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DIGITAL GAME-BASED VOCABULARY LEARNING USING KAHOOT! PERCEPTIONS, ENGAGEMENT, AND ACHIEVEMENT AMONG MOROCCAN EFL YOUNG LEARNERS

Omar Baissane — Faculty of Arts and Humanities, Sultan Moulay Slimane University, Beni Mellal, Morocco — baissaneomar@gmail.com

ABSTRACT

Aim/Purpose	To investigate the effectiveness of game-based learning (GBL) using Kahoot! on vocabulary achievement and engagement among Moroccan young EFL learners.
Background	This study addresses the limited research on the impact of digital GBL tools in Moroccan EFL classrooms, particularly among young learners. It also offers novel evidence from a Moroccan context and demonstrates a connection between GBL and young learners' vocabulary development.
Methodology	Quasi-experimental design with 60 intermediate EFL learners divided into experimental and control groups; data analyzed using descriptive statistics, Wilcoxon Signed-Rank, Mann–Whitney U, and Spearman correlation tests.
Contribution	Provides empirical evidence on the benefits and limitations of GBL in vocabulary instruction and highlights the complex relationship between engagement and learning outcomes.
Findings	The experimental group showed significantly improved vocabulary scores after the GBL intervention using Kahoot! (Md = 6 vs. Md = 5; $Z = -6.726$, $p < .001$), while the control group showed no significant gain ($Z = -0.421$, $p = .674$). A Mann–Whitney U test confirmed a significant difference between groups ($U = 168.50$, $p < .001$). However, a surprising non-significant negative correlation was found between engagement and post-test performance ($\varrho = -0.12$, $p = .373$, $n = 60$).
Recommendations for Practitioners	Future research should consider incorporating digital games like Kahoot! to enhance vocabulary learning and increase student motivation.

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Recommendations for Researchers	Further research is needed to explore the role of engagement as a variable influencing vocabulary learning outcomes.
Impact on Society	Enhancing the use of GBL could improve language learning by promoting more interactive, learner-centered practices in Moroccan EFL classrooms and by supporting the quality of language instruction.
Future Research	Further studies should investigate the long-term impacts of GBL, its effects on other language domains, and comparative studies across different learner demographics, as well as examine contextual factors such as the classroom environment and teacher digital readiness.
Keywords	digital game-based learning, engagement, Kahoot! perceptions, vocabulary learning

INTRODUCTION

Vocabulary is a fundamental component of language proficiency. It supports learners' ability to understand spoken and written texts, participate in conversations, and express ideas clearly and accurately (Willis & Ohashi, 2012). In contexts where English is learned as a foreign language, access to authentic linguistic input is often limited, which places greater emphasis on formal vocabulary instruction (Barcroft, 2004; Lervåg & Aukrust, 2010). However, conventional methods such as memorizing isolated wordlists offer limited support for retention and can diminish learners' motivation and active participation (Arslan, 2024). In contrast, technological tools provide immediate feedback, visual reinforcement, and active participation, practices that align with self-determination theory (SDT) (X. Li et al., 2025).

This study addresses a gap in Moroccan EFL classrooms, where vocabulary instruction is often ineffective, especially among young learners. English is introduced in the final years of middle school and taught throughout high school, while private schools often teach it from earlier grades. Moroccan EFL classrooms are large, teacher-centered, and have limited access to digital technologies, particularly in rural areas (Ben Haman, 2021). These conditions affect the implementation of educational interventions, including game-based learning (GBL), which makes the examination of digital tools in this context essential.

This challenge is not unique to Morocco. In various EFL contexts, English is becoming more prominent in both private and public education. However, vocabulary instruction in many of these settings still relies on teacher-centered approaches (Boudihaj & Sahli, 2021). Many learners struggle with low-frequency vocabulary, especially when instruction lacks contextualization and active involvement. These issues are further exacerbated by overcrowded classrooms, insufficient digital infrastructure, and limited access to technological tools, which hinder effective language learning (Ben Haman, 2021).

To address these limitations, researchers have proposed integrating digital technologies into language instruction, especially strategies that promote learner autonomy and engagement (Pratiwi & Waluyo, 2023). GBL, which combines educational content with competitive and interactive features, has gained attention as a promising method (Hung et al., 2018). Digital platforms such as Kahoot! and Wordwall! have been explored for their potential to enhance vocabulary development by engaging learners in enjoyable and meaningful learning experiences (Arsyad, 2024; Dang, 2024).

A number of studies in EFL contexts suggest that game-based tools not only support vocabulary retention but also improve students' confidence and willingness to participate. The Baicizhan! game, for example, has been successful in China in promoting vocabulary acquisition through multimedia repetition and learner competition (R. Li, 2021; Wan et al., 2025). Similarly, Wordwall! and Quizizz!

have been effective in Saudi Arabia and Turkey, as they increase motivation and performance compared to traditional methods (Alfares, 2025; Çil, 2021). Kahoot! in particular has been praised for its simplicity and accessibility, which help reduce language anxiety and encourage learners to take risks in using vocabulary in both spoken and written contexts (Katemba et al., 2022; Rababah et al., 2025).

The effectiveness of game-based tools is well documented; however, studies of Moroccan EFL classrooms are limited. In these settings, both learners and educators face various challenges, which highlights the need to assess GBL's impact. This is especially relevant for young learners, aged 11 to 14, who benefit more from playful, collaborative vocabulary learning activities that align with their cognitive and social development (Fletcher et al., 2024). Therefore, examining how tools like Kahoot! influence vocabulary learning and engagement is of great importance. This study explores the extent to which game-based instruction enhances vocabulary achievement compared to conventional methods. It also investigates learners' perceptions and engagement during GBL and analyzes the relationship between engagement and vocabulary performance. Accordingly, this study is guided by the following research questions:

1. How do young Moroccan EFL learners perceive and engage with game-based vocabulary learning using Kahoot!?
2. Do young Moroccan EFL learners who receive vocabulary instruction through GBL perform better than those taught using conventional paper-based wordlist methods?
3. Is there a relationship between learners' engagement in GBL and their vocabulary performance on the post-test?

LITERATURE REVIEW

Vocabulary development has long been recognized as essential for successful language learning. Without sufficient vocabulary, learners often struggle to follow spoken discourse, comprehend reading texts, and produce coherent speech and writing (Schmitt, 2008). For this reason, vocabulary teaching remains a key concern in Moroccan EFL classrooms. Despite its significance, traditional vocabulary instruction frequently relies on mechanical drills or static wordlists, which tend to isolate words from authentic usage and limit opportunities for reinforcement (Bromley, 2004). Nation (2012), for instance, emphasizes that repeated exposure to words through reading, listening, and speaking is key to long-term vocabulary retention and development.

This shift in perspective has encouraged educators and researchers to explore more interactive methods, especially those that leverage digital technologies. Webb and Chang (2012), among others, have advocated for integrating explicit vocabulary instruction with engaging digital environments. GBL represents one such model that has gained increasing attention. Embedding language content in interactive game formats can create environments where students receive immediate feedback, experience meaningful repetition, and collaborate with peers, factors that can significantly increase learner engagement and vocabulary retention (Hung et al., 2018; Laranjeira & Teixeira, 2025)).

The theoretical foundation for this approach is SDT, which identifies autonomy, competence, and relatedness as key components in sustaining learner motivation and engagement (Deci & Ryan, 2000). In other words, GBL activities enhance autonomy by having a low-stakes participation structure that lets learners respond on their own, make their own decisions, and participate without worrying about failing in front of others. Competence is promoted through quick feedback, point accumulation, and visible progress indicators, which enable learners to track their performance and enjoy a sense of achievement during vocabulary assignments. Live classroom interaction, shared gameplay experiences, and friendly competition can all help learners feel more connected to one another and more involved in the group (Deci & Ryan, 2000). These SDT constructs are operationalized via Kahoot characteristics that facilitate learner autonomy through choice and control, competence through immediate feedback and visible progress, and relatedness through peer interaction during gameplay,

all of which are reflected in the engagement of this study's questionnaire. In the same vein, Lee (2023) emphasize that games provide repeated exposure to vocabulary, enhancing recognition and retention and shifting learners from passive recipients to active participants.

Evidence from classroom-based studies supports these claims. In Saudi Arabia, for instance, the use of Wordwall led to notable improvements in vocabulary test scores and motivation among younger learners (Alfares, 2025). Similar outcomes were observed in Turkey and Oman, where digital tools such as Quizizz and Wordwall enhanced vocabulary retention more effectively than traditional methods (Bouzaiane & Youzbashi, 2024; Çil, 2021). In China, Baicizhan has been successfully employed to integrate audio, visual, and interactive elements into vocabulary instruction, resulting in better long-term retention and increased learner confidence (R. Li, 2021; Wan et al., 2025). These findings consistently indicate beneficial effects of GBL on vocabulary acquisition and learner motivation; however, its applicability to the Moroccan EFL context requires further examination, as Moroccan learners encounter unique linguistic and pedagogical challenges distinct from those observed in Saudi Arabia, Turkish, or East Asian classrooms. Moroccan learners generally encounter restricted out-of-class exposure to English as they are far more exposed to French as a second language, which has remained the dominant language in Morocco since colonization (Ennaji, 2005), alongside teacher-centered instructional methods, and inconsistent access to educational technologies, all of which may influence the efficacy of game-based interventions (Ennouari & Houssaini, 2023). In contrast to settings where digital resources are integrated into communicative and technology-enhanced learning environments, Moroccan EFL education frequently emphasizes textbook-based vocabulary acquisition and an exam-oriented approach, resulting in limited opportunities for substantive lexical application (Farmati et al., 2024).

Given these limitations, Moroccan EFL learners may particularly benefit from GBL in addressing various challenges. First, GBL can partially mitigate limited linguistic exposure by promoting interactive, language-rich contexts where vocabulary and structures are frequently encountered through meaningful application, feedback, and contextualized tasks (Nation, 2012). Second, in EFL contexts marked by diminished learner motivation and restricted oral participation, competition, incentives, and goal-directed activities integrated into GBL can enhance engagement and readiness to participate (Reinders & Wattana, 2015). Finally, GBL develops learner autonomy, active engagement, and collaborative learning, which provide an alternative to conventional teacher-centered instruction, principles that are prominently emphasized in communicative and motivational techniques in language education (Chowdhury et al., 2024).

Within the Moroccan context, emerging research has begun to explore similar pedagogical applications. For instance, Erradi et al. (2013) demonstrated that a game-based micro-learning platform significantly enhanced learners' ability to recognize, recall, and retain vocabulary compared to conventional instruction, which highlights the value of short, repetitive, and interactive learning sequences. Similarly, Ben El Moudden (2021) reported that integrating games into EFL classrooms positively influenced learners' vocabulary development, classroom participation, and attitudes toward English learning. Moreover, Farhane (2025) found that Kahoot! based instruction led to significant improvements in both immediate and long-term vocabulary retention among Moroccan EFL secondary school students compared to traditional teaching methods**.** These studies indicate that GBL instruction enhances vocabulary retention, reduces foreign language anxiety, increases learner motivation, and elevates levels of engagement among Moroccan learners. The observed outcomes can be primarily ascribed to factors including real-time competition, enjoyment, and active learner participation, which contribute to a more interactive and supportive classroom environment (Flores Quiroz et al., 2021; Katemba et al., 2022; Rababah et al., 2025).

However, although these findings are encouraging, scholars such as Rofiah and Waluyo (2024) caution that not all game-based approaches automatically lead to effective learning outcomes. The success of GBL depends largely on how well the game mechanics are aligned with instructional objectives. Enjoyment alone is not sufficient to ensure retention; rather, meaningful practice and cognitive

engagement during gameplay are essential for effective learning (Román-Celi, 2023). Within the previously discussed structural constraints, such limitations may be particularly salient in Moroccan classrooms, where restricted access to technology and insufficient teacher readiness can hinder the effective implementation of GBL tools (Mastafi, 2014). Schools often lack reliable internet connections or modern devices, which can significantly hinder the potential benefits of GBL platforms. Moreover, GBL requires active student participation and meaningful engagement, but teachers in Morocco may face difficulties integrating these tools effectively due to limited familiarity with digital teaching methods or reluctance to move away from traditional, teacher-centered approaches (Wang et al., 2024).

Despite the growing body of evidence that supports the use of GBL tools in international EFL contexts, few studies have focused on their application within the Moroccan context. Studies in other settings have shown promising results with GBL tools, such as improved vocabulary retention and increased learner motivation (Alfares, 2025; Bouzaiane & Youzbashi, 2024; R. Li, 2021); however, these findings may not directly translate to Moroccan EFL classrooms. Moroccan students face unique challenges, including limited access to digital tools and cultural factors influencing teacher–student dynamics, which may affect the implementation and effectiveness of GBL tools (El Karfa, 2019). In this regard, GBL offers a pedagogical response to these challenges by increasing vocabulary exposure through repeated interaction, enhancing more participatory classroom dynamics, and complementing existing pedagogical practices with learner-centered, technology-mediated activities. Furthermore, SDT (Deci & Ryan, 2000) suggests that GBL enhances motivation, autonomy, and engagement, which makes it essential to examine how these theoretical benefits manifest within Morocco's educational context. This study, therefore, fills an important gap in the literature by going beyond prior Moroccan GBL research that has primarily emphasized vocabulary gains; rather, it examines learner engagement as an explanatory variable. Specifically, it examines how Kahoot! can influence vocabulary learning, evaluates its effectiveness in supporting vocabulary learning, explores learners' perceptions and engagement with game-based instruction, and investigates the relationship between engagement and vocabulary performance in Moroccan classrooms.

METHODOLOGY

This study employed a quasi-experimental design, comparing two non-randomized groups, followed by a post-intervention questionnaire to assess participants' perceptions. A quasi-experimental design was chosen because random assignment was not feasible within the context of the current study, where intact classes are maintained for administrative and pedagogical reasons, and because such designs are commonly used in classroom-based educational research, particularly when interventions occur in authentic instructional environments. Quasi-experimental designs also facilitate the assessment of instructional effects and maintain ecological validity (Creswell, 2014; Shadish et al., 2002). This design aimed to ascertain the effectiveness of game-based vocabulary learning through the Kahoot! digital game among young Moroccan EFL learners, their engagement with game-based tools, and to examine the relationship between learner engagement and vocabulary achievement.

A total of 60 intermediate-level students from a private language center participated in the study**.** Before the intervention, all students completed a vocabulary pre-test to establish a baseline of their vocabulary knowledge. Participants were divided into two equal groups, each comprising two intact classes of 15 students, for a total of 30 students per group. The experimental group (N = 30) received vocabulary practice through GBL using Kahoot! digital game over the course of three weeks. Simultaneously, the control group (N = 30) studied the same vocabulary items using a traditional wordlist-based approach, without any gamified elements**.** This grouping helped maintain natural classroom settings while ensuring that instructional content was consistent across both groups. As a result, the two groups could be compared more fairly, even though participants were not randomly assigned. In week four, both groups completed a vocabulary post-test. Following the post-test, all

participants responded to a structured questionnaire designed to evaluate their engagement with and perceptions of the vocabulary learning experience.

Participants

Sixty Moroccan EFL learners participated in the study. All were aged 11 to 14 years and enrolled in intermediate-level English courses at the Center for Language and Culture (CLC) in Marrakesh, Morocco. The CLC offers English as a Foreign Language (EFL) for Moroccan students and Arabic as a Foreign Language (AFL) for international students from institutions such as Lewis & Clark College, the University of Georgia, Northeastern University, the University of California, and the National Security Language Initiative for Youth (NSLI-Y). The sample consisted of 27 females and 33 males. A non-probabilistic convenience sampling method was used (Creswell, 2012), through which participants were selected based on availability and willingness. Learners were drawn from four intact classes and assigned to the experimental or control group based on their existing class structures. This non-randomized assignment introduced potential selection bias, but efforts were made to enhance comparability. Both groups were similar in instructional level and content exposure. To confirm group equivalence, an independent samples t-test was conducted on pre-test scores. As shown in Table 1, the test revealed no significant difference between the pre-test scores of the experimental ($M = 15.15$, $SD = 2.70$) and the control groups ($M = 14.89$, $SD = 2.50$), $t(58) = –0.42$, $p = .677$. This indicates that both groups were similar in vocabulary knowledge before the intervention.

Table 1. Independent samples t-test for pre-test scores

Group	N	M	SD	t (58)	p
Experimental	30	15.15	2.70		
Control	30	14.89	2.50	–0.42	.677

Data Collection and Procedures

In week 1, all students completed a vocabulary pre-test assessing their knowledge of 30 target words, including phrasal verbs such as "look after," "run out of," and "call off." These lexical items were selected from the students' intermediate-level curriculum and drawn from instructional units not yet covered in class in order to control prior exposure. The pre-test consisted of matching exercises and sentence-completion tasks and was reviewed for content validity by two qualified EFL instructors.

Over a three-week period, both groups studied 10 new vocabulary items per week (30 words in total). Prior to each instructional session, the target vocabulary items were briefly introduced by the teacher through contextualized examples and short explanations to ensure initial comprehension. To account for possible instructor-related variability, the experimental and control groups were both instructed by the same English teacher during the intervention. The experimental group participated in weekly 30-minute Kahoot! sessions, each comprising a multiple-choice quiz with 10 questions projected on a shared screen. Students joined the game via a PIN at kahoot.it and submitted responses using smartphones. The Kahoot! activities incorporated real-time feedback, accuracy-based scoring, and response-time tracking to promote active participation, alongside a live leaderboard designed to encourage peer interaction and friendly competition (Figure 1). During gameplay, the teacher actively facilitated the sessions by clarifying instructions, monitoring students' responses, and providing immediate oral feedback. When incorrect answers occurred, brief explanations were provided to reinforce word meaning, form, pronunciation, and usage. Following each Kahoot! session, short whole-class discussions were conducted to consolidate learning and address remaining misunderstandings, as well as to ensure that game-based practice was integrated into broader instructional objectives rather than used in isolation (Nation, 2012).

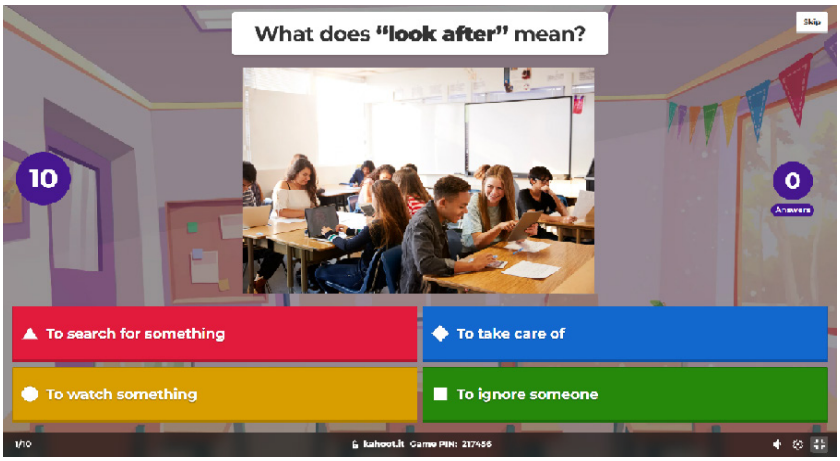

Figure 1. Kahoot! question interface projected on screen during the vocabulary activity

The control group studied the same vocabulary items through traditional paper-based activities, including wordlists, sentence-writing tasks, and gap-fill exercises, without any gamified elements. Moreover, this group received equivalent instructional time and was exposed to identical lexical content to ensure consistency in learning objectives across conditions. In week 5, both groups completed a vocabulary post-test designed with parallel items to measure vocabulary retention. After completing the post-test, all participants responded to a 16-item questionnaire adapted from Wiggins et al. (2017), which assessed learners' engagement and perceptions of the instructional approach using a five-point Likert scale (Table 2). The questionnaire's use in the present study was considered appropriate for participants aged 11–14, as the items were simple, concise, context-specific, and administered in a guided classroom setting to support comprehension. For the current sample, the questionnaire demonstrated acceptable internal consistency, with a Cronbach alpha coefficient of .733, indicating satisfactory reliability of the adapted instrument (Table 3). Ethical approval was obtained from the language center, and informed parental consent was secured in accordance with institutional policy. Participant anonymity was maintained throughout the study through the use of coded identifiers, and all collected data were handled with strict confidentiality. In this study, participation was entirely voluntary, and students were informed that they could withdraw at any stage without academic or personal consequences. To address potential power imbalances associated with the teacher-researcher role, participants were assured that their responses would not influence course evaluations or grades. In addition, data collection instruments were administered uniformly across groups, and analyses were conducted objectively to minimize researcher bias.

Data Analysis

To address Research Question 1, which examined students' engagement and perceptions, descriptive statistics (means and standard deviations) were calculated, as they are appropriate for summarizing learners' self-reported engagement and attitudinal responses measured on a Likert-scale questionnaire. Prior to conducting inferential analyses, the normality of the pre-test and post-test vocabulary score distributions was assessed using the Shapiro–Wilk test. Results indicated significant departures from normality ($p < .001$), thus violating the assumptions required for parametric tests such as the paired-samples *t*-test. Given the relatively small sample size and the non-normal distribution of the data, non-parametric statistical procedures were considered more appropriate and robust for the present analysis (Field, 2013). Therefore, the non-parametric Wilcoxon Signed-Rank test was employed to compare pre-test and post-test scores within both the experimental and control groups.

To examine Research Question 2, which concerns the effectiveness of game-based learning on vocabulary achievement, two Wilcoxon Signed-Rank tests were conducted: one within the experimental group and one within the control group, which compared learners' pre-test and post-test vocabulary

scores. This within-group analysis allowed for the examination of vocabulary gains over time while controlling for individual baseline differences. In addition, a Mann-Whitney *U* test was performed to compare post-test scores between the experimental and control groups. This test enabled a direct comparison of vocabulary achievement outcomes across instructional conditions and was selected due to the non-normal distribution of the dependent variable. In addition to statistical significance testing, effect sizes (r) were calculated for the Wilcoxon Signed-Rank and Mann-Whitney U tests to estimate the magnitude of observed differences between the experimental and control groups.

To investigate Research Question 3, which explores the relationship between learners' self-reported engagement and their vocabulary post-test performance, a Spearman's rank-order correlation was conducted. This non-parametric test was selected based on the non-normal distribution and ordinal nature of the engagement data, as confirmed by the Shapiro-Wilk test. It also enabled examination of whether higher levels of engagement during the intervention were associated with improved vocabulary achievement, thus providing insight into the relationship between affective and cognitive dimensions of learning. All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS, version 25), and the level of statistical significance was set at $\alpha = .05$.

Despite the robustness of the selected non-parametric procedures, several limitations should be acknowledged. First, the relatively small sample size may limit the generalizability of the findings. Second, the quasi-experimental design did not involve random assignment, which may have introduced pre-existing group differences. Finally, reliance on technology-based instruction such as Kahoot! may have been influenced by learners' access to devices and internet connectivity, potentially affecting engagement and performance outcomes.

RESULTS

STUDENTS' PERCEPTIONS OF USING GBL IN VOCABULARY LEARNING

To address Research Question 1, descriptive statistics were used to examine students' engagement and perceptions of using the Kahoot! digital game in vocabulary learning. As shown in Table 2, mean scores ranged from 3.02 to 4.48, indicating moderate to high agreement with statements related to motivation, enjoyment, and engagement (Boone & Boone, 2012). These positive responses indicate that Kahoot! created an engaging learning atmosphere that students generally reacted to well.

Table 2. Descriptive statistics of students' engagement (ASPECT Questionnaire)

N	Items	Mean	SD
1	Playing Kahoot! helped me better understand the vocabulary.	4.25	0.63
2	Hearing other students' answers in Kahoot! helped me understand the vocabulary.	4.38	0.69
3	Group competition in Kahoot! helped me understand the vocabulary better.	4.37	0.69
4	I had fun during the Kahoot! vocabulary activities.	4.48	0.77
5	My teammates made useful contributions during the Kahoot! games	3.92	0.74
6	I would prefer to take more classes that use Kahoot! for vocabulary learning.	3.98	0.87
7	I felt confident about the vocabulary we practiced using Kahoot!	3.65	0.94
8	Kahoot! helped me remember the vocabulary more effectively.	3.87	1.02
9	Kahoot! made me more interested in learning vocabulary.	4.15	0.73
10	I made a valuable contribution during the Kahoot! games.	3.92	0.74
11	I stayed focused during the Kahoot! activities.	3.43	0.78
12	I worked hard to do well during the Kahoot! sessions.	4.22	0.76

N	Items	Mean	SD
13	The teacher's energy and enthusiasm encouraged me to engage in the Kahoot! games.	3.97	0.80
14	The teacher made a clear effort to help us learn during the Kahoot! sessions.	4.12	0.86
15	The teacher seemed well-prepared for the Kahoot! activities.	4.27	0.94
16	The teacher was available to help us during the Kahoot! sessions.	3.02	1.17

The highest mean was observed for item 4 (M = 4.48), followed by items 2 (M = 4.38) and 3 (M = 4.37), which suggests that enjoyment and motivation were particularly strong aspects of students' experience. The lowest mean was recorded for item 16 (M = 3.02). Standard deviations ranged from 0.63 to 1.17. It reflects some variation in students' responses, especially regarding perceptions of instructor availability. This pattern implies that GBL effectively stimulated interest and enjoyment, but students still valued clear instructional support during gameplay. The questionnaire demonstrated acceptable internal consistency, with a Cronbach's alpha of .733 across all adapted items (Table 3).

Table 3. Reliability test results

Cronbach's alpha	No. of items
.733	16

Effectiveness of GBL in Vocabulary Achievement

To address Research Question 2, Wilcoxon Signed-Rank tests were conducted to evaluate vocabulary performance before (T1) and after (T2) the intervention within each group. As shown in Table 4, the results for the experimental group revealed a statistically significant improvement, with post-test scores (Md = 6) clearly higher than pre-test scores (Md = 5), $Z = –6.726$, $p < .001$. This indicates that students in the experimental group achieved meaningful vocabulary benefits following the Kahoot! based instruction. In contrast, the control group showed no statistically significant difference between pre-test and post-test vocabulary scores, $Z = –0.421$, $p = .674$. The effect size was small ($r = .08$), suggesting no meaningful vocabulary improvement.

Table 4. Wilcoxon Signed-Rank test results (T1 & T2)

Group	T1	T2	Z value	P value
Experiment	5	6	–6.726	.001
Control	5	5	–0.421	.674

To further assess the impact of the intervention between groups, a Mann–Whitney U test was conducted. As shown in Table 5, the experimental group outperformed the control group in post-test vocabulary achievement, $U = 168.50$, $Z = –4.189$, $p < .001$. The effect size was large ($r = .54$), which indicates a significant and meaningful advantage for the GBL condition, and highlights the GBL's pedagogical promise as a tool for improving vocabulary learning outcomes.

Table 5. Mann–Whitney U test results (post-test comparison)

Group	Mean rank	U value	Z value	P-value
Experiment	39.88	168.50	–4.189	.001
Control	21.12	–	–	–

Spearman Correlation Between Engagement and Post-Test Scores

To investigate Research Question 3, a Spearman rank-order correlation was conducted to examine the relationship between learners' self-reported engagement and their vocabulary post-test scores. Surprisingly, the results in Table 6 revealed a very weak, negative correlation ($\rho = -0.12$, $p = .373$), which was not statistically significant. This suggests that there was no meaningful monotonic association between the level of student engagement during Kahoot! based vocabulary activities and their post-test vocabulary performance, which indicates that although GBL enhanced enjoyment and motivation, these affective responses did not serve as direct predictors of learners' vocabulary improvements.

Table 6. Spearman correlations between engagement and post-test scores

	Post-test	Engagement
Post-test	1	-.12
Engagement	-.12	1
Sig. (2-tailed)	.373	.373

Discussion

The purpose of this study was to examine the impact of GBL using Kahoot! on vocabulary learning and engagement among Moroccan EFL young learners. The findings collectively support the educational value of GBL, particularly in enhancing learner motivation and vocabulary outcomes, while also revealing complexities in how engagement relates to performance.

In response to research question 1, the descriptive analysis revealed that participants generally expressed positive perceptions of the Kahoot! platform as a tool for vocabulary learning. Learners regarded GBL not only as an effective means for practicing vocabulary but also as a motivating, enjoyable, and interactive experience that promotes a sense of autonomy. These findings are consistent with previous studies by Katemba et al. (2022) and Rababah et al. (2025), who emphasized the dual cognitive and affective benefits of digital GBL. Furthermore, the results resonate with the principles of SDT (Deci & Ryan, 2000), particularly the role of autonomy and intrinsic motivation in enhancing learner engagement. In this sense, the findings for Research Question 1 directly support the theoretical expectation that autonomy-supportive learning environments enhance greater engagement and motivation, which aligns with the broader aims of the study. Nonetheless, the variability in participant responses, as evidenced by the standard deviations, suggests that engagement levels were not homogeneous across the sample. This points to the need to account for individual learner differences, such as prior digital familiarity, learning preferences, or motivational orientations, when integrating game-based approaches into language instruction.

In line with these positive learner perceptions, the results related to research question 2 demonstrated that students in the experimental group achieved statistically significant gains in vocabulary knowledge following the Kahoot! based intervention, whereas their counterparts in the control group exhibited no comparable improvement. The Mann–Whitney U test further confirmed a significant difference between the groups, with a large effect size in favor of those exposed to the GBL environment. These findings directly support the study's objective of examining GBL's impact on vocabulary development, as they show that the use of Kahoot! translated not only in increased motivation but also in measurable improvements in learning. These outcomes corroborate prior research highlighting the benefits of immediate feedback, interactivity, and heightened learner participation in enhancing language acquisition (Alfares, 2025; Hung et al., 2018). From a theoretical standpoint, the significant vocabulary gains observed in the experimental group also align with SDT's assertion that

intrinsically motivating learning environments can facilitate deeper cognitive engagement and improved performance**.** Nonetheless, as Rofiah and Waluyo (2024) caution, the pedagogical effectiveness of digital tools is contingent upon their alignment with clear instructional objectives and thoughtful integration into the curriculum. The present findings thus reinforce the premise that GBL yields the most substantial educational benefits when implemented within a well-structured and scaffolded instructional framework.

The findings pertaining to research question 3 introduce a layer of complexity to the overall analysis. Contrary to expectations and in contrast to prior research demonstrating positive correlations between learner engagement and academic achievement (Laranjeira & Teixeira, 2025), this study found no statistically significant relationship between students' self-reported engagement with the Kahoot! activities and their vocabulary performance. This unexpected outcome warrants further consideration. From the perspective of SDT (Deci & Ryan, 2000), it is plausible that the game-based activities fulfilled learners' emotional needs, particularly for enjoyment and autonomy; however, they may not have sufficiently stimulated the cognitive challenge or sense of competence necessary to translate engagement into measurable academic gains. In this context, learner engagement may have been primarily affective and situational rather than strategic or goal-oriented. This interpretation is consistent with Román-Celi's (2023) assertion that emotional engagement, in the absence of metacognitive regulation and structured instructional support, is unlikely to yield deep or sustained learning outcomes.

The findings from all three research questions put emphasis on the multifaceted nature of GBL outcomes. Digital tools such as Kahoot! effectively promote positive learner perceptions and contribute to significant gains in vocabulary learning, but they do not inherently ensure a direct correlation between perceived engagement and academic performance. This divergence highlights a crucial pedagogical implication, as emotional motivation alone is insufficient for sustained learning unless accompanied by cognitive challenge and strategic engagement. Consequently, the study emphasizes the need to embed GBL within well-designed instructional frameworks that activate both affective and metacognitive dimensions of learner involvement, which maximizes its educational impact.

IMPLICATIONS AND LIMITATIONS

This study offers several important implications for vocabulary instruction in EFL contexts, particularly within the Moroccan educational system. The findings suggest that GBL, whether through Kahoot! or other digital platforms, can effectively enhance students' vocabulary learning and increase learner motivation. The statistically significant post-test results confirmed that digital games can create motivating and effective learning environments, especially for young learners. Moreover, the positive learner perceptions revealed through the questionnaire indicated strong emotional engagement and receptivity to GBL methods.

These results suggest that Moroccan EFL teachers, especially in primary, secondary, and private education settings, could benefit from integrating structured game-based tasks into their vocabulary instruction to improve student engagement, language retention, and motivation. However, the absence of a significant correlation between self-reported engagement and vocabulary achievement highlights the need for careful task design, explicit instructional scaffolding, and support for learners with varying proficiency levels. Effective GBL implementation, therefore, requires thoughtful alignment between game mechanics and learning objectives. Beyond classroom practice, the findings also carry implications for educational policy**.** Policymakers might consider providing targeted teacher training, creating GBL integration guidelines, and investing in equitable access to digital learning resources across public and private schools. Such systemic measures would help ensure that GBL tools are not only available but also implemented consistently and effectively at a national level.

Several limitations should be acknowledged. First, the sample size was relatively small and drawn from a single private language center, which limits the generalizability of the results. This directly affects external validity, as the findings may not represent learners from public schools, rural areas, or

different proficiency backgrounds. Second, the study relied solely on quantitative methods, which may not capture the full complexity of learner engagement or learning behavior. This limitation impacts internal validity by constraining the depth of interpretation and potentially neglecting cognitive, motivational, or contextual elements that influenced learners' performance**.** Future studies should incorporate larger, more diverse samples and use mixed-methods approaches, including interviews, focus groups, or classroom observations, to obtain richer insights into learners' cognitive and emotional processes. Moreover, extending the intervention duration would allow researchers to explore the long-term effects of GBL on vocabulary retention, learner autonomy, and attitudes toward language learning.

CONCLUSION

This study was designed to address three key research questions. First, it investigated how young Moroccan EFL learners perceive and engage with game-based vocabulary learning using digital platforms such as Kahoot!. Second, it examined whether learners who receive vocabulary instruction through GBL demonstrate greater vocabulary achievement compared to those taught using conventional, paper-based wordlist methods. Finally, the study explored the relationship between learners' engagement in GBL activities and their performance on the post-test. The findings revealed that learners generally expressed positive perceptions of GBL, reporting moderate to high levels of enjoyment, interest, and motivation.

Statistical analyses confirmed that the experimental group significantly outperformed the control group in vocabulary post-test scores, and this confirms the instructional effectiveness of Kahoot! game. However, no significant correlation was found between self-reported engagement and vocabulary performance, which presented an unexpected and noteworthy result. Collectively, these findings offer a significant contribution to both theory and practice by illustrating that GBL can effectively enhance motivation and vocabulary learning in Moroccan EFL situations, while also emphasizing the constraints of affective involvement as a predictor of learning outcomes.

Interpreted through the lens of SDT (Deci & Ryan, 2000), these findings suggest that GBL may support emotional and motivational needs such as autonomy and enjoyment, but it does not necessarily promote the cognitive aspect required for improved academic performance. The negative correlation found between engagement and vocabulary achievement might be attributed to the complex and multidimensional nature of engagement and its limited predictive value when not paired with structured instructional goals. This insight highlights the importance of instructional design, as GBL activities must incorporate cognitive challenge, scaffolding, and clear learning objectives to translate emotional engagement into meaningful academic gains.

These findings carry important implications for Moroccan educators and policymakers. As English instruction expands in both public and private educational settings, tools like Kahoot! provide accessible and engaging platforms that support learner-centered instruction. However, successful integration of GBL requires not just enthusiasm for technology, but also thoughtful task design, teacher support, and alignment with learning outcomes. Policymakers are encouraged to invest in digital training, curriculum development, and equity of access to ensure all learners can benefit from these innovations. Through highlighting both the strengths and restrictions of GBL, this study provides practical recommendations for designing pedagogically sound, theory-informed digital learning environments in the Moroccan context.

Finally, future research may build on this study by implementing longer intervention periods, incorporating qualitative methods such as learner interviews or classroom observations, and exploring how task complexity, feedback mechanisms, and teacher mediation influence the effectiveness of GBL. Priority could be given to examining which instructional design features most effectively con-

vert motivational engagement into vocabulary gains. Moreover, studies conducted across diverse regions, age groups, and proficiency levels would enhance external validity and help determine the conditions under which GBL supports not just engagement, but deep, transferable learning.

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AUTHOR

Omar Baissane, PhD candidate, is an adjunct professor at the Faculty of Science, Cadi Ayyad University, and a Cambridge-certified full-time English teacher at the Center for Language and Culture in Marrakesh, Morocco. He holds double Bachelor's degrees in French and English, majoring in linguistics, and earned his Master's degree in Applied Linguistics and English Language Teaching in 2021. He is currently pursuing a PhD in Applied Linguistics at the Faculty of Letters and Human Sciences, Beni Mellal, Morocco. His primary research interests include applied linguistics, language learning and teaching, higher education, and self-regulation research.