes emerge when these approaches are combined into a cohesive instructional sequence that aligns with established learning theories such as Mayer's multimedia learning principles, Vygotsky's scaffolding, and Nation's four strands.

For practitioners, this implies a shift from viewing technology as a supplementary resource toward treating it as an integrated element of curriculum design, with each modality deliberately positioned to complement and reinforce the others. For researchers, future inquiry should examine longitudinal effects of integrated technological ecosystems and explore learner variables (e.g., motivation profiles, digital literacy) that mediate the impact of these interventions. In conclusion, technology's transformative potential for EFL vocabulary learning will be fully realized only when innovative tools meet informed, theory-driven pedagogy ensuring that digital engagement translates into enduring lexical competence.

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