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**| RESEARCH ARTICLE**

# An Investigation of the Effect of Kahoot on Vocabulary Retention among Moroccan EFL Secondary School Students: A Quasi-Experimental Study

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**| ABSTRACT**
Game-based learning has increasingly been recognized as an effective strategy to enhance learner engagement and improve educational outcomes. Among such tools, Kahoot has gained prominence in language learning contexts for its interactive and competitive features. This study aimed to examine the impact of using Kahoot on vocabulary retention among Moroccan secondary school students learning English as a Foreign Language (EFL). A quasi-experimental design was employed with 52 participants divided into an experimental group (n = 28), which received Kahoot-based instruction, and a control group (n = 24), which followed traditional teaching methods. A researcher-developed vocabulary test was administered at three points: pre-test, post-test, and delayed post-test. Additionally, semi-structured interviews were conducted with students from the experimental group to explore their perceptions of the Kahoot intervention. Statistical analysis revealed significant vocabulary gains in the experimental group across all stages of testing. The total mean improvement from pre-test to delayed post-test was 4.49 points ($p < .001$), which indicates a strong effect on long-term retention. Qualitative data further highlighted increased motivation, engagement, and perceived learning effectiveness, with minor concerns regarding time pressure and occasional technical difficulties. Kahoot appears to be an effective digital tool for supporting vocabulary retention in EFL classrooms. Its integration into language instruction may foster higher learner motivation and better long-term outcomes, particularly in contexts similar to Moroccan secondary education.

**| KEYWORDS**

Game-based learning, vocabulary retention, Kahoot, EFL learners, quasi-experimental study.

**| ARTICLE INFORMATION**

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## 1. Introduction

A robust vocabulary is widely recognized as fundamental to success in learning English as a foreign language (EFL) (Nation, 2005; Webb & Nation, 2017). Vocabulary knowledge underpins all language skills; without knowing key words, learners struggle to comprehend texts or express ideas (Sun, Chen, & Zhu, 2023). In secondary EFL programs, students must acquire large numbers of lexical items each year, making vocabulary retention especially crucial. Deficiencies in vocabulary can severely limit communication and academic performance, so mastery of a large vocabulary is often the initial goal of EFL learners (Sun et al., 2023). This importance is reflected in teacher and learner attitudes; for example, Alshumrani (2024) found that 94.5% of EFL instructors and 78.7% of students agreed that vocabulary plays a key role in language proficiency.

To address these vocabulary challenges, educators have increasingly turned to digital game-based learning (DGBL). In DGBL, learners interact with content through games or game-like applications, which can create a positive and engaging learning environment (Vnucko & Klimova, 2023). Research suggests that DGBL can enhance motivation and retention. A recent systematic review found that digital games consistently aid vocabulary learning and often outperform traditional teaching methods.

(Vnucko & Klimova, 2023). The interactive nature of games produces positive emotions and heightened attention, which in turn can boost long-term retention of new words (Vnucko & Klimova, 2023). Gamification elements such as points, badges, and leaderboards further stimulate students; such game mechanics have been shown to increase engagement and improve vocabulary outcomes in EFL contexts.

Among game-based tools, Kahoot has become one of the most popular platforms for classroom quizzing. Kahoot allows teachers to create timed quizzes and interactive questions that students answer in real time using smartphones or computers. As Ahmed et al. (2022) describe, Kahoot supports multiple-choice and jumble questions and operates through a web interface, tracking students' answers and scores. The platform incorporates features like countdown timers, music, and on-screen leaderboards to encourage competition and excitement. These game elements make Kahoot inherently motivating; studies note that Kahoot promotes the learners' curiosity and creates an enjoyable, competitive environment. In language learning research, Kahoot has shown promising results. For example, Phan and Tran (2024) reported that Vietnamese EFL students who practiced new vocabulary with Kahoot quizzes made significantly larger gains and were more engaged than under traditional instruction. Similarly, Ahmed et al. (2022) found that Iranian intermediate learners taught with Kahoot scored significantly higher on both immediate and delayed vocabulary post-tests than a control group. These studies suggest that using Kahoot can enhance both acquisition and longer-term retention of vocabulary in EFL classrooms.

However, evidence from Moroccan settings is still scarce, especially at the secondary level. The few existing Moroccan studies have focused on older learners; for instance, Boulaid and Moubtassime (2019) implemented Kahoot with university EFL students and found increased confidence and engagement in learning English vocabulary. To our knowledge, no empirical study has yet examined the impact of Kahoot on vocabulary retention among Moroccan secondary school students. Therefore, the present quasi-experimental study investigates the effect of incorporating Kahoot into EFL instruction on vocabulary retention in a Moroccan secondary classroom**.** By addressing this gap, the research aims to determine whether the game-based approach can lead to improved long-term vocabulary learning in this context. Specifically, this study aims to answer the following research questions:

1. What is the impact of Kahoot on Moroccan EFL secondary school students' vocabulary retention?
2. What are students' perceived impact and benefits of Kahoot as a game-based tool?

The significance of this study lies in its potential contribution to both research and classroom practice. First, it provides empirical evidence from a context where research on digital game-based learning remains limited, especially at the secondary level. Second, by focusing on vocabulary retention, the study adds depth to existing knowledge on Kahoot's pedagogical value. Third, the findings can inform curriculum designers, language instructors, and policymakers seeking scalable, low-cost digital tools to enhance language learning in Moroccan public schools. Lastly, by collecting students' perceptions, this study offers insight into how learners respond to game-based vocabulary instruction, which can guide more learner-centered approaches in future practice.

## 2. Literature Review

### *2.2 The Role of Vocabulary in EFL Learning*

Vocabulary knowledge is widely recognized as a cornerstone of language proficiency and communication in EFL contexts. Learners with a richer vocabulary tend to perform better across language skills as vocabulary breadth facilitates reading comprehension, speaking, and writing fluency (Kesmez, 2021). Conversely, many secondary EFL learners struggle in productive skills partly due to limited lexicon; insufficient vocabulary has been linked to difficulties in writing and speaking underscoring the critical role of lexical development in overall language mastery (Rajayi & Maleki, 2023). A robust vocabulary not only directly enhances communicative competence but also supports the acquisition of grammar and other language sub-skills by providing the necessary linguistic building blocks and thus strengthening students' vocabulary has become a fundamental goal in EFL instruction at the secondary level.

Achieving long-term retention of new vocabulary is a major learning goal and challenge. Due to the way human memory works, newly learned words are prone to rapid forgetting if not reinforced. In fact, a large proportion of vocabulary can fade shortly after initial learning without review (Schmitt, 2010, as cited in Bao & Peng, 2024). This forgetting curve means that retention, the ability to remember vocabulary over time, is as important as initial acquisition. Research emphasizes that learners must not only acquire but also retain a substantial number of lexical items to attain high proficiency (Seibert Hanson & Brown, 2020). Obviously, meaningful progress in EFL cannot occur if most taught words are forgotten soon afterwards. For this reason, effective vocabulary learning involves strategies to promote long-term recall, such as repeated exposure and review. Studies indicate that frequent encounters with new words significantly improve retention rates (Bao & Peng, 2024). It is recommended

that learners engage in spaced reviews or repeated practice of target words, which strengthens memory traces and counters the natural tendency to forget.

EFL learners face several specific challenges in vocabulary acquisition and retention. One key issue is the often limited exposure to English outside the classroom. In many EFL environments, especially in countries like Morocco, students have few opportunities for authentic language contact beyond their school lessons, which hinders incidental vocabulary growth. Thus, inadequate exposure means new words are not encountered enough times for stable retention (Bao & Peng, 2024). To compensate, traditional pedagogical approaches have typically relied on deliberate rote learning techniques; for example, memorizing bilingual word lists or definitions. However, these conventional methods have well-known limitations. They tend to be teacher-centered, decontextualized, and can quickly become tedious leading to low student engagement. Indeed, surveys of EFL classrooms report that many learners find memorization-based vocabulary learning dull, and it often fails to translate into long-term recall (Rajayi & Maleki, 2023). Moreover, such methods lack strong theoretical support; simply drilling word lists without meaningful context or usage practice does not align with how vocabulary is best learned. As a result, learners may memorize words for tests but then promptly forget them, which indicate poor retention. In short, while vocabulary is of paramount importance in EFL learning, the dual hurdles of insufficient exposure and uninspiring traditional techniques often impede vocabulary acquisition and retention among secondary learners. These challenges highlight the need for more effective and engaging strategies to help students build and retain a rich vocabulary base.

### *2.3 Digital Game-Based Learning (DGBL) in Language Education*

Digital Game-Based Learning (DGBL) refers to the use of interactive digital games to achieve educational outcomes. In language education, DGBL involves integrating language content into gameplay to allow students to learn through active participation in game-like tasks. The theoretical foundations of DGBL are rooted in constructivist and engagement theories of learning. Unlike passive lecture-based approaches, a game-based approach is learner-centered and emphasizes learning by doing; students construct knowledge as they solve problems, make decisions, and receive immediate feedback in a virtual environment (Coleman & Money, 2020, as cited in Fithriani et al., 2021). Well-designed educational games create a playful and experiential context for learning that can increase student involvement and interest (Noroozi et al., 2020). From an engagement theory perspective, DGBL harnesses elements of fun, challenge, and competition to capture learners' attention and sustain their motivation. The competitive or goal-oriented aspects of games can satisfy learners' need for achievement and autonomy, while cooperative or multiplayer features tap into social constructivist principles by enabling interaction and collaboration among peers. In short, DGBL offers a pedagogical approach that aligns with how today's digital-native students like to learn. By providing immediate feedback and clear goals, games create a learning loop that keeps students actively engaged and self-motivated to progress (Nadeem et al., 2023). The result is a learning environment that encourages exploration, persistence, and deeper processing of content, all of which are conducive to effective language acquisition.

Empirical evidence also shows that digital game-based approaches can yield tangible learning gains in language education. In multiple EFL/ESL contexts, researchers have observed improved vocabulary outcomes when instructional games or gamified applications are used in place of or alongside traditional methods. For instance, a systematic review by Zhang et al. (2024) concluded that game-based learning creates a motivating and interactive environment that enhances the retention of vocabulary in language learners (Rajendran et al., 2025). By integrating new words into gameplay, learners encounter and use those words in varied contexts repeatedly, which strengthens their memory of the words. Empirical studies reinforce this; Patra et al. (2022) conducted a quasi-experiment with young EFL learners and found that the group taught via a digital vocabulary game significantly outperformed the control group on both immediate vocabulary tests and a delayed retention test three weeks later. The game-based group not only recalled more words right after the intervention, but also retained more of that vocabulary after a period of time, which indicates superior long-term learning. Similarly, another recent study showed that incorporating gamified exercises led to higher vocabulary gains among secondary school students compared to a conventional teaching approach (Cabrera-Solano et al., 2022, as cited in Fithriani et al., 2021). These positive outcomes are often attributed to DGBL's ability to provide repeated exposure to target words in engaging contexts, which promotes deeper processing. Unlike rote memorization, games can require learners to actively recall or apply vocabulary to solve problems which aids consolidation in memory. Furthermore, the multimedia elements of digital games create dual coding of information which can improve recall.

### *2.4 Kahoot as a Game-Based Learning Tool*

Kahoot is a popular digital game-based learning platform that exemplifies the principles of DGBL in practice. Technically, Kahoot is a web-based quiz application that allows educators to create or use pre-made quizzes which students answer in real time using their own devices (Wang & Tahir, 2020). A growing body of studies has investigated Kahoot's impact on language learning outcomes. In a comprehensive literature review covering 93 studies, Wang and Tahir (2020) found that using Kahoot in the classroom often yields positive effects on learning performance, classroom dynamics, and student attitudes. They noted that

students frequently show improved engagement and even reduced anxiety when learning via Kahoot as compared to more traditional activities. Many empirical studies specific to EFL have echoed these findings. For example, Quiroz et al. (2021) conducted a quasi-experimental study in a high school EFL context and demonstrated that the group using Kahoot for vocabulary practice scored significantly higher on vocabulary tests than a control group, which indicates that Kahoot can effectively enhance vocabulary learning in secondary students. The improvement was notable in an area that is often considered challenging in foreign language education, which suggests that the game-based approach helped students retain and recall words better.

Another study by Ahmed and Sayed (2022) examined Kahoot's effects on Iranian EFL learners and specifically measured both immediate vocabulary recall and delayed retention. They found that Kahoot's enjoyable and competitive format significantly boosted vocabulary retention; students who learned with Kahoot not only remembered more words right after learning, but also maintained a higher retention of those words weeks later, compared to peers who learned through a traditional method. This evidence points to Kahoot's potential for improving long-term learning, not just short-term performance. Likewise, Añora et al. (2025) reported in a quasi-experimental study with Grade 10 EFL learners that Kahoot-based instruction led to higher post-test scores and better retention than conventional teaching, accompanied by increases in student motivation and classroom engagement.

Taken together, these studies illustrate that Kahoot can positively impact multiple dimensions of learning including cognitive, behavioral, and affective. In particular, Kahoot appears to be an effective tool for reinforcing vocabulary; the platform's use of repetition, immediate feedback, and reward mechanisms aligns well with known principles for vocabulary retention. Students often report that the game-like atmosphere keeps them alert and encourages them to pay closer attention to word meanings in order to compete, and thus indirectly increasing their focus on vocabulary learning (Licorish et al., 2018). Additionally, the motivational surge provided by Kahoot cannot be understated in the sense that several studies note that learners find the approach enjoyable and that it fosters a more positive attitude toward class exercises (Cárdenas-Moncada et al., 2020).

Reviewing the existing literature reveals a notable gap in research on Kahoot's effectiveness within the Moroccan EFL secondary school context, particularly with regard to vocabulary retention. To date, the majority of studies on Kahoot in language learning have been conducted in contexts outside of Morocco, such as in East Asia, Europe, or other Middle Eastern countries or in university settings. Few published studies have focused on Moroccan secondary classrooms. This is despite the fact that digital gamified learning is becoming more common in Morocco; recent teacher surveys indicate that Kahoot is one of the most popular online learning games among Moroccan English teachers, used by over half of those surveyed for classroom practice and review (Qasserras & Qasserras, 2023). This suggests a growing local interest in game-based learning, yet academic research lags behind practice. The only directly related studies in Morocco have examined either different education levels or different focal points. For instance, Boulaid and Moubtassime (2019) investigated Kahoot with Moroccan university EFL students and found that integrating Kahoot over an eight-week period significantly enriched the students' vocabulary knowledge. However, that study dealt with older learners in a tertiary context and primarily looked at vocabulary growth rather than retention.

At the pre-university level, there is emerging research on game-based learning in Morocco's language classrooms, but not yet in English. A very recent quasi-experimental study by Kherazi and Bourray (2025) explored Kahoot's use with sixth-grade students learning French as a foreign language, and it reported promising results. In this respect, the Kahoot group showed significantly better vocabulary outcomes and higher motivation than a control group. While encouraging, that study was conducted in a French language context and in primary school. No published research so far has zeroed in on Moroccan secondary school EFL learners and how Kahoot might affect their English vocabulary retention. This lack of local empirical evidence constitutes a gap that the present study aims to fill. By focusing on secondary students in Morocco, the study will provide context-specific insights that international findings may not fully capture. It responds to calls in the literature for more diversified research settings, as Wang and Tahir (2020) noted, many Kahoot studies have concentrated on certain regions or learner populations, leaving other contexts underrepresented. Addressing the Moroccan context is important for both practical and scholarly reasons as it will inform local educators about the viability of Kahoot in their classrooms and contribute to the global understanding of game-based learning across diverse EFL environments.

## 3. Methods

### *3.1 Research Design and Participants*

This study employed a quasi-experimental design with a non-equivalent control group. In other words, two intact classes of first-year Baccalaureate students (high school juniors) were selected and randomly assigned to an experimental group and a control group. All participants were EFL (English as a Foreign Language) learners using the *Gateway to English* curriculum, which is one of the standard 1st-year Baccalaureate English textbooks in Moroccan public high schools. The experimental class learned vocabulary through a game-based approach (Kahoot), whereas the control class received traditional vocabulary instruction. Both

groups were pre-tested, underwent the instructional intervention, and then post-tested twice (immediately and after a delay). This pre-test – post-test – delayed post-test format is consistent with similar quasi-experimental studies in the literature. For instance, Ahmed et al. (2022) divided 50 EFL learners into an experimental group (using Kahoot) and a control group (traditional teaching), administered a vocabulary pre-test, taught new words over ten sessions, and then gave an immediate post-test followed by a delayed post-test three weeks later. In the present study, the two classes were comparable in English level at the start (as confirmed by the pre-test results), ensuring a fair comparison between the teaching methods.

### *3.2 Materials and Instruments*

#### *3.2.1 Instructional Materials*

The target vocabulary content was drawn from the *Gateway to English* textbook units to ensure relevance to the students' curriculum. *Gateway to English* contains themed units covering various topics, and the vocabulary chosen for this study corresponded to those topics. The teacher researcher first identified a pool of new or challenging words from the upcoming units. In line with Ahmed et al. (2022), he screened these words to focus on those unfamiliar to the students. For example, Ahmed et al. prepared a list of 130 new words and, after surveying student familiarity, narrowed it down to 80 truly unknown words as the teaching targets. Similarly, in our study the final list of target vocabulary included only words that the majority of students did not already know, which maximizes the potential learning gains. These target words were taught during the intervention and were the basis for the vocabulary tests.

#### *3.2.2 Vocabulary Tests*

A researcher-designed vocabulary test was used as the pre-test, immediate post-test, and delayed post-test. The test content covered the target words from the textbook units, assessing both recognition and recall of meanings. Each test was composed of objective items (e.g. multiple-choice questions asking for the correct definition or use of a word in context). To ensure test validity, the initial version was reviewed by two experienced English teachers for content relevance and clarity. The same test was administered three times (before and after instruction) to measure learning and retention, a method commonly used in vocabulary retention studies. To prevent any test-retest memory effects, the order of the questions and options was altered on each administration while keeping the content identical. The pre-test established a baseline of each student's vocabulary knowledge. The immediate post-test (given right after the intervention) assessed how much vocabulary was learned, and the delayed post-test (given approximately three weeks later) assessed how much of that learning was retained over time. Both the immediate and delayed tests were unannounced quizzes, to ensure students did not specifically study for them and thus provide a genuine measure of retention.

#### *3.2.3 Kahoot Platform*

The Kahoot application (a game-based learning platform) was the key tool for the experimental group. A teacher's account was used to create interactive vocabulary quizzes for each session, and students participated using either smartphones. Each Kahoot quiz consisted of multiple-choice questions targeting the new words of that session. The platform's points system and immediate feedback were leveraged to increase engagement. Students would see each question (e.g. a new English word with four possible definitions) and select their answer within a time limit. After each question, Kahoot displays the correct answer and a scoreboard, which adds a fun, competitive element to the learning process.

#### *3.2.4 Traditional Instruction Materials*

The control group was taught using conventional techniques, such as teacher-led explanation of word meanings, example sentences from the textbook. Essentially, the teacher provided a list of the target words with definitions and discussed each word in context. Students were asked to learn the meanings and see how the words are used in sample sentences from the textbook or teacher's handouts. This approach mirrors the "traditional vocabulary instruction" described in comparable studies. For example, in Ahmed et al.'s control group, students were given printed lists of the 80 new words with their meanings and practiced them in sentences, without any gamified elements. In this study, the control group received a similar treatment, relying on explanation and written practice to learn the new vocabulary.

#### *3.2.5 Interviews*

In addition to the quantitative tests, a semi-structured interview protocol was prepared to gather qualitative data on student perceptions. A set of open-ended questions was designed to explore the experimental group students' experiences with Kahoot. These questions asked about topics such as: how using Kahoot affected their motivation and engagement, what they enjoyed or found beneficial, any difficulties or frustrations they encountered (e.g. time pressure or technical issues), and whether they felt this method helped them learn and remember the vocabulary. The interview guide was validated by an expert in educational research, and was slightly piloted (with two students not in the actual sample) to ensure the questions were clear and elicited detailed responses. This qualitative instrument aimed to provide deeper insight into students' attitudes and perceptions

regarding game-based learning, complementing the test score data. Using semi-structured interviews in this way is supported by recent research, such as Hattee (2025) which collected data via both vocabulary tests and interviews to investigate not only learning outcomes but also students' and teachers' perceptions of Kahoot in the classroom.

### *3.3 Procedure*

#### *3.3.1 Pre-test*

At the beginning of the study, both groups took the vocabulary pre-test under identical conditions. The pre-test was administered in class during a regular lesson period and supervised by the teacher researcher. To reduce anxiety, students were instructed that this test was for research purposes and would not affect their grades. The results of the pre-test were recorded for each student and later used to verify that the experimental and control groups started at a comparable vocabulary level. An independent samples t-test confirmed that there was no statistically significant difference between the two groups on the pre-test scores, $t(50) = -0.23$, $p = .819$, confirming the groups were equivalent prior to the intervention.

#### *3.3.2 Instructional Intervention*

The instructional intervention was implemented over the course of Semester 1, spanning 12 weeks, and coincided with the completion of the first five units of the *Gateway to English 1* textbook. These units were part of the standard 11th-grade Moroccan EFL curriculum. While each unit covered multiple language components (e.g., grammar, communication functions, listening, speaking, and writing), a dedicated vocabulary lesson was included within each unit. This structure led to a total of 50 target vocabulary items (10 per unit) used for instruction and testing during the study.

The experimental group (n = 28) received Kahoot-enhanced vocabulary instruction. For each unit, students participated in one Kahoot session following the explicit teaching of vocabulary items. The Kahoot quizzes consisted of interactive tasks such as multiple-choice, matching, and sequencing questions. Game-based elements such as time limits, music, point scoring, and leaderboards were embedded to promote engagement and repetition, which aligns with principles of digital game-based learning (Wang, 2021; Phan & Tran, 2024).

The control group (n = 24), in contrast, was taught the same vocabulary items using traditional instructional methods; these included eliciting the vocabulary items from a given text/dialogue, practicing controlled exercises along with a production stage where the participants had to produce sentences using the given vocabulary items on the board. Both groups were taught by the same teacher to ensure instructional consistency.

#### *3.3.3 Assessment Instruments*

A researcher-developed vocabulary test was administered at three intervals: pre-test (Week 1), post-test (Week 12), and delayed post-test (Week 14). The test assessed students' knowledge of all 50 vocabulary items taught throughout the intervention. It included a combination of multiple-choice, gap-fill, and matching tasks, designed to evaluate both recognition and productive use of vocabulary. The total score was converted to a 20-point scale, following the Moroccan national grading system. The test was reviewed by two qualified EFL instructors for content validity and was piloted on a comparable group of students. The vocabulary test demonstrated excellent internal consistency (Cronbach's $\alpha = .951$). For detailed item-level statistics, see Appendix A.

#### *3.3.4. Qualitative Data*

To complement the quantitative findings, a qualitative component was conducted. Ten students from the experimental group were purposely selected to participate in semi-structured interviews following the delayed post-test. The interviews explored their perceptions of the Kahoot-based vocabulary instruction, including engagement, perceived learning gains, motivation, and enjoyment. Interviews were conducted in Arabic to ensure comfort and depth of expression, transcribed, translated, and then thematically analyzed using Braun and Clarke's (2021) six-phase framework.

### *3.4 Data Analysis*

Quantitative data were analyzed using SPSS (Version 26). Descriptive statistics were calculated for all three testing stages. Independent-sample t-tests compared performance between the experimental and control groups at each testing stage, while paired-sample t-tests examined within-group improvement over time. For qualitative data, codes were generated inductively and grouped into major themes reflecting learner experiences with Kahoot (Nowell et al., 2017)

## 4. Results

### *4.1 The impact of Kahoot on Students' Vocabulary Retention.*

This section presents the findings of the study examining the effect of Kahoot on vocabulary retention among Moroccan EFL secondary school students. The results are organized around between-group comparisons (experimental vs. control) and within-group changes over time.

To begin with, descriptive statistics were calculated for all test stages. As shown in Table 1, the mean vocabulary pre-test scores were comparable between the control group (M = 7.93, SD = 0.55) and the experimental group (M = 7.90, SD = 0.56), indicating that students in both groups started with similar levels of vocabulary knowledge.

**Table 1**: ***Means and Standard Deviations of Pre-Test, Post-Test, and Delayed Post-Test Vocabulary Scores by Group***

| Group | | Pre_Test | Post_Test | Delayed_Post_Test |
|---|---|---|---|---|
| Control | Mean | 7.934583333333333 | 9.600000000000000 | 10.422500000000000 |
| | N | 24 | 24 | 24 |
| | Std. Deviation | .553667449763426 | .494447429834118 | .694057070701902 |
| Experimental | Mean | 7.898928571428572 | 10.535357142857142 | 12.387857142857142 |
| | N | 28 | 28 | 28 |
| | Std. Deviation | .557529864908195 | .713569442455567 | .858402293423367 |
| Total | Mean | 7.915384615384615 | 10.103653846153847 | 11.480769230769232 |
| | N | 52 | 52 | 52 |
| | Std. Deviation | .550573538884187 | .775573232269118 | 1.259408273993512 |

To confirm the equivalence of the two groups at baseline, an independent samples t-test was conducted. The results showed no significant difference between the control and experimental groups on the pre-test scores, t(50) = –0.23, p = .819 (see Table 2).

**Table 2**: ***Independent Samples* t*-Test Results for Pre-Test Vocabulary Scores by Group***

| | | 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 |
| Pre_Test | Equal variances assumed | .008 | .931 | -.231 | 50 | .819 | -.035654761904762 | .154597183172219 | -.346172342870379 | .274862819060856 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Equal variances not assumed | | | -.231 | 48.893 | .818 | -.03565476190476 2 | .15451288311366 0 | -.34617726330390 0 | .27486773949437 7 |

This confirms that the two groups were statistically equivalent prior to the intervention. Following the intervention, the post-test results indicated notable differences. The experimental group achieved a higher mean score (M = 10.54, SD = 0.71) compared to the control group (M = 9.60, SD = 0.49), as presented in Table 1. An independent samples t-test revealed this difference to be statistically significant, t(50) = 5.40, p < .001 (see Table 3).

**Table 3:** ***Independent Samples* t-*Test Results for Post-Test Vocabulary Scores between Experimental and Control Groups***

| | | 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 |
| Post_Test | Equal variances assumed | 2.567 | .115 | 5.402 | 50 | .000 | .935357142857143 | .173143779219217 | .587587627402882 | 1.283126658311404 |
| | Equal variances not assumed | | | 5.553 | 48.029 | .000 | .935357142857143 | .168438838718508 | .596693480023746 | 1.274020805690539 |

This suggests that the use of Kahoot during instruction positively impacted immediate vocabulary acquisition. With regard to long-term vocabulary retention, the delayed post-test results also favored the experimental group. As seen in Table 1, the mean score for the experimental group increased to 12.39 (SD = 0.86), whereas the control group reached a lower average of 10.42 (SD = 0.69). The independent samples t-test confirmed that this difference remained statistically significant, t(50) = 8.98, p < .001 (see Table 4).

**Table 4: *Independent Samples* t-*Test on Delayed 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 |
| Delayed_Post_Test | Equal variances assumed | .070 | .792 | 8.977 | 50 | .000 | 1.965357142857144 | .218944649063962 | 1.525593872934095 | 2.405120412780193 |
| | Equal variances not assumed | | | 9.125 | 49.850 | .000 | 1.965357142857144 | .215378038434004 | 1.532725434739936 | 2.397988850974352 |

This indicates that the Kahoot-based instruction had a sustained positive impact on students' vocabulary retention. To assess individual progress over time, paired samples t-tests were conducted within each group (see Table 5). The experimental group showed a significant increase from pre-test to post-test, with a mean gain of 2.64 points, $t(27) = -14.35$, $p < .001$. A further significant gain was observed between the post-test and delayed post-test (mean gain = 1.85), $t(27) = -9.53$, $p < .001$. The overall gain from pre-test to delayed post-test was 4.49 points, $t(27) = -24.16$, $p < .001$, highlighting substantial vocabulary growth over time.

In comparison, the control group also demonstrated improvements. From pre-test to post-test, the mean gain was 1.67 points, $t(23) = -9.91$, $p < .001$. Between the post-test and delayed post-test, the gain was smaller but still significant (mean gain = 0.82), $t(23) = -5.31$, $p < .001$. The total gain from pre-test to delayed post-test was 2.49 points, $t(23) = -16.17$, $p < .001$.

Table 5: Paired Samples t-Test Results for Experimental and Control Groups

| **Group** | **Comparison** | **Mean Difference** | **Std. Deviation** | **t** | **df** | **p-value** |
|---|---|---|---|---|---|---|
| **Experimental** | Pre-Test vs. Post-Test | -2.636 | 0.972 | -14.354 | 27 | 0.0 |
| **Experimental** | Post-Test vs. Delayed Post-Test | -1.853 | 1.029 | -9.525 | 27 | 0.0 |
| **Experimental** | Pre-Test vs. Delayed Post-Test | -4.489 | 0.983 | -24.163 | 27 | 0.0 |
| **Control** | Pre-Test vs. Post-Test | -1.665 | 0.823 | -9.914 | 23 | 0.0 |
| **Control** | Post-Test vs. Delayed Post-Test | -0.823 | 0.759 | -5.307 | 23 | 0.0 |
| **Control** | Pre-Test vs. Delayed Post-Test | -2.488 | 0.754 | -16.168 | 23 | 0.0 |

These results collectively support the conclusion that while both groups improved their vocabulary over time, the experimental group, which received Kahoot-enhanced instruction, exhibited significantly greater gains in both immediate learning and long-term retention.

### *4.2. Students' Perceptions of Using Kahoot for Vocabulary Learning*

To complement the quantitative findings, semi-structured interviews were conducted with ten students from the experimental group to explore their experiences and attitudes toward Kahoot-based vocabulary instruction. Thematic analysis of the interview transcripts revealed several key themes: increased engagement and motivation, perceived improvement in vocabulary retention, enjoyment of competition, technical or time-related challenges, and preferences for Kahoot over traditional methods.

#### *4.2.1. Engagement and Motivation*

All interviewed students reported that Kahoot made vocabulary lessons more enjoyable and engaging. Many described looking forward to the vocabulary sessions and highlighted that the game-based nature of Kahoot helped reduce boredom. One participant stated, *"When we use Kahoot, I feel excited to learn new words because I want to win the quiz."* Others noted that the use of music, timers, and instant feedback kept them focused and motivated to participate actively in class.

#### *4.2.2. Improved Vocabulary Retention*

A majority of students felt that Kahoot helped them remember vocabulary more effectively than traditional teaching methods. They mentioned that repeated exposure to words through game-based quizzes contributed to better retention. One student remarked, *"I still remember many words because I saw them several times in Kahoot and answered them quickly."* This aligns with the quantitative results showing greater gains in the experimental group.

#### *4.2.3. Enjoyment of Competition and Interactivity*

The competitive aspect of Kahoot was frequently mentioned as a motivating factor. Students expressed that trying to score higher than their classmates made the learning process fun and encouraged them to pay closer attention. Several participants commented that seeing their name on the leaderboard was exciting and made them want to perform better in future quizzes.

#### *4.2.4. Challenges Encountered*

While the overall response was positive, some students mentioned minor challenges such as feeling time pressure during the quizzes or experiencing occasional technical issues with internet connectivity or mobile devices. However, these issues did not appear to significantly affect their perception of Kahoot's usefulness.

#### *4.2.5. Preference over Traditional Methods*

When asked to compare Kahoot with regular vocabulary instruction, nearly all students favored the Kahoot approach. They described traditional methods as "boring" or "hard to focus on" and indicated that the interactive and fast-paced nature of Kahoot kept them more engaged. One student summarized this sentiment by saying, *"In normal lessons, I sometimes get distracted, but with Kahoot, I want to listen and learn."*

Overall, the interview findings suggest that Kahoot was perceived positively by students, particularly in terms of motivation, attention, and memory retention. These qualitative insights complement the statistical findings and highlight Kahoot's potential as a learner-centered tool for enhancing vocabulary instruction in EFL classrooms.

## 5. Discussion

### *5.1. Quantitative Findings on Vocabulary Retention*

The present study examined the effectiveness of Kahoot as a game-based learning tool for enhancing vocabulary retention among Moroccan EFL secondary school students. The findings revealed that students in the experimental group, who received vocabulary instruction via Kahoot, significantly outperformed their peers in the control group across all testing stages.

At the pre-test stage, both groups started at a comparable vocabulary level ($M = 7.90$, $SD = 0.56$ for experimental; $M = 7.93$, $SD = 0.55$ for control), with no significant difference between them ($t(50) = -0.23$, $p = .819$), ensuring baseline equivalence. However, after the 12-week intervention using 50 vocabulary items from the "Gateway to English" textbook, substantial gains were observed in the experimental group. Their mean post-test score rose to 10.54 ($SD = 0.71$), significantly higher than the control group's 9.60 ($SD = 0.49$), $t(50) = 5.40$, $p < .001$. This immediate improvement is consistent with findings from Ahmed et al. (2022), who observed enhanced vocabulary recall after implementing Kahoot-based instruction, and with the conclusions of

Rojabi et al. (2022), who found statistically significant vocabulary gains in Kahoot-supported classrooms compared to those using traditional methods.

In terms of long-term retention, the delayed post-test conducted three weeks later showed a further advantage for the Kahoot group, with their mean score increasing to 12.39 (SD = 0.86), while the control group's mean was 10.42 (SD = 0.69). The difference remained significant ($t(50) = 8.98$, $p < .001$), highlighting the effectiveness of Kahoot not just for acquisition but for sustained retention. These findings mirror the conclusions of Nur Azkiyah et al. (2024), who found that students exposed to Kahoot exhibited stronger vocabulary retention over time. Similarly, Talapova and Abdusalamova (2024) emphasized Kahoot's ability to promote long-term recall by incorporating repeated exposure and feedback mechanisms.

The within-group comparisons also underscore this pattern. For the experimental group, the mean gains from pre-test to post-test ($\Delta M = 2.64$, $t(27) = -14.35$, $p < .001$), from post-test to delayed post-test ($\Delta M = 1.85$, $t(27) = -9.53$, $p < .001$), and from pre-test to delayed post-test ($\Delta M = 4.49$, $t(27) = -24.16$, $p < .001$) were all significant. In contrast, although the control group also improved significantly, their gains were comparatively smaller ($\Delta M = 1.67$, 0.82, and 2.49 respectively; all $p < .001$). These differences affirm the added value of game-based vocabulary practice, which appears to stimulate deeper encoding and retrieval, as suggested by Munawarah et al. (2024).

Such results resonate with the broader literature on digital game-based learning (DGBL), which attributes increased vocabulary performance to the engaging, interactive nature of tools like Kahoot (Ahmed et al., 2025). The combination of competitive elements, immediate feedback, and spaced repetition is especially conducive to vocabulary retention (Maemanah & Shofiana, 2025). In line with this, our study not only confirms Kahoot's short-term benefits, but also addresses the commonly noted gap in longitudinal assessment (Maemanah & Shofiana, 2025). By incorporating a delayed post-test, we offer evidence that vocabulary gains through Kahoot persist over time, reinforcing findings from recent quasi-experimental studies in varied EFL contexts (Nur Azkiyah et al., 2024).

Taken together, these quantitative findings strengthen the claim that Kahoot significantly enhances vocabulary retention and learning durability, particularly when integrated into structured classroom instruction over multiple weeks.

### *5.2. Qualitative Insights from Student Interviews*

The qualitative findings from semi-structured interviews offer valuable insight into how students perceived Kahoot as a vocabulary learning tool. Across themes of motivation, engagement, memory retention, interactivity, and comparative effectiveness, students consistently described their experiences with Kahoot in positive terms. These perceptions align with an expanding body of literature attesting to the pedagogical benefits of game-based learning environments in EFL contexts.

#### *5.2.1 Engagement and Motivation*

All ten interviewed students indicated that Kahoot made vocabulary learning more stimulating and enjoyable. Many highlighted the excitement generated by music, timers, and real-time feedback. These motivational features were echoed in Oktaviani's (2024) study, where EFL learners viewed Kahoot as both entertaining and educational due to its interactive and competitive interface. Similarly, Darwis and Amal (2023) observed that Kahoot fostered increased interest in language learning through heightened classroom engagement and emotional investment. The intrinsic motivation seen in our participants is consistent with the broader gamification literature, which emphasizes the value of autonomy, competition, and instant rewards in promoting sustained learner attention.

#### *5.2.2. Improved Vocabulary Retention*

Several students reported that Kahoot contributed to more effective vocabulary retention. One student stated, "I still remember many words because I saw them several times in Kahoot and answered them quickly," suggesting that repeated retrieval in a gamified setting reinforced long-term memory. This observation resonates with findings by Rojabi et al. (2022), who documented improved recall rates among students using quiz-based digital tools. Nur Azkiyah et al. (2024) also noted that students exposed to Kahoot exhibited higher vocabulary retention, attributing the gains to its repetitive and feedback-rich environment.

#### *5.2.3. Enjoyment of Competition and Interactivity*

The competitive dimension of Kahoot emerged as a key motivator. Participants described leaderboards and point accumulation as fun and encouraging, leading them to concentrate more during lessons. This corroborates earlier findings by Talapova and

Abdusalamova (2024), who observed that learners in gamified classrooms demonstrated heightened focus and engagement due to peer competition. The concept of "friendly competition" has been linked to increased learner investment and deeper cognitive processing of vocabulary items (Munawarah et al., 2024; Maemanah & Shofiana, 2025).

#### *5.2.4. Challenges Encountered*

Although the overall sentiment was positive, a few students raised concerns regarding time pressure and occasional technical issues. These challenges are not unique to the present study. Phan and Tran (2024) similarly reported that time-limited quizzes and unreliable internet access were barriers to optimal Kahoot implementation. However, these issues were infrequent and did not significantly diminish students' enthusiasm for the platform.

### *5.3 Preference over Traditional Methods*

Perhaps most notably, nearly all participants expressed a strong preference for Kahoot over conventional vocabulary instruction. They described traditional methods as monotonous or unengaging. One student remarked, "In normal lessons, I sometimes get distracted, but with Kahoot, I want to listen and learn." This aligns with the findings of Ahmed et al. (2022), who reported that students in the Kahoot group found their lessons more memorable and interactive compared to teacher-led instruction. The preference for Kahoot underscores the potential of digital tools to make EFL instruction more learner-centered and participatory.

As a result, the qualitative evidence not only supports the quantitative findings of improved vocabulary retention but also provides a richer understanding of the learner experience. Kahoot was not merely effective in boosting scores; it was perceived as an enjoyable, motivating, and cognitively engaging tool for learning vocabulary. These insights confirm the conclusions of recent reviews and meta-analyses suggesting that gamified learning environments offer significant promise for enhancing vocabulary acquisition in secondary EFL settings (Maemanah & Shofiana, 2025; Ahmed et al., 2025).

## 6. Conclusion

This quasi-experimental study explored the impact of Kahoot-based instruction on vocabulary retention among Moroccan secondary EFL learners. The findings from both quantitative and qualitative data reveal a consistent pattern: students who participated in Kahoot-enhanced instruction not only demonstrated significantly higher vocabulary gains in both immediate and delayed post-tests, but also expressed positive attitudes toward the use of Kahoot in vocabulary learning. The interactive and gamified nature of the platform appeared to foster motivation, enhance attention, and promote better recall.

### *6.1 Pedagogical Implications*

The results have several implications for EFL teaching practices in Moroccan secondary schools and similar educational contexts. First, integrating game-based learning platforms like Kahoot can lead to measurable improvements in vocabulary acquisition and retention, especially when combined with traditional instruction. Second, the positive perceptions voiced by learners suggest that Kahoot may serve as a motivational catalyst, encouraging active participation in vocabulary activities and reducing learner boredom and anxiety. Third, since vocabulary development is foundational to language proficiency, incorporating digital games into regular classroom routines may enhance overall language competence if implemented consistently.

### *6.2 Limitations*

Despite its promising outcomes, this study is subject to several limitations. The sample was limited to two intact classes from one educational setting, which may affect the generalizability of the results. Also, the vocabulary items were limited to those covered in one semester, and the retention interval measured only short-term gains over a three-week period. Technical challenges such as inconsistent internet connectivity, though minor, were reported by some participants and may have affected their experiences. Finally, the reliance on self-reported perceptions during interviews could introduce bias, despite triangulation with quantitative data.

### *6.3 Recommendations for Future Research*

To build on the current findings, future studies should consider larger, more diverse samples across multiple institutions and regions. Longitudinal designs could be employed to assess vocabulary retention over extended periods beyond three weeks. Further investigation into the differential impact of Kahoot on learners with varying proficiency levels and learning styles would also be beneficial. Additionally, future research could explore the integration of Kahoot with other language skills (e.g., reading or speaking) and compare its effects with other gamified or mobile-assisted vocabulary tools.

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## Appendices

### Appendix A: *Item-Total Statistics and Reliability Analysis for the Vocabulary Retention Test*

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Item_1 | 21.54 | 176.376 | .604 | .951 |
| Item_2 | 21.52 | 176.989 | .551 | .951 |
| Item_3 | 21.34 | 175.658 | .649 | .951 |
| Item_4 | 21.32 | 177.120 | .540 | .951 |
| Item_5 | 21.56 | 175.925 | .647 | .951 |
| Item_6 | 21.52 | 179.642 | .346 | .952 |
| Item_7 | 21.56 | 177.517 | .521 | .951 |
| Item_8 | 21.34 | 176.147 | .611 | .951 |
| Item_9 | 21.46 | 176.049 | .612 | .951 |
| Item_10 | 21.42 | 176.085 | .607 | .951 |
| Item_11 | 21.44 | 176.578 | .570 | .951 |
| Item_12 | 21.56 | 176.333 | .615 | .951 |
| Item_13 | 21.50 | 178.173 | .455 | .952 |
| Item_14 | 21.44 | 178.374 | .434 | .952 |
| Item_15 | 21.42 | 176.902 | .545 | .951 |
| Item_16 | 21.48 | 177.561 | .499 | .951 |
| Item_17 | 21.46 | 179.804 | .328 | .952 |
| Item_18 | 21.38 | 176.853 | .551 | .951 |
| Item_19 | 21.48 | 176.989 | .543 | .951 |
| Item_20 | 21.48 | 176.459 | .583 | .951 |

| | | | | |
|---|---|---|---|---|
| Item_21 | 21.54 | 178.253 | .457 | .951 |
| Item_22 | 21.56 | 177.843 | .495 | .951 |
| Item_23 | 21.48 | 176.173 | .605 | .951 |
| Item_24 | 21.46 | 176.498 | .578 | .951 |
| Item_25 | 21.48 | 178.704 | .412 | .952 |
| Item_26 | 21.50 | 178.214 | .452 | .952 |
| Item_27 | 21.40 | 177.102 | .531 | .951 |
| Item_28 | 21.46 | 176.253 | .597 | .951 |
| Item_29 | 21.50 | 177.969 | .471 | .951 |
| Item_30 | 21.44 | 176.496 | .577 | .951 |
| Item_31 | 21.58 | 178.412 | .457 | .951 |
| Item_32 | 21.48 | 176.826 | .555 | .951 |
| Item_33 | 21.50 | 176.010 | .622 | .951 |
| Item_34 | 21.52 | 177.561 | .506 | .951 |
| Item_35 | 21.52 | 180.459 | .284 | .952 |
| Item_36 | 21.44 | 176.986 | .539 | .951 |
| Item_37 | 21.38 | 176.934 | .545 | .951 |
| Item_38 | 21.52 | 178.867 | .406 | .952 |
| Item_39 | 21.44 | 177.109 | .530 | .951 |
| Item_40 | 21.66 | 177.494 | .575 | .951 |
| Item_41 | 21.46 | 177.070 | .534 | .951 |
| Item_42 | 21.50 | 181.602 | .196 | .953 |
| Item_43 | 21.46 | 178.988 | .389 | .952 |
| Item_44 | 21.50 | 177.235 | .527 | .951 |
| Item_45 | 21.50 | 175.765 | .641 | .951 |
| Item_46 | 21.52 | 178.418 | .440 | .952 |
| Item_47 | 21.48 | 176.459 | .583 | .951 |
| Item_48 | 21.56 | 177.476 | .524 | .951 |
| Item_49 | 21.56 | 176.251 | .621 | .951 |
| Item_50 | 21.46 | 176.580 | .572 | .951 |

**Appendix B:** ***Paired Samples t-Test Comparing Pre-Test and Post-Test Scores in the Experimental Group***

**Paired Samples Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference Lower | Upper | | | |
| Pair 1 | Pre_Test - Post_Test | -2.636428571428572 | .971909972532947 | .183673720290414 | -3.013295915795874 | -2.259561227061270 | -14.354 | 27 | .000 |

**Appendix C: Paired Samples t-Test Comparing Post-Test and Delayed Post-Test Scores in the Experimental *Group***

**Paired Samples Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference Lower | Upper | | | |
| Pair 1 | Post_Test - Delayed_Post_Test | -1.852500000000001 | 1.029147885568625 | .194490669108753 | -2.251561890047974 | -1.453438109952028 | -9.525 | 27 | .000 |

**Appendix D:** ***Paired Samples t-Test Comparing Pre-Test and Delayed Post-Test Scores in the Experimental Group***

**Paired Samples Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference Lower | Upper | | | |
| Pair 1 | Pre_Test - Delayed_Post_Test | -4.488928571428573 | .983031363373347 | .185775465604475 | -4.870108340969133 | -4.107748801888012 | -24.163 | 27 | .000 |

**Appendix E:** ***Paired Samples t-Test Comparing Pre-Test and Post-Test Scores in the Control Group***

**Paired Samples Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference Lower | Upper | | | |
| Pair 1 | Pre_Test - Post_Test | -1.665416666666667 | .822990195761068 | .167992170243988 | -2.012934948132684 | -1.317898385200651 | -9.914 | 23 | .000 |

**Appendix F:** ***Paired Samples t-Test Comparing Post-Test and Delayed Post-Test Scores in the Control Group***

**Paired Samples Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference Lower | Upper | | | |
| Pair 1 | Post_Test - Delayed_Post_Test | -.822500000000000 | .759217274280043 | .154974577157731 | -1.143089338458793 | -.501910661541207 | -5.307 | 23 | .000 |

**Appendix G:** ***Paired Samples t-Test Comparing Pre-Test and Delayed Post-Test Scores in the Control Group***

**Paired Samples Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference Lower | Upper | | | |
| Pair 1 | Pre_Test - Delayed_Post_Test | -2.487916666666667 | .753830676217012 | .153875042432407 | -2.806231444247999 | -2.169601889085335 | -16.168 | 23 | .000 |