

The Effect of Game-Based Digital Platforms on Iranian EFL Students' Vocabulary Achievement

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ARTICLE INFO

Article History:

Received: September

Accepted: October

KEYWORDS

Digital Game-Based Learning (DGBL)
Educational Technology
Gamification
Vocabulary
Achievement

ABSTRACT

The incorporation of digital game-based learning (DGBL) into English as a Foreign Language (EFL) education has attracted increasing scholarly attention due to its potential to foster learner engagement and improve language achievements. Although numerous studies have documented the general effectiveness of DGBL, limited research has addressed its impact within specific pedagogical frameworks, particularly structured online environments designed for vocabulary instruction. This research investigated the impact of Education.com, a digital game-based platform, on facilitating vocabulary acquisition among Iranian intermediate EFL learners. A quasi-experimental, pre-test–post-test design was implemented with sixty participants randomly assigned to either an experimental group (n = 30), which received vocabulary instruction via Education.com, and a control group (n = 30), which followed conventional paper-based instruction. Group equivalence was confirmed through a Nelson proficiency test and a researcher-developed vocabulary pre-test. After a ten-session treatment, an independent-samples t-test displayed a statistically significant achievement in the experimental group's post-test performance compared to the control group. The results demonstrated that the gamified and interactive affordances of Education.com significantly enhanced vocabulary learning outcomes. These findings underscore the pedagogical value of integrating structured, game-based online platforms into EFL curricula to promote more effective vocabulary achievement.

1. Introduction

In the landscape of global communication, English has solidified its role as the predominant lingua franca, essential for international discourse in business, science, academia, and digital spaces (Ilyosovna, 2020). With an estimated 1.5 billion speakers worldwide, its function as a global language is unequivocal (Eberhard et al., 2019; Crystal, 2001). For English as a Foreign Language learners (EFL), mastering this language necessitates the acquisition of its core components, among which vocabulary is paramount. Vocabulary serves as the foundational building block of linguistic proficiency, critical for developing both receptive (listening and reading) and productive (speaking and writing) skills

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Cite this paper as: Hoseinzade, F. & Khodashenas, M. R. (2025). The effect of game-based digital platforms on Iranian EFL students' vocabulary achievement. *Journal of Research in Techno-based Language Education*, 5(2), 1-11. <https://10.22034/jrtle.2025.558744.1068>

(Brown, 2008; Hastuti, 2020). A learner's lexical resource directly influences their ability to comprehend complex input, express ideas coherently, and engage in meaningful communication (Patisung, 2021). Consequently, the quest for effective and sustainable vocabulary acquisition strategies remains a central concern in EFL pedagogy.

The digital era has profoundly reshaped educational paradigms, offering innovative avenues for language learning. Among these, Digital Game-Based Learning (DGBL) has emerged as a particularly promising approach. DGBL leverages the engaging mechanics of games to create immersive, interactive, and low-anxiety learning environments (Vnucko & Klimova, 2023). Empirical studies demonstrate that game-based motivational affordances, including challenge, immediate feedback, and reward systems like points and badges, can foster positive emotional states and heighten learner engagement. Moreover, based on the findings of their study, Yaghoobi and Kazemi (2023) claim that gaming can be considered the most appropriate instrument in the process of learning speaking skills, especially fluency and accuracy. This heightened engagement, in turn, has been shown to significantly enhance vocabulary retention and acquisition, with DGBL often outperforming traditional, non-digital instructional methods (Vnucko & Klimova, 2023; Zahara, et al., 2025). Online educational platforms that incorporate these gamified principles provide structured yet flexible environments for vocabulary development.

One such platform is Education.com, a comprehensive educational resource offering thousands of learning materials, including a suite of interactive games aligned with standardized curricula. While platforms like Education.com are widely used, their specific impact within defined EFL contexts requires further empirical investigation. This is particularly true in Iran, where the integration of such digital tools is a growing area of interest. Although some studies have explored game-based learning in Iran, they have predominantly focused on younger learners or general game applications (e.g., Ashraf et al., 2014). A conspicuous gap exists in the literature considering the efficacy of structured online platforms, specifically Education.com, on the vocabulary achievement of intermediate-level Iranian EFL learners.

To address this gap, this study aims to examine the effect of using Education.com on the vocabulary achievement of Iranian intermediate EFL learners. It seeks to determine whether the gamified, interactive nature of this platform can significantly enhance vocabulary knowledge and retention compared to more conventional methods. The findings of this study are expected to provide valuable attitudes for EFL instructors, curriculum developers, and educational policymakers in leveraging digital tools to optimize language learning outcomes. The research question addressed in this study is as follows:

RQ: Does the use of game-based digital platforms have any impact on the vocabulary learning of Iranian intermediate-level EFL male learners?

2. Review of the Literature

English has increasingly become the main global language, playing a key role in various areas like education, career growth, and international communication. It serves as the main way to connect across cultures and engage in global economic activities, such as business and related endeavors (Khan et al., 2018). The vital role of vocabulary in learning a second language is well recognized. Schmitt (2008) points out that acquiring vocabulary is a basic part of mastering a language. This has been acknowledged for a long time; Laufer (1986, as cited in Simonnet et al., 2025) states that learning new words is essential for any type of language learning, whether it is a first, second, or foreign language, and regardless of the learner's age. Vocabulary acquisition has been seen as a crucial aspect of learning a second language. Bai (2018) famously states that while limited communication is possible without full grammar mastery, effective communication cannot happen without vocabulary. This emphasizes how important vocabulary is in helping learners convey meaning. Additionally, Asyiah (2017) highlights that knowing vocabulary is closely linked to learners' skills in reading, writing, listening, and speaking. In case of electronic vocabulary learning, Sazegar and Sarsarabi (2022) show a significant difference between the vocabulary learning of EFL students exposed to face-to-face teaching and those exposed to Shaad. A strong vocabulary base not only helps understand various texts but also aids in sentence building and engaging in meaningful discussions.

In the realm of language teaching and learning, Gee (2005) suggests that games act as conceptual frameworks that work well in both formal and informal learning settings. In language education specifically, Warschauer and Healey (1998, as cited in Sørensen & Meyer, 2007) state that games have often been used to boost learner motivation and encourage real communication since they are seen as enjoyable learning tools. These game-based activities create a lively environment where learners and teachers show more enthusiasm for the learning process. Moreover, games have been recognized as an important part of education, providing stimulating experiences and chances for simulated learning.

The term Industry 4.0, or the fourth industrial revolution, is now used to describe the current stage of technological growth, where digital technologies influence nearly all aspects of human life (Castillo-Cuesta, 2022). Regarding vocabulary instruction through technology, many scholars (e.g., Dodigovic, 2005; Yoshii, 2003, as cited in Hajebi et al., 2018) have noted that vocabulary has become one of the most frequently addressed aspects of language through technological tools in recent years. Genc (2012, as cited in Hajebi et al., 2018) similarly argued that quick and transformative developments in computer technology have affected nearly every area of language learning for over twenty years, particularly in vocabulary acquisition. Genc (2012, as cited in Hajebi et al., 2018) states that reading skills and vocabulary development are among the areas most influenced by these technological advancements.

Gorjian et al. (2011) claim that developments in vocabulary instruction reflect broader changes occurring in other knowledge domains and advances in connected technologies. They also argue that these technological changes have led to virtual environments mainly designed to support real-time learning rather than delayed interactions, enabling learners to connect with each other instantly. From this viewpoint, technology can be seen as a useful tool that improves both teaching and learning of vocabulary in a second language. Long and Doughty (2009) also argue that technology can enhance the quality of linguistic input, provide effective feedback, and equip learners with important digital skills that help with vocabulary acquisition in a second language.

The rapid growth of science and technology has greatly impacted many areas of human life, including education. One method that has gained prominence is digital games (Almukahhili, 2022). For games to work well as teaching tools, they must be designed to challenge and motivate learners, generating lasting interest. Educational games combine learning content with interactive formats, allowing students to engage directly with materials embedded in the game environment (Chien, 2019). Evidence shows that game-based instruction can lead to better learning outcomes and increased enthusiasm among students studying English (Wu et al., 2024). Additionally, Ahmadpour et al. (2022) reveal that students show positive attitudes toward using game-based tasks in EFL classes.

Online games, which are interactive digital games played by people in different locations via the internet, expose learners to various languages (Harun & Arsyad, 2020). Their popularity comes from features that make gaming more appealing than traditional learning, prompting many students to engage with online games daily. Nugrahani et al. (2019) emphasize that well-designed instructional media can boost learner motivation and encourage active participation in the classroom. Khasanah (2025) indicates that online games can positively impact the learning of English vocabulary, making them potentially valuable for English instruction. Beyond fun, these games provide meaningful chances for incidental language learning. Similarly, Figna et al. (2020) highlight that web-based learning platforms work as effective instructional media that can turn passive learners into active participants. By presenting abstract concepts in clearer, visually-supported formats, these tools help improve understanding and promote more effective transmission of content both in and out of the classroom.

The use of online games in education has grown significantly in recent years. Efendi (2013) describes combining games with education as “edutainment,” where entertainment is mixed with learning goals. Research by Rosydiyah et al. (2022) and Sipayung (2018) shows that learners who study English grammar or vocabulary through online games often demonstrate more positive attitudes, higher motivation, and greater engagement. Hou (2011) describes educational online games as supplementary tools that can reinforce traditional grammar and vocabulary teaching methods. Seli (2015) further notes that using games in language instruction can simplify complex language concepts, making them clearer and promoting more dynamic interactions between teachers and students. Calvo-Ferrer (2017) asserts that online games encourage learners to take charge of their own language development. Al-Eqabi and

Alnoori (2021) support the use of educational online games as tools that enhance traditional methods. Hou (2011) points out that the fast pace of online games pushes learners to process information quickly and accurately, which may speed up vocabulary acquisition. Therefore, teachers need to find ways to make the gaming experience enjoyable while ensuring learners benefit linguistically. As Seli (2015) suggests, vocabulary instruction should be engaging and rooted in familiar contexts, and integrating online games provides an innovative way to accomplish this while boosting motivation and participation.

Overall, these studies show that online games act as a strong tool for developing vocabulary by promoting motivation, creativity, engagement, and learner confidence. By incorporating new words into interactive and contextual game experiences, online games improve both the cognitive and emotional aspects of learning a language. This approach shows great potential for various English as a Foreign Language (EFL) context, including beginner-level learners in Iran, where research on game-based vocabulary instruction is still limited.

3. Method

3.1. Study Design

This research employed a quasi-experimental, pre-test/post-test design with a control group to examine the impact of a digital game-based learning platform on vocabulary achievement. This design allowed for the comparison of vocabulary gains between an experimental group, which received instruction via the Education.com platform, and a control group, which received conventional, textbook-based vocabulary instruction. This design was chosen because it offers a methodologically robust approach for evaluating educational interventions in real classroom contexts where random assignment is not feasible (Campbell & Stanley, 1963; Mackey & Gass, 2016).

3.2. Participants and Setting

The participants consisted of 60 intermediate-level EFL (aged 18–30) recruited from an English Language Institute in Mashhad, Iran. A purposive sampling strategy was adopted because the study required learners with a clearly defined proficiency level to ensure the suitability of the instructional intervention. Accordingly, the Nelson Proficiency Test was administered to all participants as a standardized screening instrument to establish a participant pool with a uniform level of English proficiency. The use of purposive sampling in conjunction with proficiency screening reduced variability attributable to pre-existing linguistic differences rather than to the intervention itself, thereby enhancing the internal validity of the study. Following the homogenizing phase, the 60 learners were randomly assigned to two groups: an experimental group ($n = 30$) and a control group ($n = 30$). The selection of 30 participants per group was guided by methodological recommendations for quasi-experimental research, which indicate that group sizes of approximately 25–30 participants provide adequate statistical power for detecting medium-sized effects and yield stable estimates of treatment outcomes (Cohen, 1988; Mackey & Gass, 2016).

3.3. Instrumentation

Three instruments were employed in this quasi-experimental study to collect the required data. These data collection tools are as follows.

3.3.1. The Nelson Proficiency Test (Series 400A). The test was administered to determine participants' general English proficiency and ensure their suitability for inclusion at the intermediate level. This standardized test comprised 50 multiple-choice items evaluating grammar, vocabulary, and reading comprehension, with one point assigned for each correct response, yielding a total possible score of 50. Following the test manual's guidelines, a 30-minute time limit was applied. The Nelson Test has been widely validated and frequently used in EFL research due to its strong psychometric properties and its reliability in classifying proficiency levels (Hughes, 2003).

3.3.2. A researcher-developed multiple-choice vocabulary pre-test. This test that included 20 items, was administered to both groups prior to the intervention. The items were derived from the target lexical sets included in the instructional material (Evolve 3), ensuring close alignment between

instructional content and assessment tasks. Each item consisted of a stem followed by four response options, one of which was correct. Scoring followed a dichotomous scheme (1 = correct, 0 = incorrect), yielding a maximum score of 20. The difficulty level of the items was determined through expert review by two TEFL teachers, consistent with standard procedures for content validation (Alderson, et al., 1995). Reliability evidence was established through internal consistency analysis, with Cronbach's alpha yielding a coefficient of 0.82, indicating acceptable reliability for research purposes (DeVellis, 2017). Face and content validity were further supported by expert judgment confirming that the items appropriately measured the intended vocabulary constructs.

3.3.3. A parallel multiple-choice vocabulary post-test. The test, which contained 20 items, was administered after the instructional treatment to measure vocabulary gains. Constructed according to the same specifications and difficulty level as the pre-test but using alternative wording to reduce memory effects, this test provided a comparable measure of participants' mastery of the target lexical items. Scoring procedures mirrored those of the pre-test, and the assessment was completed within a 20-minute time frame. The post-test also demonstrated strong internal consistency, with a Cronbach's alpha of 0.84. As with the pre-test, expert review ensured content validity, and the use of parallel forms strengthened the overall validity of the measurement of vocabulary acquisition (Bachman & Palmer, 2010).

3.4. Procedure

The study procedure spanned ten instructional sessions (75 minutes per session) and followed a uniform structure for both groups to ensure methodological rigor. After administering the Nelson Proficiency Test, all the participants were randomly assigned to either the experimental or control group. Prior to instruction, all participants completed the researcher-developed vocabulary pre-test to establish baseline knowledge of the target items. The intervention for both groups focused on the same set of 80 target vocabulary items drawn from the course book (Evolve 3). These items were selected based on three criteria: (a) their relevance to the learners' curriculum, (b) their alignment with the CEFR lexical descriptors, and (c) their mid-range frequency levels according to the British National Corpus (BNC) or Corpus of Contemporary American English (COCA) word lists to ensure appropriate difficulty. Instructional time was carefully standardized so that both groups received equal time-on-task across the ten sessions. The experimental group was instructed using the Education.com digital platform, where the selected vocabulary was practiced through interactive games and activities offering immediate feedback. These tasks were mapped directly onto the target words and sequenced to match the pacing of the textbook content. In contrast, the comparison group was taught the same vocabulary items using conventional, paper-based instruction consistent with typical classroom practice at the institute, including sentence-based presentation, reading passages containing the target items, and written vocabulary exercises; no digital or gamified tools were used. Following the intervention, the parallel-form vocabulary post-test was administered to both groups under identical testing conditions to measure and compare gains in vocabulary acquisition.

4. Results

The quantitative data set derived from the pre-test and post-test administrations was subjected to analysis using the Statistical Package for the Social Sciences (SPSS). An independent samples t-test was planned to compare the post-test scores of the two groups, ensuring that any observed difference in vocabulary achievement could be attributed to the differential treatment (the intervention).

Table 1
Tests of Normality for Pre-test Scores

	Statistic	Sig.	Statistic	Sig.
Experimental	.161	.045	.947	.137
Control	.131	.197	.965	.409

Prior to the main analysis, preliminary assumption checks were conducted to ensure the appropriateness of parametric tests. Normality for the pre-test scores of both groups was evaluated using the Kolmogorov-Smirnov and Shapiro-Wilk tests. As presented in Table 1, the results of the Shapiro-Wilk test, which is considered more powerful for small sample sizes, were non-significant for both the experimental ($W = .95$, $p = .137$) and the control ($W = .97$, $p = .409$) groups. The absence of a significant deviation in the pre-test scores confirms that the assumption of normality was met for both groups. Although the Kolmogorov-Smirnov test was significant for the experimental group ($D = .16$, $p = .045$), given the robustness of parametric tests like the t-test to minor violations of normality, especially with equal sample sizes, and the non-significant Shapiro-Wilk result, both sets of pre-test data did not significantly deviate from normality. Therefore, parametric tests were deemed appropriate for subsequent analyses. Moreover, the assumption of normality was also assessed for the post-test scores prior to conducting inferential analyses. Table 2 presents the outcomes of the Kolmogorov-Smirnov and Shapiro-Wilk normality tests.

Table 2
Tests of Normality for Post-test Scores

Group	Kolmogorov-Smirnov		Shapiro-Wilk	
	Statistic	sig.	Statistic	Sig.
Experimental	.187	.009	.937	.076
Control	.158	.053	.945	.127

As shown in Table 2, the Shapiro-Wilk test, which is prioritized for sample sizes below 50, was non-significant for both the experimental group ($W = .94$, $p = .076$) and the control group ($W = .95$, $p = .127$). This indicates that the distribution of post-test scores for both groups did not significantly deviate from normality. While the Kolmogorov-Smirnov test was significant for the experimental group ($D = .19$, $p = .009$), this is a known sensitivity of the test with larger sample sizes. Given the primary reliance on the Shapiro-Wilk test and the robustness of parametric procedures like the independent samples t-test to minor violations of normality, particularly with equal group sizes, the assumption of normality was considered met for the post-test data. This justifies the subsequent use of parametric tests to compare the groups' post-intervention performance. Table 3 summarizes the pre-test and post-test scores for both groups through descriptive statistics, namely the means and standard deviations.

Table 3
Descriptive Statistics for Pre-test and Post-test Scores by Group

Group	Test	Mean	Std. Deviation	N
Experimental	Pre-test	14.53	1.63	30
	Post-test	16.43	1.17	30
Control	Pre-test	14.47	1.76	30
	Post-test	15.53	1.31	30

As shown in Table 3, the mean pre-test scores for the experimental group ($M = 14.53$, $SD = 1.63$) and the control group ($M = 14.47$, $SD = 1.76$) were very similar, indicating a comparable baseline level of vocabulary knowledge prior to the intervention. Following the intervention, both groups demonstrated an increase in their mean scores on the post-test. The experimental group, which utilized the Education.com platform, showed a mean post-test score of 16.43 ($SD = 1.17$). The control group, which received conventional instruction, attained a mean post-test score of 15.53 ($SD = 1.31$). Paired-samples t-tests were conducted to assess the statistical significance of the difference in vocabulary improvement (Experimental: 1.90; Control: 1.07), with the results detailed in Table 4.

Table 4
Results of Paired-Samples T-Tests for Pre-test and Post-test Scores

Group	Mean Difference	SD	95% CI of the Difference		t	df	p-value
			Lower	Upper			
Experimental	-1.90	0.80	-2.20	-1.60	-12.96	29	<.001
control	-1.07	1.01	-1.45	-0.69	-5.76	29	<.001

Statistical analysis using a paired-samples t-test confirmed a significant gain in vocabulary scores within the experimental group, $t(29) = -12.96$, $p < .001$. The mean increase was 1.90 points (95% CI [-2.20, -1.60]). Similarly, a significant increase was also found for the control group, $t(29) = -5.76$, $p < .001$, with a mean gain of 1.07 points (95% CI [-1.45, -0.69]). These results confirm that both instructional methods were effective in significantly improving learners' vocabulary knowledge over the course of the intervention. However, the magnitude of the within-group improvement was notably larger for the experimental group ($M = 1.90$) than for the control group ($M = 1.07$). This preliminary finding suggests that while traditional instruction is effective, the digital game-based learning approach may have provided a more potent intervention for vocabulary acquisition. The smaller standard deviation for the experimental group's gain scores (0.80 vs. 1.01) further indicates that the improvement was more consistent across learners in this group. The critical test to determine if the *difference* in effectiveness between the two methods is statistically significant is provided by the subsequent independent samples t-test on the post-test scores. To test the hypothesis of superior vocabulary gains in the experimental group, an independent-samples t-test was performed on the post-test data.

Table 5
Results of Independent-Samples T-Tests for Pre-test and Post-test Scores

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
pretest	Equal variances assumed	.180	.673	.152	58	.880	.06667	.43804	-.81016	.94350
	Equal variances not assumed			.152	57.702	.880	.06667	.43804	-.81026	.94359
posttest	Equal variances assumed	.326	.570	2.817	58	.007	.90000	.31954	.26037	1.53963
	Equal variances not assumed			2.817	57.260	.007	.90000	.31954	.26019	1.53981

Levene's test confirmed the homogeneity of variances for both the pre-test ($F = 0.18$, $p = .673$) and post-test scores ($F = 0.33$, $p = .570$), supporting the assumption of equal variances between groups at both baseline and for the primary analysis. An independent-samples t-test established no statistically significant difference in pre-test scores between the experimental group ($M = 14.53$, $SD = 1.63$) and the control group ($M = 14.47$, $SD = 1.76$) prior to the intervention, $t(58) = 0.15$, $p = .880$. This confirms the initial equivalence of the two groups. The independent-samples t-test provided robust support for the primary hypothesis, revealing a statistically significant difference in post-test scores ($p = .007$). This finding indicates that the digital game-based learning platform (Education.com) constituted a more

effective pedagogical tool for enhancing vocabulary achievement among intermediate Iranian EFL learners than traditional, paper-based methods.

5. Discussion

The present study investigated the effectiveness of the *Education.com* online platform as a digital game-based learning (DGBL) tool for enhancing vocabulary acquisition among Iranian intermediate EFL male learners. The findings demonstrated that although both the experimental and control groups showed significant vocabulary gains from pre-test to post-test, learners who engaged with *Education.com* outperformed those who received traditional paper-based instruction. This pattern indicated that DGBL environments can provide more substantial learning benefits than conventional pedagogical methods in similar EFL contexts.

The results align with a growing body of research highlighting the pedagogical value of game-mediated vocabulary learning. Consistent with the present findings, Ashraf et al. (2014) and Rahimi and Sahragard (2012) reported that DGBL environments significantly improve lexical development by providing repeated exposure, immediate feedback, and motivational affordances unavailable in textbook-based instruction. Similarly, Chen and Li (2010) found that interactive digital games enhanced learners' vocabulary retention more effectively than non-interactive tasks, attributing this advantage to increased learner engagement and the cognitive benefits of multimodal input.

At the same time, the magnitude of the learning gains observed in the current study is comparable to those documented in meta-analytic research. For example, Yip and Kwan (2006) and Hung (2015) concluded that digital games yield moderate to large effect sizes on vocabulary development, particularly when integrated as a structured component of instruction rather than as supplementary practice. The current findings supported this conclusion, as participants in the experimental group were systematically exposed to game-based tasks aligned with their proficiency level and target word set.

However, the present results diverged from some studies that reported limited or non-significant advantages of DGBL. For instance, deHaan (2005) and Rankin et al. (2008) found no significant vocabulary improvement attributable to gaming environments, arguing that high cognitive load or task complexity may detract from learners' focus on linguistic forms. The stronger outcomes in the current study may be attributed to the pedagogically designed structure of *Education.com*, which employs simple interfaces, controlled vocabulary tasks, and incremental difficulty, all of which are known to reduce extraneous cognitive load and promote target-form processing.

6. Conclusion

This study investigated the effectiveness of the *Education.com* online platform as a digital game-based learning (DGBL) tool for improving vocabulary acquisition among Iranian intermediate EFL learners. The results offered strong empirical support for the pedagogical value of DGBL in vocabulary instruction. Although both the experimental and control groups exhibited statistically significant progress from pre-test to post-test, indicating that vocabulary learning occurred under both instructional conditions, the magnitude of improvement differed substantially. Learners in the experimental group, who engaged with interactive, game-based activities, demonstrated significantly greater gains than those taught through traditional, paper-based methods. Their post-test performance was not only statistically superior but also reflected a more consistent pattern of achievement across individuals, suggesting enhanced depth of processing and retention of the target lexical items. These findings underscored the capacity of digital game-mediated environments to promote active engagement, immediate feedback, and repeated, meaningful exposure to vocabulary, factors that likely contributed to the superior learning outcomes observed. Overall, the evidence indicated that the integration of platforms such as *Education.com* can meaningfully enhance vocabulary learning in EFL contexts, offering a viable and pedagogically sound alternative to conventional instructional approaches.

Despite the promising results, several limitations should be acknowledged. First, the study was conducted with a relatively small, gender-homogeneous (males) sample drawn from a single private language institute, which limits the generalizability of the findings to broader or more diverse learner populations. Second, the intervention period was limited to ten sessions, restricting the ability to assess long-term retention or transfer of vocabulary knowledge beyond the immediate post-test. Third, the

study focused exclusively on receptive vocabulary knowledge as measured by multiple-choice tests; productive vocabulary gains or more complex lexical competencies were not examined. Additionally, only one digital platform was used, preventing direct comparison across different types of DGBL tools or instructional technologies. Finally, although efforts were made to equate instructional time and content across groups, classroom dynamics, instructor interaction, and learners' prior experience with digital tools may have influenced the outcomes.

The results of this study carried both theoretical and practical implications. Theoretically, they lent robust support to the growing body of literature on DGBL (e.g., Vnucko & Klimova, 2023), confirming that the principles of gamification—such as interactivity, immediate feedback, and a compelling reward structure—can effectively be translated into tangible vocabulary learning gains in an EFL context. The heightened engagement and motivation inherent in the game-based environment appear to facilitate deeper cognitive processing and more durable retention of lexical items.

From a practical standpoint, this research offered valuable insights for EFL practitioners, curriculum designers, and educational policymakers in Iran and similar contexts. It strongly suggested that integrating structured, educational online platforms like Education.com into existing language curricula can significantly enhance vocabulary instruction. Educators are encouraged to move beyond traditional methods and adopt these digital tools to create more dynamic, student-centered learning experiences that cater to the digital proclivities of modern learners.

Building upon these findings, future research could explore the long-term retention of vocabulary acquired through digital game-based learning using delayed post-tests. Investigations could also be extended to assess the impact on other language skills, such as grammatical accuracy or writing fluency. Furthermore, examining the efficacy of this approach with different learner demographics, including varying proficiency levels, age groups, and cultural contexts, would help establish its generalizability. Subsequent investigations could productively examine the mediating effects of psychological variables (e.g., motivation, anxiety) and conduct comparative analyses of educational platforms to isolate the most impactful game-based learning principles.

Acknowledgments

We would like to express our sincere gratitude to all EFL learners who participated in the process of data gathering for the study.

Declaration of Conflicting Interests

The authors declare that there are no conflicts of interest regarding the publication of this article.

Funding

The authors declare that no funding was received for this study.

Declaration of AI-Generated Content

During the preparation of this manuscript, the authors used Grammarly to assist with grammar and sentence-structure revision. All text was subsequently reviewed and edited by the authors.

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