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Digital Game-Based Learning in Enhancing English Vocabulary: A Systematic Literature Review

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Abstract

This study explores key factors influencing the effectiveness of Digital Game-Based Learning (DGBL) in enhancing English vocabulary acquisition among EFL learners. Using a Systematic Literature Review (SLR) under the PRISMA framework, a total of 206 articles were found, but only 18 were eligible for peer review. We chose a range of years published between 2016 and 2025 to ensure the inclusion of the latest research findings and methodologies that reflect current trends and technological advances in the field. Results show that DGBL significantly boosts vocabulary learning by increasing motivation, engagement, and retention. Technological aspects like interactivity, accessibility, adaptive features, and pedagogical elements such as self-regulated learning and emotional engagement are critical. Cognitive Load Theory helps explain the role of game complexity and scaffolding. DGBL faces challenges like digital literacy gaps and infrastructure issues despite its benefits. The study offers practical insights for educators and recommends further research on AI-driven games and long-term motivation in EFL settings.

Keywords**: **Digital Game-Based Learning, Vocabulary, EFL Learners, Systematic Literature Review

Abstrak

Penelitian ini mengeksplorasi faktor-faktor utama yang mempengaruhi efektivitas Pembelajaran Berbasis Permainan Digital (DGBL) dalam meningkatkan penguasaan kosakata bahasa Inggris di kalangan pelajar EFL. Dengan menggunakan Tinjauan Literatur Sistematis (SLR) di bawah kerangka kerja PRISMA, total 206 artikel ditemukan, tetapi hanya 18 artikel yang memenuhi syarat untuk tinjauan sejawat. Kami memilih rentang tahun yang diterbitkan antara 2016 dan 2025 untuk memastikan dimasukkannya temuan penelitian terbaru dan metodologi yang mencerminkan tren saat ini dan kemajuan teknologi di lapangan. Hasil penelitian menunjukkan bahwa DGBL secara signifikan meningkatkan pembelajaran kosakata dengan meningkatkan motivasi, keterlibatan, dan retensi. Aspek teknologi seperti interaktivitas, aksesibilitas, dan fitur adaptif, serta elemen pedagogis seperti pembelajaran yang diatur sendiri dan keterlibatan emosional, sangat penting. Teori Beban Kognitif membantu menjelaskan peran kompleksitas permainan dan perancah. Terlepas dari manfaatnya, DGBL menghadapi tantangan seperti kesenjangan literasi digital dan masalah infrastruktur. Studi ini menawarkan wawasan praktis bagi para pendidik dan merekomendasikan penelitian lebih lanjut tentang game yang digerakkan oleh AI dan motivasi jangka panjang dalam pengaturan EFL.

Keywords**: **Pembelajaran Berbasis Permainan, Kosakata, Pembelajar EFL, Tinjauan Sistematis

INTRODUCTION

Acquiring vocabulary is a crucial part of learning a second language, and digital tools have increasingly been recognised for their role in supporting this process. Digital Game-Based Learning (DGBL) has emerged as an effective method for vocabulary, creating interactive and immersive experiences that boost engagement and knowledge retention. (Vnucko & Klimova, 2023). Digital educational games align with cognitive and constructivist learning theories, emphasising active participation, problem-solving, and meaningful content interaction (Chowdhury et al., 2024). Additionally, (Chen, 2025) suggests that digital and serious games help close the digital divide in higher education, fostering critical thinking skills while enhancing vocabulary learning. These insights underscore the growing significance of DGBL as an innovative approach to second language teaching.

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Several studies have highlighted the benefits of digital games in vocabulary acquisition. For example, studies by (Studies & Babazade, 2024) Digital tools create an engaging and dynamic learning environment that enhances vocabulary retention more effectively than traditional memorisation techniques. Moreover, DGBL encourages motivation, social interaction, and contextual learning, key elements in second language development. (A Rasti-Behbahani, 2021) Research also indicates that gamifying vocabulary instruction increases student engagement and supports long-term memory retention through repeated exposure and reinforcement. (Chowdhury et al., 2024) Given these advantages, digital games present a valuable instructional tool that enhances both independent and collaborative learning experiences in vocabulary development for students.

A previous study (Vnucko & Klimova, 2023) Revealed that Digital Games-Based Vocabulary Learning (DGBVL) can create a positive learning environment, suggesting that DGBVL is useful in vocabulary learning and may even surpass conventional teaching methods in an English classroom. Another previous study (Chowdhury et al., 2024) examined that Digital Game-Based Language Learning has significantly enhanced vocabulary and reading comprehension. Also, previous studies (Sakkir et al., 2023) Revealed that utilising Wordwall as digital game-based learning has a practical impact on students' vocabulary.

Based on previous studies, some studies found that digital game-based learning positively impacted students' vocabulary skills and learning environment. Therefore, the researcher is interested in knowing the factors that influence implementing digital game-based learning in enhancing vocabulary knowledge in English language learning for foreign language learners. This study will use a systematic literature review approach, which few studies still use in the context of foreign language learners. This study is expected to provide more information about factors influencing digital game-based learning in enhancing vocabulary and suggestions for teachers to use this approach in teaching English to foreign language learners.

RESEARCH METHODS

This study employs a Systematic Literature Review (SLR) approach to identify and analyse research discussing the implementation of Digital Game-Based Learning (DGBL) in enhancing the vocabulary of English as a Foreign Language (EFL). The SLR method is used to systematically examine previous studies to determine the key factors influencing the effectiveness of DGBL in enhancing students' vocabulary acquisition. The literature review process follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, a reporting guideline designed to address poor reporting of systematic reviews. (Matthew, 2021). The PRISMA framework includes several key stages: study identification, article selection based on inclusion and exclusion criteria, and data extraction and analysis.

Scopus were used to ensure a broad and high-quality selection of research. The process of searching the databases was completed in April 2025. The main keywords searched in Scopus were: TITLE-ABS-KEY ("digital game-based learning" OR DGBL) AND (vocabulary) AND (learning OR teaching) AND (English OR ESL OR EFL) PUBYEAR > 2016. These keywords were applied to titles and keywords to maximise coverage and identify relevant studies. The search was limited to journal articles published in English between 2016 and 2025 to ensure the inclusion of the latest research findings and methodologies that reflect current trends and technological advances in the field. English-language publications were prioritised to access more peer-reviewed and internationally recognised academic sources.

An initial search of the Scopus database was conducted on February 12, 2025, and 206 articles were found. After reviewing the titles and abstracts, 34 papers were excluded due to their irrelevance in the DGBL in improving vocabulary for EFL. After applying the open access filter,

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the number of accessible articles was reduced to 18. These 18 articles were then screened based on their titles and abstracts, and ultimately, 18 relevant articles remained on the topic of digital game-based learning in improving vocabulary for EFL.

The search results were exported to Mendeley for efficient reference management. The full-text selection process follows the PRISMA guidelines. First, duplicate articles and irrelevant studies were identified and removed. Then, two researchers independently reviewed the titles and abstracts of the selected articles to ensure they aligned with the research objectives. Finally, full-text articles were assessed based on PRISMA guidelines to include only high-quality studies in the systematic review. Articles that did not fit the DGBL in improving vocabulary for EFL learning, did not have full-text access or were not peer-reviewed were rejected. The number of studies identified, screened, excluded and included in the final analysis is documented in the PRISMA flowchart.

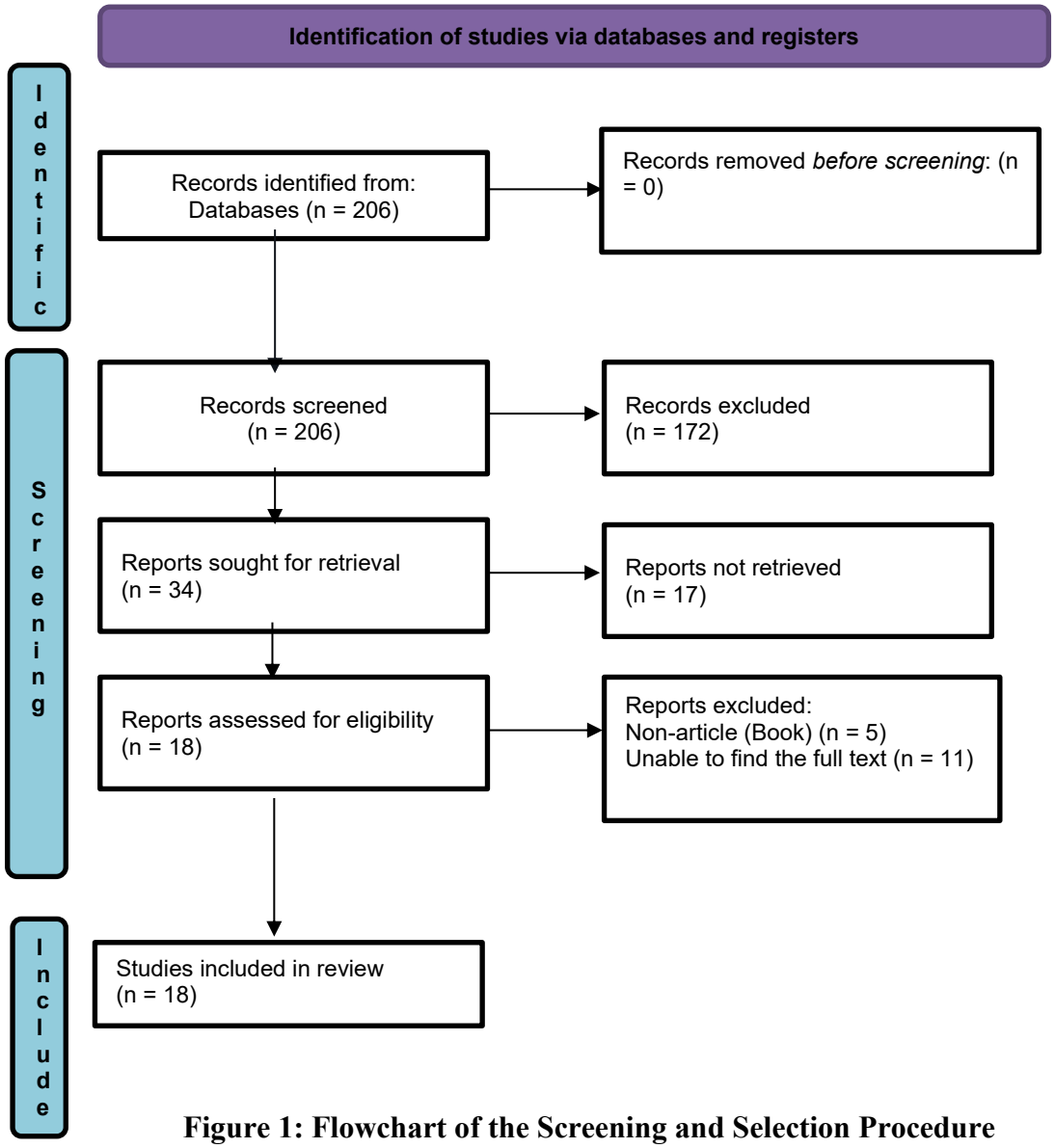

Figure 1: Flowchart of the Screening and Selection Procedure

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RESULTS AND DISCUSSION

This study evaluated the factors influencing digital game-based learning (DGBL) in enhancing EFL students' vocabulary. The analysis of 18 studies revealed that DGBL contributes significantly to vocabulary learning by fostering learner motivation, engagement, and retention. Key technological affordances such as interactivity, ease of access, and adaptive game elements were consistently identified as central to DGBL's success. In addition, student-centred elements such as self-regulated learning strategies, emotional involvement, and preference-based game modes further shaped the learning outcomes. However, challenges remain, including varying levels of digital literacy, infrastructure gaps, and emotional stress from specific game mechanics. Overall, the effectiveness of DGBL depends on the dynamic interplay between technological design, pedagogical alignment, and responsiveness to diverse student needs and contexts.

Information and Communication Technology (ICT)

Digital technology has been shown to contribute significantly to learning English vocabulary through digital game-based learning (DGBL). Several studies confirm that digital platforms such as gamification apps, PowPow, Wordwall, Kahoot!, and mobile-assisted learning tools increase learning effectiveness by creating interactive, accessible, and fun learning experiences. Digital platforms like Wordwall and PowPow might improve students' academic performance and motivate and actively engage them. The interactive features provided by the platform attract students' attention and make learning more meaningful. These findings underscore that integrating digital assistants or game-based learning applications that are easy to use and provide instant feedback can make it easier for students to understand and remember new vocabulary. The apps' ease of access and interactivity provide a more enjoyable and productive learning experience. However, there is a challenge in applying to DGBL. The challenge emphasises that the effectiveness of DGBL is highly dependent on the availability of digital infrastructure and teachers' readiness to make optimal use of technology. Therefore, adequate teacher training and digital resource development are key to successfully implementing ICT in learning.

(Andreani & Ying, 2019) Tell that:

"The findings indicated that the PowPow game successfully enhanced students' motivation and interest in learning English vocabulary."

(Sianturi & Hung, 2023) Show that:

"There was no significant difference between the scores of the students who used digital-game-based learning (Kahoot!, Quiz) and paper-based learning, but both groups showed an improvement in the post-test compared to the pre-test.

(Polyzi & Moussiades, 2023) Say that:

"... students obtained excellent impressions from using the assistant... considered that the assistant helped them learn vocabulary... showed a statistically significant increase in student performance compared to studying using traditional methods."

(Alfares, 2025) Explain that:

"The use of the Wordwall platform significantly improved the vocabulary acquisition of EFL students... The experimental group... experienced an increase in mean score from 76.77 to 92.10... Wordwall is effective in increasing learning motivation, student engagement, as well as vocabulary retention."

(Dashtestani, 2022) Says that:

"...significant challenges, including a lack of digital facilities, insufficient knowledge about DGBL, and limited access to appropriate educational digital games."

Student-Centred Learning (SCL)

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Student-centred learning strategies have been proven effective in improving vocabulary engagement, motivation and learning outcomes. In the context of SCL, an approach that focuses on students' needs, interests, and individual differences is important to make the learning experience more personalised and relevant. This study shows that when students are actively engaged-behaviorally, cognitively, and emotionally, they significantly improve vocabulary acquisition. Games encouraging students to think, feel and interact promote higher learning achievement. This confirms that approaches considering students' learning preferences and characteristics are more effective. Competition can be motivating for some students, but stressful for others. Therefore, game design must be tailored to student profiles to balance challenge and emotional comfort.

Based on (Calvo-Ferrer & Belda-Medina, 2021):

Intentional vocabulary learning was significantly more effective than incidental learning. Students who intentionally used the target vocabulary during the game retained more words."

Based on (Liu et al., 2022):

"...competitive gamification can enhance learning and motivation, but optimal modes (individual vs. team-based) depend on context and learner preferences."

Based on (R Zhang et al., 2023):

"The findings indicated learners' overall active engagement in DGBVL behaviorally, cognitively, and emotionally... Statistically significant, positive effects... on vocabulary development."

Based on (Ruofei Zhang et al., 2024):

"The SR-DGBVL participants experienced significantly greater improvements in vocabulary knowledge and reported higher levels of motivation than those in the conventional vocabulary learning context. We also found motivation to be a full mediator between using SRL strategies and vocabulary knowledge development. Interestingly, the application of SRL strategies appeared consistent across different learning methods."

Motivational Impact

Learning motivation is one of the key factors in the effectiveness of Digital Game-Based Learning (DGBL) in improving EFL students' vocabulary acquisition. Digital games encourage intrinsic and extrinsic motivation through elements such as competition, rewards, and instant feedback that increase student engagement in learning. The fun and pressure-free learning environment also helps high-anxiety students to participate more actively. However, motivation may vary depending on students' preferences and experiences with the game, and overuse of extrinsic rewards may weaken long-term engagement. Therefore, the game design needs to be customised to keep various student profiles motivated and relevant.

(Liu et al., 2022)Show that:

"Well-designed competitive gamification can enhance learning and motivation."

(Y.-F. Yang et al., 2024) Argue that:

"Significant gains in vocabulary retention and comprehension, with anxious learners particularly benefiting from the engaging, low-pressure gameplay environment."

(A Rasti-Behbahani et al., 2024) Show that:

"DGBVL activities led to large effect sizes in receptive and productive vocabulary knowledge acquisition, underlining that motivation and task attractiveness are central factors influencing learning success."

(A Rasti-Behbahani, 2021) That:

"Motivation was the most recurring theme, and instantiation was the least recurring theme."

Cognitive Development

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Digital Game-Based Learning (DGBL) contributes significantly to cognitive development in vocabulary learning because it provides an interactive, challenging and contextualised learning environment. Games with cognitive strategies such as storytelling, adaptive difficulty, and recall-based tasks can meaningfully strengthen memory and word association. In context and narrative-rich game environments, students recognise new vocabulary and use it functionally in real-life situations, which can strengthen comprehension and retention. Studies show that games encouraging high cognitive engagement, such as problem solving and teamwork, contribute to forming semantic associations and deep understanding of word meanings. In addition, DGBL also encourages exploratory and reflective learning, where students actively construct their knowledge rather than passively receiving information. However, the complexity of game design can be a challenge, as games that are too complex or full of visual stimuli can result in cognitive overload, especially for novice learners or those with limited working memory capacity. Therefore, developers and educators need to ensure that the game elements used remain balanced, not only visually and narratively appealing, but also appropriate to the cognitive capacity of the students and the vocabulary learning objectives to be achieved.
Based on (Govender & Arnedo-Moreno, 2021):

"Well-designed games incorporating adaptive difficulty, immersive storytelling, and social collaboration features significantly enhanced learner engagement and linguistic outcomes." (A Rasti-Behbahani, 2025) Say that:

"Digital game-based vocabulary learning (DGBVL) activities significantly improved participants' receptive and productive vocabulary knowledge."
(A Rasti-Behbahani, 2025) Say that:

"The DGBVL tasks strengthened the interconnectedness of word knowledge components, highlighting that structured cognitive engagement is a critical factor in enhancing vocabulary learning through games."
(Frolli et al., 2023) Explain that:

"Both the traditional and game-based learning groups showed significant improvements in Italian vocabulary acquisition after four weeks of intervention. However, the game-based learning group demonstrated a significantly greater increase.

Information and Communication Technology (ICT) shapes the learning experience. A study (Zafar, 2019) explains that "By the adoption of Information and Computer Technology (ICT), education has become much more effective than in the past. Researchers, academicians and industry professionals have proved that ICT provides opportunities to all educational participants to learn and excel. Its instructional use improves the progress and development of faculty and students alike." The digital platforms, such as PowPow, Wordwall, Kahoot!, and learning apps, provide interactive and accessible environments that enhance student engagement and vocabulary retention. Study (Alfares, 2025) explains that "The use of the Wordwall platform significantly improved the vocabulary acquisition of EFL students. Wordwall is effective in increasing learning motivation, student engagement, as well as vocabulary retention." Some studies show that students who use DGBL in their learning show an improvement in vocabulary acquisition. Studies by Adriana Cecibel Pesántez-Sigüenza and Naranjo-Andrade say that "Learners can acquire vocabulary words meaningfully through games such as Quizizz and Wordwall because students with those applications feel motivated, engaged, confident, and excited to learn. Furthermore, their anxiety is reduced due to the game's entertainment, and they enjoy learning that way." The efficacy of ICT-based Digital Game-Based Learning (DGBL) in enhancing vocabulary acquisition among EFL learners is well-documented. However, numerous challenges have been identified that impede its optimal implementation. The primary challenges encompass a paucity of digital infrastructure, disparate access to devices, and inadequate digital literacy among educators and students. A study (Dashtestani, 2022) identifies several significant challenges, including a lack of digital facilities, inadequate knowledge about DGBL, and limited access to suitable educational digital games. The

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efficacy of the implementation of DGBL is significantly influenced by the design of user-friendly applications that are compatible with students' characteristics. In this case, Cognitive Load Theory (Sweller, 1988) offers a relevant framework for understanding how overly complex game designs can overload students' working memory and inhibit vocabulary processing. Conversely, games that possess a deliberate cognitive structure, manifested through narrative elements, repetition, and immediate feedback, can facilitate effective learning. Furthermore, the Self-Determination Theory (Deci & Ryan, 1985) posits that learning that fosters autonomy, competence, and relatedness can enhance students' intrinsic motivation. The DGBL platform facilitates a personalized learning experience, allowing students to select their preferred pace, learning style, and game mode, thereby enhancing engagement. Consequently, the training of educators constitutes a pivotal element in the implementation of the DGBL. This training must encompass not only the technical competencies but also the pedagogical understanding necessary to design effective and adaptive game-based learning experiences. The study (Rofii et al., 2023) asserts that training provides English teachers with the skills necessary to design and implement innovative technology-assisted learning. Consequently, the process of acquiring English proficiency becomes more engaging, applicable, and efficient."

The integration of Information and Communication Technologies (ICT) in the context of English vocabulary acquisition facilitates seamless access to information resources, thereby fostering an effective student-centred pedagogical approach. According to the findings of the study conducted by (Zafar, 2019), the integration of technology in language learning has been shown to promote learner autonomy. This promotion occurs through the allowance of students to access materials at their own pace, the ability to revisit challenging content, and engagement with a variety of media-rich resources tailored to their needs. Therefore, the role of ICT is to facilitate a personalized, flexible, and adaptive learning experience according to each student's unique needs. As indicated by the findings of research conducted by (R Zhang et al., 2023) "The overall active engagement of learners in DGBVL was behavioural, cognitive, and emotional." The students demonstrated a statistically significant enhancement in their vocabulary development. In this context, the integration of Information, Communication Technology (ICT) and Student Centred-learning (SCL) fosters an autonomous, intrinsically motivated, and actively engaged learning environment for vocabulary acquisition. Another research says that designing a game-based learning should refer to the students' characteristics to consider what type of learning students have. Finding research (Polyzi & Moussiades, 2023) says that "Game-based learning offers motivational advantages, but poorly designed competitive elements may lead to stress for some students. A balanced design that values cooperation, personalization, and student control is essential." However, the efficacy of this student-centred learning (SCL) approach is significantly influenced by individual student factors. A variety of factors have been identified as contributing to the non-uniform responses of students to games. These include differences in digital literacy, anxiety levels, and preferences for competitive or collaborative elements. A divergence in student sentiment is observed, with some reporting feelings of motivation, while others report feelings of being overwhelmed. This underscores the significance of a differentiated approach, as articulated in the seminal work Differentiated Instruction Theory (Tomlinson, 2001), which underscores the imperative to customize learning methodologies to the distinct needs and attributes of students. Another challenge that must be addressed is the issue of confusion resulting from an excess of options, as well as students' difficulties in organizing time for self-study. Consequently, educators assume a pivotal role as facilitators, actively guiding students through the learning process. In accordance with Self-Determination Theory (Dunn & Zimmer, 2020) educators must cultivate an environment that fosters autonomy, a sense of capability, and interconnectedness among students to sustain their motivation to learn.

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Students-Centred Learning (SCL) data emphasises tailoring instruction to learners' individual needs, it is the motivating game design that brings these principles to life. Study (R Zhang et al., 2023) point out, "learners' behavioural, cognitive, and emotional engagement in DGBL showed statistically significant improvements in vocabulary development", which highlights how a student-centred approach can activate motivation. This is further supported by (Liu et al., 2022), who found that "competitive gamification increases motivation, but only if it is aligned with learners' preferences", underlining the need for SCL principles in motivational design. Learning motivation is one of the key factors in the effectiveness of Digital Game-Based Learning (DGBL) in improving EFL students' vocabulary acquisition. As emphasized (A Rasti-Behbahani, 2021) "Motivation is the most recurrent theme across studies on game-based vocabulary learning". Digital games encourage intrinsic and extrinsic motivation through elements such as competition, rewards and instant feedback that increase student engagement in learning. (Y. F. Yang et al., 2024) found that "significant improvements in particular, benefiting from an engaging and low-pressure game environment". A fun and pressure-free learning environment also helps students who have high anxiety to participate more actively. However, motivation may vary depending on students' preferences and experiences with the game. As (Liu et al., 2022) state that, "Well-designed competitive gamification can enhance learning and motivation, but the optimal mode (individual & team-based) depends on context and learner preferences". Additionally, the overuse of extrinsic rewards can undermine long-term engagement, as (Hamari et al., 2014) Stated: "Extrinsic rewards in DGBL initially increase engagement, but overuse can undermine intrinsic motivation." Therefore, game design needs to be adjusted to keep various students' profiles motivated and relevant.

Motivation serves as a gateway to cognitive engagement in DGBL. While reward and a low-pressure environment (Y. F. Yang et al., 2024) lower the affective filter, they simultaneously prepare learners for deep cognitive processes. (Amin Rasti-Behbahani, 2025) found that motivated learners showed 23% stronger activation in the semantic network during game play, directly linking motivation states to enhance memory encoding. This synergy is exemplified in narrative-game based, where emotional immersion (Plass et al., 2020) They not only sustain motivation but also improve cognitive retention through the use of contextualised words. Cognitive development is significantly enhanced through DGBL, especially in game designs that incorporate elements such as storytelling, learning tasks and problem solving. As (Plass et al., 2020) say that "contextual storytelling in games strengthens semantic networks by linking new vocabulary to immersive scenarios", which strengthens knowledge retention. Studies show that providing deliberate tasks, such as memory activities and contextual word usage, is very effective. Cognitive Load Theory (Mayer, 2024) emphasises games that follow cognitive load theory, optimise vocabulary encoding and recall". However, some digital games can cause high cognitive load, which is prohibitive for beginners or learners with limited working memory. (Sweller, 2008). For this reason, the development of Game-based learning must adjust to the needs and pay attention to students' cognitive load. This DGBL can still be relevant to students and can continue to improve students' vocabulary.

CONCLUSION

This research study explores the factors that influence Digital Game-Based Learning (DGBL) in enhancing vocabulary for English as a Foreign Language (EFL) learners. A comprehensive review of the extant literature revealed that four main themes have emerged as critical in determining the effectiveness of DGBL. This assertion is validated by a synthesis of 18 peer-reviewed studies published between 2016 and 2025. The four subjects that factor into DGBL's influence on enhancing vocabulary are Information and Communication Technology (ICT), Student-Centered Learning (SCL), Motivational Impact, and Cognitive Development.

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These subjects are of particular interest in this case, as they demonstrate the efficacy of advanced recreation in facilitating more successful, intelligent, and effective vocabulary learning. The incorporation of mechanical highlights, including ease of reach, smarter impressions, and issue changes, has been demonstrated to facilitate the complete replacement of lexicon tasks, thereby rendering them more straightforward and more enjoyable. When these instruments are combined with student-centered principles, such as paying attention to the student's personal inclinations, interests, and autonomy, vocabulary learning becomes more personalized and important. This advanced course combines innovative interactivity, engaging curriculum, and accessibility, thus facilitating an enjoyable and effective learning experience. In the future, research could explore the potential of integrating digital game-based learning with artificial intelligence (AI) to improve vocabulary acquisition in the context of foreign language learning. This integration is particularly relevant in the context of English language education, where technology is undergoing rapid evolution and educators, in particular, are compelled to develop and master technology to create more effective learning experiences.

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