

The Effectiveness of Computerized Game-based Learning Tools in Teaching English Idioms in Virtual Classrooms

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Abstract: Teaching idiomatic expressions effectively remains a challenge in EFL contexts. Game-based learning has emerged as a way to increase learner engagement and improve language learning outcomes. The present study examined the effectiveness of computerized game-based learning in teaching English idioms to EFL learners through interactive digital activities and games in a fully virtual classroom. Three types of computerized games were designed and implemented: a story-based adventure game entitled The Lost Map, an interactive Wordwall, and Graphics Interchange Format-based GIF-based visual games. The participants were 120 EFL learners selected from English language institutes and private schools. They were divided into three experimental groups and one control group. While the experimental groups received idiom instruction through computerized gamified activities, the control group was taught through conventional instructional methods. ANOVA results on idioms comprehension ($F_{(3, 119)} = 18, P < .001$) and idioms production ($F_{(3, 119)} = 41.42, P < .001$) suggested significant differences among the groups and pairwise comparisons showed that the three game groups did not differ significantly from each other, although they all outperformed the control group. Overall, computerized game-based learning proved to be quite effective for enhancing idiom learning in EFL contexts. The study suggests that integrating computerized gamified activities into EFL instruction can provide a more engaging and effective environment for teaching idiomatic expressions.

Keywords: Computerized Game-based Learning, GIF-based Games, Idiom Teaching, The Lost Map, Wordwall.

Introduction

In recent decades, the role of technology in language education has significantly increased (Harsha Vardhin, 2023). Technology-enhanced instruction, including blended learning, Mobile Assisted Language Learning (MALL), Computer-Assisted Language Learning (CALL), and online tools, have become widely used in English as Foreign Language (EFL) contexts (Alahmadi et al., 2023; Casanova & Moreira, 2017; Zain & Bowles, 2021). Among these, game-based learning has gained attention for increasing engagement and motivation (Ahmed et al., 2022; Zhang & Hasim, 2023). Research shows that game-based learning improves motivation, emotional engagement, and learning performance, and reduces learner anxiety (Lou, 2024; Zuhri et al., 2025).

Digital tools have created new opportunities for teaching complex language features such as idioms. Idiomatic expressions are considered to be among the most difficult areas in language learning because of their figurative and culturally embedded meanings (Hajiyeva, 2024; Vnucko & Klimova, 2023). Although learners may improve in grammar and vocabulary, they still struggle with

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understanding authentic language use in real communication (Chacón, 2022). Therefore, idioms require equal attention alongside other language components (Hajiyeva, 2025).

Idioms are fixed expressions whose meanings cannot be understood literally and are essential for fluency and native-like competence (Suhodolli, 2019). However, they are often taught through memorization and translation, which limits meaningful learning and real communication. Idioms are essential for communicative fluency and cultural understanding (Liontas, 2017), yet they have long been neglected in language teaching due to their perceived complexity (Shahidipour, 2025). Game-based learning has been shown to increase motivation, engagement, and learner participation through rewards, feedback, and competition (Chan & Lo, 2024). It also supports shy learners by increasing interaction in digital environments (Sadeghi et al., 2022). Therefore, it is hypothesized that game-based learning tools could facilitate the learning of idioms.

This study is significant because it compares three different computerized games (games played through the use of computers) to identify which one is most effective on idiom learning in virtual classrooms. It contributes to CALL and game-based learning research by providing empirical evidence on idiom comprehension and production. Practically, it helps teachers, curriculum designers, and institutions select more effective digital tools for teaching idioms in online EFL contexts (Laksanasut, 2025). This study focuses on three computerized games for idiom learning: The Lost Map (story-based serious game), Wordwall (interactive quizzes with feedback and competition), and GIF-based games (visual animation-based learning) in terms of their effects on idiom comprehension and production. Despite growing research on game-based learning, several gaps remain (Huang et al., 2022; Zhang & Crawford, 2024). Most studies focus on vocabulary and grammar rather than idioms. In addition, game-based learning is often treated as a general concept without comparing different game types. Limited research has examined idiom learning in fully virtual classrooms. Furthermore, most studies focus on motivation and engagement rather than actual idiom comprehension and production outcomes (Gupta & Goyal, 2022; Laksanasut, 2025).

Literature Review

Idioms are context-dependent and culturally grounded expressions whose meanings require more than literal interpretation (Kyriacou & Köder, 2024). They are now considered essential for communicative competence and language fluency (Danilina, 2025). Recent cognitive and psycholinguistic studies view idioms as meaningful linguistic units influenced by metaphor, metonymy, familiarity, frequency, and cross-linguistic similarity (Alasgarova et al., 2025). Repeated exposure supports long-term retention (Ciocan, 2025; Lacroix et al., 2024). In addition, recent studies emphasize that idiom learning is not only a lexical issue but also a conceptual one, requiring learners to build mental representations that connect language input with embodied experience and cultural knowledge (Flor et al., 2025).

From a Cognitive Linguistics perspective, one of the theoretical frameworks of this study, idioms are meaningful conceptual units rather than arbitrary expressions. Visual and contextual support, conceptual grouping, and Multi-Word Units (MWUs) facilitate idiom comprehension and fluency (Karim & Fatah, 2022; Kyriacou et al., 2022; Mayer, 2021). However, MWUs remain insufficiently represented in language instruction (Owusu Debrah & Issaka, 2025). Furthermore, research shows that processing idioms as chunks reduces cognitive load and supports automatization in second language acquisition, which is particularly important for learners at intermediate and upper-intermediate levels who aim for fluency rather than word-by-word decoding (Sadeghi et al., 2022).

Metaphor-based instruction improves idiom comprehension and production, while L1 comparison strategies enhance learner understanding (Dai et al., 2023; Yu & Boers, 2023). However, a gap remains between theoretical models and practical idiom instruction (Chen et al., 2022). This gap is particularly evident in classroom settings where idioms are still often taught through rote memorization rather than conceptual mapping or context-based learning strategies, limiting learners' ability to transfer knowledge to real communication.

Another theoretical framework of the study is Dual Coding Theory. Multimodal approaches integrating visual, auditory, and contextual input can enhance idiom learning (Kalamatova, 2024). Role-play, gestures, and interactive multimodal tasks improve retention and comprehension (Wooten & Cuevas, 2024). However, many multimodal approaches remain teacher-centered and lack digital interaction (Maier & Klotz, 2022). Recent research suggests that learner-centered multimodal environments, especially those supported by digital tools, significantly increase engagement by providing immediate feedback and interactive participation opportunities (Cui & Yang, 2023; Denden et al., 2025).

Meanwhile, game-based learning has become an important approach in digital education because it increases engagement, participation, and motivation. Digital environments support interaction and collaborative learning (Alahmadi et al. 2023; Kang & Lou, 2022; Marashi & Ahmadi, 2026; Sivakumar et al., 2023; Triantafyllou & Sapounidis, 2023). Effective game-based learning depends on appropriate instructional design that balances intrinsic and extrinsic motivation through meaningful mechanics such as feedback, challenges, and levels (Cui & Yang, 2023; Denden et al., 2025; Gao, 2024; Li et al., 2024). Games and digital platforms support language learning by increasing motivation, reducing anxiety, and promoting repetition and contextual learning (Temel & Cesur, 2024; Zhang & Hasim, 2023). Multimedia games combining visual and textual information improve idiom comprehension, while serious games provide immersive and problem-solving environments (Leo & Rajkumar, 2025). In addition, game-based learning is increasingly viewed not just as a motivational tool but as a pedagogical framework that shapes learner behavior, engagement patterns, and long-term knowledge retention when properly aligned with instructional objectives (Gao, 2024; Sangtarash & Heidari, 2026; Triantafyllou et al., 2025). The present study focuses on three game types: serious games (The Lost Map), Wordwall activities, and GIF-based multimedia games (Leo & Rajkumar, 2025; Skenderi & Ejupi, 2024). These three categories represent different levels of cognitive engagement, ranging from structured drill-based learning to narrative-driven immersive experiences and visually enhanced input-based learning (Leo & Rajkumar, 2025).

Despite the growth of game-based learning research, most studies have focused on vocabulary and grammar rather than idioms, and few have compared different types of computerized games for idiom learning (Gupta & Goyal, 2022; Van Rij et al., 2024). Empirical studies show that game-based learning improves motivation, engagement, and learning outcomes across different educational contexts (Gini et al., 2025; Kim, 2024; Swacha & Szydłowska, 2023; Zeybek & Saygi, 2024). In EFL settings, game-based learning has been found to improve language skills and learner motivation, although excessive competition may negatively influence some learners (Shen et al., 2024). This suggests that while game-based learning is generally beneficial, its effectiveness is highly dependent on design choices, learner characteristics, and the balance between competition and collaboration (Zeybek & Saygi, 2024).

Studies on gamified language platforms indicate that tools such as Kahoot and Quizizz improve grammar learning, engagement, and collaboration (Ardi & Rianita, 2022; Koç & Sütçü, 2023). Ahmed et al. (2022) demonstrated that quizzes, puzzles, and storytelling activities effectively improved idiom comprehension, while Laksanasut (2025) reported positive effects of gamified tools on idiom retention and motivation. However, these studies often focus on short-term outcomes and do not sufficiently address long-term retention or productive use of idioms in communicative contexts (Ahmed et al., 2022; Laksanasut, 2025).

Research on Wordwall has shown significant improvement in vocabulary, grammar, participation, and learner motivation, although some studies have reported limitations related to duration and technical issues (Han & Huyen, 2025; Pelangi et al., 2025; Salsabila & Budianto, 2023). Moreover, most Wordwall-based studies have been conducted in controlled classroom environments, limiting generalizability to fully virtual or self-directed learning contexts (Han & Huyen, 2025; Salsabila & Budianto, 2023).

Similarly, GIF-based and multimedia learning have shown positive effects on engagement and language development. GIFs, animated images, and visual materials improve vocabulary

retention, grammar learning, and learner motivation (Lou, 2024; Soltani & Mohseni, 2024; Tavanapour et al., 2022; Tsymbal & Skrypnik, 2021; Zou & Teng, 2023). These findings align with the Dual Coding Theory, suggesting that a combination of verbal and visual input enhance learning and remembering, particularly for abstract or figurative language (Mayer, 2021; Tavanapour et al., 2022).

The major theoretical frameworks of the study including the cognitive linguistics perspective and the dual coding theory suggest that when game-based learning is incorporated into idioms instruction, the results are expected to be better than the conventional decontextualized teaching of idioms. However, the question still remains whether different idioms teaching games, especially when they are computerized, would affect idioms learning differentially. Overall, previous research confirms that game-based learning, digital games, Wordwall, and multimedia tools enhance language learning. However, limited studies have examined their effectiveness in idiom instruction, particularly in virtual EFL environments. Therefore, the present study addresses this gap by comparing different types of computerized games to improve idiom comprehension and production. This comparative approach contributes to existing literature by providing pedagogically grounded evidence on which type of game-based learning environment is most effective on idiom learning in digital classrooms (Denden et al., 2025; Triantafyllou & Sapounidis, 2023; Zhang & Hasim, 2023). Given these gaps, the aim of this study is to answer these questions:

Research Question One: Are there any significant differences among the three games (The Lost map, Wordwall and GIF-based) in terms of idiom comprehension?

Research Question Two: Are there any significant differences among the three games (The Lost map, Wordwall, and GIF-based) in terms of idiom production?

Methodology

Design of the Study

This study was a quantitative study with a pre-test and two post-tests, three experimental groups, and a control group. It was a quasi-experimental study because participants were not randomly selected, although their assignment to the experimental conditions was random. The initial selection was done through convenience sampling largely based on availability and willingness to participate. However, each participant was assigned to one of the treatment conditions on a random basis.

Participants

The participants of this study were upper-intermediate (B2) learners of English, including 120 B2 learners of both genders from private institutes and schools in Tehran. They participated voluntarily through online announcements, social media groups, and academic networks. All the participants were Iranian L2 learners whose first language was Persian. Table 1 summarizes their characteristics.

Table 1

Distribution of Participants Across Study Groups

Group	Treatment Condition	Number of participants
Experimental Group 1	The Lost Map Game	30
Experimental Group 2	Wordwall Activities	30
Experimental Group 3	GIF-based Games	30
Control Group	Traditional Instruction	30

Instruments

Oxford Quick Placement Test (OQPT)

OQPT was used at the beginning of the study to make sure that all the participants had a similar level of English proficiency and to homogenize them. This test consists of three sections and 60 items. Those students who scored in the range of 37-47, corresponding to an upper-intermediate level, were selected.

Idiom Tests

To measure the learners' knowledge of idioms, the current study employed three researcher-designed idiom tests: a pre-test given before the treatment, and two post-tests, which were given after the instructional period. The pre-test included 120 contextualized idioms in which each idiom was underlined, and the participants were asked to write the meaning of the idiom in Persian. This was basically a screening test the purpose of which was to see which idioms were familiar so they would be removed from the list of the target idioms. The receptive post-test contained 30 items in different multiple-choice formats; ten items were meaning recognition, 10 items were sentence completion, 5 items were situation-based comprehension items, and 5 items were dialogue-based ones. Each correct answer was given one point, so the maximum score of the test was 30. Since the test was completely based on the idioms instructed during the treatment, its content validity could be taken for granted. Still, its content validity was confirmed through expert opinion; two experts in the field confirmed its validity. Its reliability was estimated using the KR-21 formula, and the result showed an index of .78. Another 30-item test was given as a productive post-test in fill-in-the-blanks format to measure the participants' productive knowledge of idioms. For each item, the students were awarded one point only if they wrote the correct idiom, making the total possible score of the test 30. The content validity of this test was also confirmed through expert opinion, and its reliability was checked through Cronbach's alpha, which yielded a reliability index of .74. The total allocated time for each test was 60 minutes, and clear guidance was given to all the participants to ensure they understood how to respond.

Instructional Materials

The present researchers used 'English Idioms in Use', upper intermediate level, and 'Speak English Like an American'. These books have clear explanations, examples, and some activities that are suitable for common English idioms. Additionally, they used researcher-made instructional resources, such as PowerPoint slides, sample dialogues, short texts, and real-life usage examples. These materials were used during instruction to support the learners' understanding through various examples. A central part of this research was the use of three different computerized idiom games, each implemented for one experimental group.

Data Collection and Analysis Procedures

The researchers selected 120 upper-intermediate learners from several schools and private language institutes in Tehran. The OQPT was used to check the general English level of the participants and to homogenize them. These students were contacted to invite volunteers for the study, and from among these interested learners, those who scored within the B2 range on the OQPT test were selected. Each participant was then randomly assigned to one of the treatment conditions. The idiom pre-test was given to ensure the novelty of the target idioms, and if more than 5% of the participants were familiar with an idiom, it would not be included in the posttests. Therefore, the remaining idioms were those that were unfamiliar to more than 95% of the participants, guaranteeing baseline equivalence. The instruction was implemented over a 12-session online semester, lasting approximately six weeks, two sessions per week. The duration of each session was 60 minutes on Google Meet, which allowed the

instructor to share screens, monitor students' progress, and guide learners through each activity. There were 30 learners in each group. All groups were taught the same target idioms by the same teacher (the first author). The instructional materials were also the same; however, the instructional technique was different. Each session, an average of 10 idioms were presented in about 30 minutes, and all groups had another 30 minutes to practice the newly learnt idioms. At the end of the 12 sessions, all the learners took the idiom post-tests, each with its own purpose.

The Lost Map

This group received idiom instruction through a researcher-designed adventure-style computerized game, the Lost Map. The learners were divided into groups, and the game provided learners with some challenges and placed them in a story-based environment. The game provided learners with a storyline in which the main character had to find a missing treasure map, and at each stage, the students were expected to understand and apply idioms correctly in order to unlock clues and advance to the next location; for instance, the students read a short scene: The village leader tells you, 'Do not worry, finding the map *is a piece of cake*'. What does it mean? Students choose the correct meaning to unlock the next scene. Another example can be an adventure choice, like: students choose the correct idiom in a dilemma: 'your friend tells you not to *make a mountain out of a molehill*. What should you do? A) Stop exaggerating B) Run away from the scene C) stop killing little creatures'.

Wordwall

This group of learners learned idioms through interactive games on Wordwall, which emphasized recall and repeated practice. During these games, learners received immediate feedback. Two teams competed in a Wordwall race game. The game showed two characters running on a track: team A (blue) and team B (red). The question was: select the alternative showing the meaning of the idiom *break the ice*. A) Ignore someone B) Get angry C) Start a conversation. If team A selected the correct meaning first, their character ran 3 meters ahead; if team B was incorrect, they fell behind; if both teams pressed their choice simultaneously, the character moved forward 2 steps.

GIF-based Multimedia

In this group, idioms were taught through meaningful, humorous, or exaggerated animations. Students looked at 3 GIFs in a sequence and chose the idiom that was suitable and described the situation. Students chose a GIF and wrote a short sentence using the idiom correctly. During this game, students benefited from visual memory, increased engagement, and stronger comprehension.

Control Group

This group received conventional online instruction through explanation, examples, and discussions without gamified elements. The teacher introduced each target idiom by providing its definition, literal meaning, and figurative meaning. The cultural background was explained when needed. After the explanation, the researcher presented several example sentences showing how each idiom is used in different contexts. Students were asked to analyze the meanings of idioms in additional sentences provided by the teacher, and the teacher provided corrective feedback immediately after responses. In order to answer each research question, a one-way ANOVA was used to compare the post-test idiom scores of the groups.

Results

Before conducting the main statistical analyses, the assumptions of normality and homogeneity of variances were checked to ensure that the use of ANOVA was appropriate. The assumption of normality was checked using the Kolmogorov-Smirnov test. As shown in Table 2, the results for all

groups on both idiom comprehension and production were non-significant, indicating the data were normally distributed.

Moreover, Levene's test for homogeneity of variances for idiom comprehension (Levene Statistics (3, 116) = .385, $p=0.764 > .05$) and idiom production (Levene Statistics (3,116) = 1.124, $p=.343 > .05$) indicated that the assumption of equal variances was also met.

Table 2

Test of Normality for Idiom Comprehension and Production

	Group	Kolmogorov-Smirnov ^a		
		Statistic	df	Sig.
Idiom Comprehension	1	.106	30	.200
	2	.156	30	.059
	3	.148	30	.093
	4	.093	30	.200
Idiom Production	1	.156	30	.062
	2	.096	30	.200
	3	.121	30	.200
	4	.128	30	.200

Results on Idiom Comprehension

To answer the first research question, the idiom comprehension posttest scores of the learners in the groups were compared. As shown in Table 3, group 1 obtained the highest mean score, followed by group 3 and group 2, while group 4 had the lowest mean score.

Table 3

Descriptive Statistics of the Scores on Idiom Comprehension

		N	Mean	Std. Deviation
1.	The Lost Map	30	23.70	3.344
2.	Wordwall	30	22.43	3.059
3.	GIF-based Multimedia	30	22.60	3.286
4.	Control Group	30	17.80	3.782

The results of the one-way ANOVA (Table 4) indicated statistically significant differences among the groups, ($F(3,116) = 18.00, p < .001, \omega^2 = .31$), suggesting that the type of instructional treatment had a significant effect on idiom comprehension with a large effect size.

Table 4

ANOVA Results on Idiom Comprehension

	Sum of Squares	df	Mean Square	F	Sig.	ω^2
Between Groups	616.200	3	205.400	18.000	.000	.31
Within Groups	1323.667	116	11.411			
Total	1939.867	119				

Post hoc comparisons using Tukey HSD (Table 5) revealed that group 4 was significantly worse than the other groups with a medium effect size; however, no significant differences were found between groups 1, 2, and 3. These findings suggest that while the experimental groups performed similarly, all of them significantly outperformed the control group.

Table 5

Multiple Comparisons Results for Idiom Comprehension

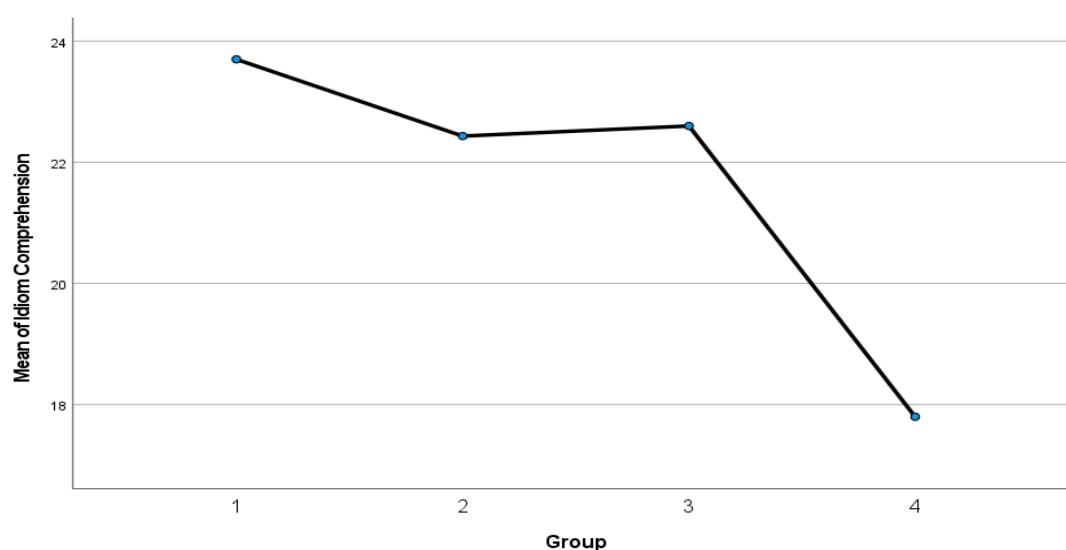
z(I) Group	(J) Group	Mean Difference (I-J)	Sig.	η^2	95% Confidence Interval	
					Lower Bound	Upper Bound

1	2	1.267	.470	-1.01	3.54
	3	1.100	.589	-1.17	3.37
	4	5.900*	.000	.11 3.63	8.17
2	3	-.167	.998	-2.44	2.11
	4	4.633*	.000	.08 2.36	6.91
3	4	4.800*	.000	.09 2.53	7.07

Figure 1 illustrates the mean scores for idiom comprehension across the four groups. As shown, groups 1, 2, and 3 had similar mean scores, forming a relatively flat pattern. In contrast, group 4 showed a noticeable drop in the mean score, indicating lower performance. This visual pattern supported the statistical findings, confirming that the main difference existed between the control group and the experimental groups.

Figure 1

Means Plot for Idiom Comprehension



Results on Idiom Production

The second research question aimed at investigating whether there are any significant differences among the three mentioned computerized games in terms of idiom production. Table 6 presents the descriptive statistics for idiom production. Group 1 achieved the highest mean score, followed by group 3, and group 2, while group 4 had the lowest mean score. Similar to idiom comprehension, the differences among groups 1, 2, and 3 were relatively small, whereas group 4 showed a considerably lower performance. The standard deviations were relatively similar, indicating consistent variability across groups.

Table 6

Descriptive Statistics of the Scores on Idiom Production

	N	Mean	Std. Deviation
1	30	26.53	2.474
2	30	24.73	2.876
3	30	25.03	3.358
4	30	18.50	3.309

ANOVA results (Table 7) indicated statistically significant differences among the four groups in terms of idiom production ($F(3,116) = 41.42, p < 0.001, \omega^2 = .51$) with a very large effect size.

Table 7

ANOVA Results on Idiom Production

	Sum of Squares	df	Mean Square	F	Sig.	ω^2
Between Groups	1137.400	3	379.133	41.420	.000	.51
Within Groups	1061.800	116	9.153			
Total	2199.200	119				

The results of the Tukey HSD (Table 8) indicated that, similar to idiom comprehension, all the experimental groups significantly outperformed the control group (with medium to large effect sizes), while performing similarly to each other.

Table 8

Multiple Comparisons Results for Idiom Production

(I) Group	(J) Group	Mean Difference (I-J)	Sig.	η^2
1	2	1.800	.103	.19
	3	1.500	.225	
	4	8.033*	.000	
2	3	-.300	.981	.12
	4	6.233*	.000	
3	4	6.533*	.000	.13

Discussion

The findings of the present study clearly showed that using computerized games can have a positive impact on learners' idiom comprehension and production. In both areas, students who used the games performed significantly better than those in the control group. The effect sizes suggest that incorporating digital games into language teaching can be an effective way to support idiom learning. This finding can be explained by the nature of game-based learning itself. Unlike traditional methods, which often rely on memorization and passive learning, digital games create interactive environments where learners can actively be involved in the learning process. Through repeated exposure, immediate feedback, and meaningful engagement, learners are more likely to process language deeply and retain what they learn. In this way, the results of the present study strongly support the idea that learning is more effective when it is active rather than passive. At the same time, no statistically significant difference was found among the three types of games. Even though the Lost Map group achieved slightly higher scores, the differences between the experimental groups were not strong enough to be considered statistically significant. This means that three game types were similarly effective overall.

These results were in line with recent research. For example, Vnucko and Klimova (2023) highlighted that digital games created interactive and engaging environments that support vocabulary learning. This helps explain why students in the experimental groups performed better, as they were more actively involved in the learning process. A similar point is made by Alahmadi et al. (2023), who found that technology-based instruction improves learning by giving students more opportunities to practice and interact with the material. In this study, the games probably encouraged learners to engage more deeply with idioms, rather than simply memorize them. The fact that there was no clear difference between the three game types is also supported by Lou (2024), who suggested that different gamified tools can lead to similar learning outcomes, even if they look different on the surface. This idea fits well with the results of the present study, where all three games were effective despite their different designs. However, it is still interesting that the Lost Map group consistently had the highest mean scores. Although this difference was not statistically significant, it may still point to a possible advantage. At first, this might seem surprising, especially considering that the games were designed with different features and formats. However, this result reflected an important aspect of game-based learning. One explanation could be the use of narrative and context in this game. Unlike more

traditional quiz-based or task-based games, the Lost Map game probably provided learners with a continuous storyline, allowing them to encounter idioms in meaningful and connected contexts. This kind of contextualized learning can be particularly beneficial for idiom learning, as they are often difficult to understand when presented in isolation. In addition, the narrative element of the Lost Map may also have increased learner engagement. Stories naturally capture attention and creativity, which can motivate learners to continue interacting with the material. Another possible explanation for the success of the experimental groups is motivation. Recent studies (Lou, 2024; Soltani & Mohseni, 2024; Zou & Teng, 2023) have suggested that digital games increase learners' motivation by making learning more enjoyable and engaging. This may have encouraged students to spend more time and effort on the tasks, which could explain their better performance compared to the control group.

Overall, the findings suggest that the use of computerized game-based activities had a generally positive impact on learners' idiom comprehension and production compared to traditional instruction. This can be understood in relation to SDT, as the interactive and engaging nature of the games may have supported learners' motivation and involvement during learning. However, since the three game types produced similar outcomes, it appears that the features of these three games, such as interaction, repetition, and contextualized practice, may have played a more important role than the specific game format itself. From a theoretical perspective, this aligns with the idea that learning is strengthened when learners are actively involved in processing and using language in meaningful contexts. From this perspective, the slight advantage in the Lost Map group may be linked to its narrative and contextual structure, which potentially supports more meaningful engagement with idiomatic expressions.

The findings were also supported by Pelangi et al. (2025), who emphasized the benefits of interactive digital tools for vocabulary learning. Features such as immediate feedback and repeated practice, which were presented in the games used in this study, are known to help learners improve their language skills. Another important point was that the same pattern of results was found in both idiom comprehension and production. This consistency makes the findings more reliable and suggests that the benefits of game-based learning are not limited to understanding idioms but also extend to using them correctly. This is particularly important because idiom production is considered more difficult than comprehension. The fact that learners were able to improve not only their understanding but also their use of idioms suggests that the games were effective in promoting deeper learning. This supports the idea that interactive and engaging learning environments can facilitate both receptive and productive skills.

Conclusion and Implications

On the basis of the findings of the present study, a number of conclusions may be drawn. First, the superior performance of the experimental groups over the control group leads to the conclusion that this finding provides evidence supporting the theoretical frameworks including Cognitive Linguistics (CL) and Dual Coding Theory (DCT). The control group's methods relied on rote memorization, decontextualized lists, and lecture-based explanations, which simply could not compete with the interactive, multimodal, and engaging nature of the gamified tools. All three experimental groups shared several key pedagogical features that the control group lacked. Learners in the experimental groups were actively engaged, solving puzzles in The Lost Map, matching phrases in Wordwall, or guessing meanings from GIFs. This active engagement allows for deeper cognitive processing compared to passive listening or reading definitions. Each tool presented idioms in a meaningful context; for instance, The Lost Map used a story, Wordwall used gamified quizzes with instant feedback, and GIFs used animated visuals. This perfectly aligns with Dual Coding Theory (Clark & Paivio, 1991), which argues that combining verbal and visual information can lead to better memorization. As SDT suggests, the experimental tools may have satisfied learners' basic psychological needs such as autonomy, competence, and relatedness. On the other hand, the traditional method in the control group made learning boring.

Moreover, since all three computerized games showed effective learning results in comparison with the control condition, it can be concluded that their similar positive effects may be due to their common features. For example, all three game types involved repetition; Wordwall offered explicit, repetitive drills; The Lost Map offered repetition through stories, and GIF offered repetition through visual association. The form of repetition differed, but the function was the same. In addition, in all three tools, learners received instant feedback on their guesses and choices. Therefore, it may be concluded that the form of computerized game is immaterial so long as they involve the beneficial feature(s). Furthermore, the finding that there were no differences among the game-based learning tools for teaching idioms leads to the conclusion that each tool probably enjoys one feature and, therefore, improves one aspect of learning idioms. This implies that a combination of game-based learning tools may be more advisable than any single tool, given the fact that individual differences among learners may call for a variety of game-based learning tools. Some learners may have preferred the narrative space of The Lost Map, others the clear structure of Wordwall, and other students the visual creativity of GIF-based games. This also leads one to the conclusion that instead of sticking to any single game-based learning tool, teachers need to have the flexibility to choose tools that fit their context, resources, and learners' preferences. It is also probable that the differences among the three game-based learning tools may have gone unnoticed (undetected) due to the size of the sample, the duration of the treatments, the degree of the cooperation of the participants, and other factors. This could actually limit the generalizability of the findings.

All in all, despite limitations such as internet instability, the findings strongly support the integration of gamified, multimodal instruction into idiom teaching. Ultimately, when learners are engaged, receive immediate feedback, and interact with meaningful contexts, idiom learning becomes more effective and enjoyable.

From a pedagogical perspective, the findings of this study have several important implications. For one thing, they provide strong support for the integration of digital games into language teaching. Teachers who incorporate game-based activities into their classrooms may be able to create more effective and attractive learning environments. Second, the lack of significant differences among the three game types suggests that teachers have flexibility in choosing the types of games they use. Rather than focusing on finding the best game, teachers can select games that fit their specific teaching context, available resources, and learners' preferences. A teacher with limited technology access might prefer Wordwall, which runs on basic devices; a teacher who likes storytelling might prefer The Lost Map, and a teacher with creative, visual learners might choose GIF-based games. Third, the lack of significant differences among the three game types can actually be seen as a positive result. It shows that teachers are not limited to one specific type of game. Instead, they can choose different kinds of games depending on their teaching goals and classroom conditions, knowing that all of them can be effective. Moreover, factors such as ease of preparation, accessibility, technical requirements, or cost could be considered as useful criteria for the selection of game type. Finally, teachers should be selective and critical. The fact that these three tools worked does not mean every digital tool will.

The findings also have important implications for learners. First, when learners understand that different computerized games have different strengths, they can better accept and engage with their teachers' technological choices. Second, learners can take ownership of their learning by selecting technologies that match their personal learning styles. A learner who is visual may adjust to GIF-based games. A learner who enjoys competition may prefer Wordwall, and a learner who loves narratives may choose The Lost Map. This choice increases autonomy, which, according to Self-Determination Theory, enhances intrinsic motivation. Third, learners will understand that technology is a tool, not magic. Success comes from active engagement, thinking, guessing, testing, and producing, not just clicking through screens. Learners can become active partners in their own idiom learning journey.

The findings can also have significant implications for those who design language curricula, textbooks, and assessments. First, effective technologies like The Lost Map, Wordwall, and GIF-based games can be integrated into official curricula and textbooks. Second, if syllabus designers

know about these technologies, they can design tests, materials, and books that align with them; for example, assessments could include tasks that reflect game-based learning, such as matching idioms to GIFs, completing story-based puzzles, or recognition drills in a limited time. Third, curriculum designers should provide clear guidelines and training for teachers on how to select and integrate tools, rather than giving them a prescriptive list.

Nevertheless, the findings of this study should only be interpreted in light of the following limitations and delimitations. Throughout the study, the participants experienced several challenges; for instance, some students had limited access to reliable devices, such as laptops or tablets, and had to join classes using small smartphone screens, which made some game-based activities harder to do. These external factors were not measured or controlled in this study.

The participants in this study were similar to one another in several important ways. All 120 students were at the B2 level, all were young adults, and all were Persian-speaking EFL learners. On the one hand, this homogeneity was useful because it reduced variability and made it easier to see the real effects of the different game types; on the other hand, it was a serious limitation because the real world is diverse, and classrooms contain students of different ages, proficiency levels, first languages, genders, and life experiences. The last limitation was related to the problems of connectivity. Due to the problems in the researchers' country, the internet connection was not always reliable and stable. Some learners experienced sudden disconnections or slow loading times during the game-based activities. This was especially problematic for The Lost Map, which required a stable connection for collaboration, and for GIF-based games, which required the smooth loading of animated images.

This study compared three specific gamified tools: The Lost Map, Wordwall, and GIF-based. These three games were selected because they represented specific categories of game-based learning, and they were easier to manage. The study included 120 students, which is a reasonable number, but it may still not have been large enough to distinguish small differences among the three experimental groups. With an even larger sample, statistically significant differences might have emerged. Most of the participants in this study were girls. This was not related to the thought that girls would perform better or worse; it was simply a matter of access. It was much easier for researchers to reach female learners than male learners. As a result, the sample does not reflect a balanced mix of genders. It is unknown if male learners would respond differently to the three computerized games. Future research should try to include a balanced sample.

All the 120 participants were at the B2 level, which was upper-intermediate. This was chosen because beginners often struggle with basic vocabulary, and advanced learners may already know many idioms. Therefore, these findings may not be generalizable to learners at other levels of proficiency. A beginner learner might find GIF-based games too fast; an advanced learner might find Wordwall too easy. Different levels might prefer different tools.

This study was done in a fully virtual class, and the findings might not apply to face-to-face classrooms, where the teacher is physically present, and students can interact with screens. Finally, from among many aspects of teaching idioms, this study focused on comprehension and production.

Based on the limitations discussed above, it is recommended that future studies include more diverse participants, including learners at different proficiency levels, different ages, different first languages, and a balanced mix of male and female learners. Future studies may compare virtual and face-to-face classrooms to determine whether or not the same patterns hold in traditional classrooms. Future research can also use qualitative data, such as data from interviews or open-ended surveys, to capture students' own experiences and strategies. Finally, this study can be replicated in different cultural and linguistic contexts to see whether or not the findings are specific to Persian-speaking learners.

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The authors report there are no competing interests to declare.

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