



Gamified Arabic Vocabulary Learning and Critical Thinking Engagement among Non-Native Learners

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ABSTRACT

This research examines how the interactive language game “Guess the Country and City” influences Arabic vocabulary performance while engaging cognitive processing and critical thinking mechanisms among non-native learners. The research was conducted at an Arabic language institute in a tourism-track immersion program in Riyadh, Saudi Arabia. Applying a quantitative one-group pre-experimental design, the study involved 25 international learners representing 17 different nationalities. Participants completed three assessment phases in which they identified geographical names through visual prompts, symbolic cues, and manipulated Arabic letters under strict time limits. Analytical procedures included descriptive statistics, paired-sample t-tests, and Cohen’s d. The results showed a significant improvement in vocabulary performance, with mean scores increasing from 67.08 in the pre-test to 75.24 in post-test 1 and 84.84 in post-test 2 ($p < .001$), with a large overall effect size (Cohen’s $d = 1.47$). Beyond the quantitative score gains, the game required learners to interpret visual information, analyze symbolic relationships, manipulate Arabic letter patterns, and make rapid decisions under time constraints, thereby engaging higher-order cognitive processing and critical thinking during task completion. These findings suggest that integrating visual, cultural, and problem-solving elements into gamified Arabic learning can support vocabulary development while fostering cognitively demanding learning processes in diverse immersion settings.

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1. INTRODUCTION

Learning Arabic for non-native speakers has undergone massive global expansion over recent decades, driven by escalating demands for cross-cultural dialogue, international collaboration, and academic mobility (Hanifa, 2025). Within this growing field, vocabulary acquisition remains the most indispensable element in mastering the language. It fundamentally dictates the learner's overall capacity to comprehend complex texts and articulate sophisticated thoughts during interactions (Haddad et al., 2025). However, empirical evidence shows that simply placing students in Arabic-speaking immersion environments does not automatically translate to spontaneous communicative fluency (Osman et al., 2023). Immersion alone is not a guaranteed shortcut to natural communication, as underlying cognitive barriers often persist (Bilqis, 2025). During live conversations, many intermediate learners still face significant challenges with spontaneous word retrieval. Because recalling vocabulary requires intense mental effort, these learners are often forced to rely on a bridging language or pause awkwardly for extended periods before speaking, which heavily disrupts the natural flow of communication (Urmaulidiah & Soro, 2025).

To overcome these persistent communicative barriers, incorporating language games (الألعاب اللغوية) offers a highly practical and engaging solution (Moybeka et al., 2023; Faridah, 2025). Viewed through a constructivist lens, gamified tasks shift the educational focus toward active, student-centered communication and hands-on problem-solving (Rosyadi & Fata, 2025). By lowering the affective filter and reducing the anxiety typically associated with foreign language production, these activities naturally increase learner motivation, foster positive competition, and improve long-term vocabulary retention (Indriyani et al., 2025; Amalia et al., 2025). Furthermore, gamified tasks that enforce rapid responses and strict time constraints are exceptionally effective in cultivating analytical flexibility, as they require quick cognitive processing, careful clue analysis, and rapid decision-making under pressure (Ady et al., 2024; Siregar et al., 2026). Ultimately, this gamified approach establishes an interactive learning ecosystem that makes complex linguistic materials feel approachable while outperforming standard, lecture-heavy formats (Nurfauzan et al., 2026).

At the core of this linguistic complexity lies vocabulary acquisition (المفردات) (Chasanah, 2023). In Arabic language instruction, a lack of vocabulary often stands out as the primary roadblock to fluent communication (Rayhan et al., 2023). Even when learners have a solid grasp of grammar, they frequently struggle to speak spontaneously because they cannot access their acquired vocabulary fast enough (Rosyadi & Fata, 2025). However, a significant research gap exists: the majority of studies on language games measure only the quantity of vocabulary memorized (Setyaningsih, 2023; Haddad et al., 2025). The cognitive ability to rapidly activate this vocabulary (retrieval speed) in spontaneous settings, alongside the critical thinking skills required to manipulate Arabic symbols under time constraints, remains largely under-researched (Rahmawati, 2020).

Closely tied to this rapid cognitive processing is critical thinking (التفكير النقدي), the ability to systematically analyze information, weigh evidence, and make logical decisions under pressure (Kajentheran, 2023). In modern language education, critical thinking must be developed alongside linguistic fluency (Amrina et al., 2024). Teachers can foster this skill by designing activities that

force students to interpret data, solve puzzles, and make quick decisions, thereby turning the classroom into an incubator for higher-order cognitive skills (Luciana et al., 2023). Therefore, a game-based intervention that requires learners to observe images, decode symbolic visual clues, manipulate Arabic letters, and deduce correct answers before time runs out holds massive potential (Hermanto & Arifin, 2023). Consequently, this study aims to examine how such an intervention optimizes vocabulary retrieval speed and engages critical thinking mechanisms among non-native Arabic learners.

Despite these obvious theoretical benefits, the current literature on Arabic language games reveals clear limitations (Maula et al., 2022). Previous studies tend to focus on general learning outcomes, resulting in a glaring scarcity of research on games that rely on global culture and visual clues to simultaneously build vocabulary and critical thinking (Hendra & Rohaeti, 2025). Furthermore, very few empirical investigations have taken place within international immersion settings that feature highly diverse cultural backgrounds (Siballi et al., 2025).

To address this critical research gap, the present study introduces a novel instructional intervention utilizing the interactive game "أخمنوا اسم الدولة والمدينة" (Guess the Country and City). Uniquely blending visual imagery, symbolic logic, Arabic spelling manipulation, and global cultural elements under strict time limits, this game challenges learners to identify world geographies in Arabic. Unlike basic vocabulary drills, it is deliberately designed to stimulate rapid lexical activation while training higher-order cognitive analysis. Ultimately, this study aims to evaluate the game's impact on both vocabulary acquisition and critical thinking among non-native Arabic learners participating in a tourism-track language immersion program. The findings are expected to enrich theoretical discussions on game-based Arabic learning and provide a practical, innovative instructional model for educators managing multicultural immersion classrooms.

2. METHODS

Research Design

To effectively evaluate the game's impact, this research adopted a quantitative, pre-experimental methodology structured around a one-group pretest-posttest design. This framework was chosen to accurately track concrete improvements in the learners' cognitive and linguistic skills. The experimental procedure began with a baseline pre-test to gauge initial proficiency levels (Sugiyono, 2020). Following this assessment, the gamified activity was integrated into the daily classroom routine as the main instructional intervention. Finally, two consecutive post-tests were administered to map developmental progress and skill retention over the course of the study (Al Kamli, 2019). However, it must be acknowledged that the absence of a control group in this pre-experimental design renders the study vulnerable to threats to internal validity, such as maturation and history effects.

Research Setting and Participants

The investigation took place between January and February 2026 at an Arabic language institute hosting a tourism track immersion program in Riyadh, Saudi Arabia. This specific cohort consisted of 25 participants representing 17 different nationalities, creating a highly diverse linguistic environment (Creswell, 2014). A purposive sampling method was applied to carefully

select this group, ensuring that their unique cultural backgrounds and current language capabilities perfectly aligned with the core objectives of the study (Sari et al., 2022).

Research Instrument

To collect the necessary data, the researchers embedded a vocabulary mastery assessment directly into the interactive game "خمنوا اسم الدولة والمدينة". We custom-built this activity using various visual media platforms, carefully combining graphic illustrations, symbolic icons, and manipulated Arabic spelling to represent well-known countries and cities around the globe. The assessment tool itself was divided into three separate game packages, with each set containing between 30 and 31 distinct challenges. We assigned the first package as the baseline pre-test, while the second and third sets functioned as the first and second post-tests.

During the actual gameplay sessions, students had to rely on the visual clues provided on the screen to correctly guess the Arabic names of geographical locations before a strict timer ran out. To ensure the equivalence of difficulty levels (equivalent forms) and content validity across the three different game packages, the instruments were subjected to expert judgment prior to implementation. It is important to note that claiming this word-guessing score as an independent empirical measure of critical thinking raises construct validity issues. Therefore, the instrument primarily measures vocabulary retrieval proficiency. At the same time, the critical thinking aspect is analyzed as the underlying cognitive mechanism required to decode the visual data and manipulate the Arabic letters under time pressure. For a clearer picture of how the game's rules were structured, sample screenshots are included in the figures below.



Figure 1. Cover Page of the "Guess the Country and City" Game



Figure 2. Game Rules and Procedures

Explanation: Figure 1 presents the game's cover page, which serves as an initial visual stimulus to engage the participants. Meanwhile, Figure 2 outlines the game procedures, including a strict 10–15 second time limit. Cognitively, this time constraint is operationalized to measure lexical retrieval speed and to stimulate rapid, collaborative cognitive processing within the groups.



Figure 3. Symbols Used in the Game



Figure 4. Sample Item for Guessing a Country

Explanation: Figure 3 introduces symbolic elements representing cognitive instructions: letter deletion and letter substitution. These symbols require participants not only to recall basic vocabulary but also to utilize their metalinguistic awareness. Participants are cognitively compelled to mentally visualize the morphological structure and spelling of the base word before executing the letter manipulation.

Figure 4 demonstrates a complex process of multi-step cognitive manipulation and syllable synthesis. Participants must first retrieve the specific conversational Arabic vocabulary for a mandarin orange (yusafandi / يوسفندي) and apply the deletion symbol to remove the segment safandi, retaining only the initial syllable yu (يو). Next, they identify the glass of milk as laban (لبن) and delete the prefix lab, isolating the letter nun (ن). Finally, participants must synthesize these extracted morphological components with the provided textual suffix an (ان). The cognitive blending of these residual elements (yu + n + an) successfully forms the target country name, Yunan (يونان / Greece). This item effectively measures working memory, morphological manipulation, and the learners' flexibility in accessing both standard and conversational vocabulary to construct new geographical terms.



Figure 5. Sample Item for Guessing a Country



Figure 6. Sample Item for Guessing a City

Explanation: Figure 5 explicitly demonstrates higher-order cognitive processing. First, participants must visually recognize the object as an engineer (muhandis / مهندس). Subsequently, the symbolic red lines on the letters 'mim' (م) and 'sin' (س) instruct the elimination of the first and last letters. This deletion leaves the syllables هـ-ن-د (Hind), which refers to the country of India (Al-Hind). This item effectively measures the participants' mental spelling accuracy and linguistic flexibility.

Figure 6 operationalizes vocabulary mastery through a blending technique that combines textual and visual elements. Participants are provided with a textual prompt "القا" (Al-qa) which must be combined with the mental Arabic translation of the visual stimulus, a cat (hirrah / هرة). The cognitive integration of reading a partial word and accessing animal vocabulary results in the target word "القاهرة" (Al-Qahirah / Cairo). This tests the students' ability to simultaneously process and merge visual and textual contexts.

Research Procedure

The experimental procedure unfolded across four sequential phases. Initially, we established the learners' baseline capabilities by administering a pre-test using the first game package. Moving into the second phase, we rolled out the main pedagogical intervention. Over a span of one to two weeks, the instructors actively integrated the "نحنوا اسم الدولة والمدينة" activity into the regular classroom curriculum.

During the gamified sessions, whenever a student guessed correctly, the instructor immediately stepped in to share brief facts about the location's geography, its unique cultural background, and the proper Arabic spelling. Immediately after this initial treatment period, the students completed the first post-test using the second game package. Rather than stopping there, the instructional team continued to reinforce the material through interactive group discussions, short quizzes, and additional rounds of the game. In the fourth and final phase, the second post-test was administered via the third game package. However, the implementation of additional interventions (group discussions and quizzes) between the first and second post-tests introduces a confounding variable, indicating that the surge in final scores reflects the combined effect of the game and the supplementary instructional activities.

Data Analysis

Once all the scores were collected, we processed the quantitative data using SPSS software. The evaluation began with a fundamental descriptive analysis to outline the mean, minimum, and maximum values, along with the standard deviation across every testing phase (Syahrizal & Jailani, 2023). Before moving into inferential statistics, we ran normality and homogeneity checks to ensure the dataset met the necessary parametric assumptions (Aldhuwaihi & Albawardi, 2024). Our analytical plan relied on the Paired-Sample t-Test for normally distributed data, while keeping the Wilcoxon Signed-Rank Test ready as a non-parametric backup just in case the assumptions were violated (Creswell, 2014). Finally, to understand the actual practical strength of the educational game rather than just looking at its statistical significance, we measured the overall effect size by calculating Cohen's d (Yam & Taufik, 2021).

3. RESULTS AND DISCUSSION

3.1 Result

Descriptive Statistics

To establish a clear picture of how the learners progressed throughout the study, we first examined the descriptive statistics. This initial evaluation breaks down the core data—such as the sample size (N), mean values, standard deviations, and the highest and lowest scores—across all three measurement phases: the pre-test, post-test 1, and post-test 2. Table 1 systematically details the complete statistical distribution of this developmental trend.

Table 1. *Descriptive Statistics of Participants' Scores*

Test	N	Minimum	Maximum	Mean	Std. Deviation
Pre-test	25	40	88	67.08	12.75
Post-test 1	25	50	92	75.24	12.16
Post-test 2	25	75	98	84.84	7.63

A closer look at Table 1 reveals a steady and linear improvement in the participants' average scores across all assessment stages. The learners started with a baseline mean of 67.08 during the pre-test. This average climbed to 75.24 in the first post-test and ultimately reached 84.84 by the second post-test. Overall, the participants achieved a notable cumulative growth of 17.76 points from the beginning to the end of the intervention.

Beyond just the averages, the lowest recorded scores also saw a dramatic upward shift. The minimum score jumped from 40 in the pre-test to 50 in post-test 1, and eventually surged to 75 in the final evaluation. This is a crucial finding because it proves that the game did not just benefit the already high-performing students; it actively lifted the lower-achieving learners as well. Similarly, the maximum scores trended upward, moving from 88 to 92, and finally peaking at 98. This indicates that several participants attained near-perfect mastery after completing the gamified learning process.

At the same time, the standard deviation steadily shrank, dropping from 12.75 in the pre-test to 12.16, and finally down to 7.63 in the second post-test. This continuous decline indicates that the gap in abilities among the students narrowed significantly. While this composite descriptive score reflects overall performance rather than separate indicators, it strongly suggests that the game successfully boosted vocabulary retrieval speed while actively engaging the learners' cognitive skills. To confirm these improvements are mathematically significant, inferential statistics were conducted.

Normality Test

Before running any hypothesis tests, we first needed to confirm that the participants' scores followed a normal distribution, which is a strict requirement for parametric analysis. Because our sample size was relatively small (N = 25), falling well below the standard 50-participant threshold, we relied on the Shapiro-Wilk test as the most robust tool for this check. Table 2 outlines the specific results of this normality assessment.

Table 2. Results of the Shapiro–Wilk Normality Test

Test	Statistic	Sig.
Pre-test	0.962	0.451
Post-test 1	0.955	0.332
Post-test 2	0.948	0.214

As shown in Table 2, the significance (Sig.) values for the pre-test, post-test 1, and post-test 2 are 0.451, 0.332, and 0.214, respectively. Because every single one of these figures sits well above the standard 0.05 threshold ($p > 0.05$), we cannot reject the null hypothesis. This outcome practically confirms that the scores across all three measurement stages follow a normal distribution. With no severe data anomalies present, the dataset perfectly meets the normality assumption, allowing us to confidently move forward with parametric inferential tests.

Hypothesis Testing

With the parametric assumptions confirmed, we moved forward with a Paired-Sample t-Test. We designed this analysis to determine if integrating the "نحنوا اسم الدولة والمدينة" game led to any statistically significant improvements in the learners' language skills. To accurately capture their progress, we split the evaluation into two specific comparisons: measuring the baseline pre-test scores against post-test 1, and then comparing that initial baseline against the final results of post-test 2. Table 4 breaks down the findings from these paired assessments.

Table 4. Results of Paired Sample t-Test

Comparison	Mean Difference	Sig. (2-tailed)
Pre-test – Post-test 1	-8.16	0.000
Pre-test – Post-test 2	-17.76	0.000

As shown in Table 4, comparing the baseline pre-test to post-test 1 reveals a mean difference of -8.16 with a two-tailed significance value of 0.000. Since this p-value sits well below the standard 0.05 threshold ($p < .05$), it confirms that the students experienced a statistically significant improvement in their skills immediately after the first phase of the game.

When looking at the second comparison, between the initial pre-test and the final post-test 2, the mean difference expands to -17.76, maintaining that same 0.000 significance value. This clearly illustrates that once the students completed all the game packages and received further instructional reinforcement, their overall performance leap grew substantially compared to the first phase. Because both observed p-values fall strictly below 0.05, the null hypothesis (H_0) is confidently rejected, and the alternative hypothesis (H_1) is accepted. Ultimately, these results prove that the intervention has a highly significant, positive impact on accelerating vocabulary retrieval speed. Furthermore, while the composite test score directly measures linguistic gains, the process of achieving these scores demonstrates the successful engagement of the cognitive and critical thinking mechanisms required by the game.

Effect Size Analysis

To build on our inferential statistics, we also calculated the effect size using Cohen's *d*. This step is essential because while significance values only tell us whether an effect actually exists, the effect size measures how strong and practical that impact truly is within a real classroom setting. Table 5 outlines the specific results of this effect size evaluation.

Table 5. *Effect Size Analysis*

Comparison	Cohen's <i>d</i>	Interpretation
Pre-test – Post-test 1	0.65	Medium Effect
Pre-test – Post-test 2	1.47	Large Effect

When we calculated the effect size for the first comparison (Pre-test to Post-test 1), Cohen's *d* came out to 0.65, which sits comfortably in the medium effect range. This tells us that the game began making a noticeable, practical difference right from its initial implementation. Even more compelling is the second comparison (Pre-test to Post-test 2), where the Cohen's *d* score jumped to 1.47. A score this high falls firmly into the "large effect" category, highlighting just how strongly the full intervention boosted the students' learning outcomes by the end of the program.

When the effect size was calculated for the first comparison (Pre-test to Post-test 1), Cohen's *d* came out to 0.65, which sits comfortably in the medium effect range. Even more compelling is the second comparison (Pre-test to Post-test 2), where the Cohen's *d* score jumped to 1.47, indicating a very large effect size and categorizing the intervention as highly effective. This confirms that the score increase was not merely a statistical coincidence, but a tangible impact of the gamified learning process. The way this effect size grew shows that the instructional value of the game deepens the more the students practice vocabulary retrieval and decode Arabic structures.

3.2 Discussion

The Effect of the Game on Vocabulary Acquisition

The results of this study clearly show that playing the "أخمنوا اسم الدولة والمدينة" game has a strong, positive effect on how non-native learners acquire Arabic vocabulary. We can see this improvement directly in the steady rise of the participants' average scores, starting from a baseline of 67.08 in the pre-test, moving to 75.24 in the first post-test, and peaking at 84.84 in the final evaluation. Furthermore, the Paired-Samples *t*-test results ($p < .001$) mathematically guarantee that this growth did not happen by random chance; it was a direct result of our gamified intervention. Consequently, this interactive game proves to be a highly effective instructional tool for accelerating active lexical mastery within the demanding framework of a tourism track language immersion program.

The real driving force behind this vocabulary growth lies in the game's ability to lower the affective filter and utilize positive competition. By constantly pushing learners to link dynamic visual stimuli, icons, and manipulated Arabic letters under a strict time limit, the game accelerates the formation of long-term memory schemas. When international students try to guess a country from these clues, they are executing two cognitive steps at once: active vocabulary retrieval and immediate meaning construction. Consistent with theories on cognitive load, repeating this rapid

mental retrieval process effectively locks the words into long-term memory.

Additionally, using strategic imagery as the core of the game allows students to learn vocabulary in a specific context rather than trying to memorize abstract, isolated word lists. Within second language acquisition (SLA) paradigms, it is well known that words tied to rich visual contexts are much easier to understand and boast much higher retention rates compared to vocabulary gained through tedious rote memorization (Osman et al., 2023). This reliance on visual contextualization perfectly explains why the learners' scores climbed so consistently from the baseline all the way to the final test.

Ultimately, these outcomes strongly support existing literature on game-based language learning, which argues that active gamified tasks lead to far better vocabulary acquisition than traditional, teacher-centered classrooms (Rosyadi & Fata, 2025). However, our findings push this understanding a step further. We demonstrate that language games do not succeed merely because they introduce fun behavioral competition. Their true pedagogical value comes from creating a safe, highly engaging environment where students are forced to rapidly activate their vocabulary and apply it immediately within meaningful, simulated communication (Haddad et al., 2025).

The Effect of the Game on Critical Thinking Development

Beyond just improving language skills, our findings show that the "نحنوا اسم الدولة والمدينة" game actively sharpens the students' critical thinking. Unlike basic, straightforward word-guessing exercises, this game throws in structural hurdles, such as symbolic codes, visual puzzles, and modified Arabic letters, that demand deep cognitive analysis before a student can even attempt a guess. To answer correctly, participants have to look past the surface of the images and decode the complex relationships between the pictures, the instruction icons, and the required spelling changes. For example, certain questions require them to systematically delete, swap, or rearrange specific Arabic characters to form the right country or city name. This layered challenge forces learners to instantly tap into a sequence of higher-order cognitive skills, such as interpreting data, analyzing structures, making logical inferences, and evaluating options rapidly. Because of this, the mental effort required during gameplay goes far beyond simple vocabulary recall and directly engages their higher-order thinking skills (HOTS) (Kajentheran, 2023).

The strict time limits attached to each round only amplify this cognitive workout. Forcing students to operate under a ticking clock pushes them to process complex, layered information both quickly and accurately. They have to juggle different word combinations mentally, weigh the reliability of the visual clues, and make a firm decision under pressure. In many ways, this fast-paced dynamic perfectly mirrors the kind of real-world problem-solving and critical thinking exercises that 21st-century educational models heavily promote (Hermanto & Arifin, 2023).

Ultimately, these outcomes support the growing consensus that modern foreign language teaching needs to move past basic rote memorization (Amrina et al., 2024). While the empirical data in this study directly measures vocabulary retrieval speed rather than acting as an independent critical thinking test, the findings highlight that the mechanisms within the game successfully compel learners to engage high-level cognitive processes such as analysis, deduction, and rapid decision-making.

The Role of Visual and Cultural Elements in Language Immersion Programs

What sets this study apart from earlier research is how it deliberately weaves global culture and strong visual elements directly into the game mechanics. The country and city names used in the intervention are not just empty words to memorize; they act as active cultural and geographical learning moments. Whenever a student guesses correctly, the instructor immediately steps in to share brief facts about the location's geography, its unique cultural background, and the proper Arabic spelling (Maula et al., 2022).

This teaching strategy is especially fitting for the highly diverse setup of this immersion program, which brought together 25 students from 17 different countries. In any international immersion setting, learning the target language naturally goes hand in hand with cultural literacy. By exploring world geography and different cultures through Arabic, the students gain a much more authentic and meaningful educational experience. Ultimately, these results show that effective Arabic instruction depends just as much on how the material is packaged as it does on what is being taught. Combining linguistic rules with cultural concepts and visual aids creates a rich, well-rounded learning environment that easily outperforms traditional, grammar-heavy lessons (Hendra & Rohaeti, 2025).

Research Contribution and Gap Fulfillment

This research successfully addresses the gaps highlighted earlier in the literature. While older studies on Arabic language games usually stuck to measuring basic motivation, general interest, or isolated test scores, there has been very little research looking at how games can simultaneously build vocabulary and critical thinking for adult non-native speakers in an immersion setting. This study fills that exact void. Our data clearly show that a carefully designed game can produce excellent results in both areas, backed by a strong significance value ($p < .001$) and a massive Cohen's d of 1.47, proving its real-world value for modern Arabic education.

The real novelty of this research is how it addresses the gaps highlighted in previous studies on Arabic language gamification (Faridah, 2025). While older studies primarily measured quantitative gains in vocabulary memorization, this research successfully demonstrates improvements in memory activation (retrieval speed) facilitated by active critical thinking mechanisms (Husen et al., 2026). Furthermore, running this experiment in a highly diverse, multicultural classroom in Saudi Arabia gives the findings a level of real-world credibility.

4. CONCLUSION

This study provides strong empirical evidence that the interactive "أخمنوا اسم الدولة والمدينة" game is a highly effective pedagogical tool for advancing Arabic language instruction. The quantitative data confirmed a statistically significant improvement in the learners' vocabulary retrieval speed ($p < .001$), which was further backed by a massive practical impact, evidenced by a very large Cohen's d effect size of 1.47. By strategically blending global culture, symbolic puzzles, and Arabic spelling modifications into a time-pressured gamified format, the intervention went far beyond temporary classroom engagement. While the study relied on composite scores to measure linguistic proficiency, the process fundamentally steered learners away from passive memorization.

It required them to engage critical thinking and rapid problem-solving mechanisms to succeed actively.

From a theoretical standpoint, this research adds to the growing body of knowledge on game-based learning by demonstrating how visual problem-solving accelerates lexical activation. On a practical level, it is highly recommended that Arabic language instructors and immersion program administrators incorporate time-based gamification and visual problem-solving activities into their daily curriculum to build dynamic, student-centered learning environments.

However, a few limitations in the study's design must be acknowledged. The experiment relied on a single-group pre-experimental setup without a control group, utilizing a relatively small sample of 25 intermediate learners enrolled in a specific tourism-track program. Because of this, the findings cannot be automatically generalized to other educational contexts, and the potential influence of confounding variables (such as additional class discussions) must be considered. Future studies should look into more robust experimental setups, such as randomized controlled trials with distinct measurement instruments for cognitive variables.

To overcome these boundaries, future studies should look into more robust experimental setups, such as randomized controlled trials with much larger, multicultural sample sizes. Additionally, we highly recommend conducting longitudinal research to see how well students retain this acquired vocabulary over the long run. It would also be highly valuable to explore how similar culture-and-visual-based games might be adapted to improve other productive language skills, such as speaking fluency, reading comprehension, and creative Arabic writing.

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DECLARATION OF AI-ASSISTED TECHNOLOGIES

During the preparation of this work, the authors utilized AI-assisted technologies strictly for language proofreading, structural paraphrasing, and improving the overall readability of the English text. After utilizing these services, the authors thoroughly reviewed, edited, and validated all content, taking full intellectual responsibility for the final manuscript.

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AUTHOR CONTRIBUTIONS STATEMENT

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C : Conceptualization

I : Investigation

Vi : Visualization

M : Methodology

R : Resources

Su : Supervision

So : Software

D : Data Curation

P : Project administration

Va : Validation

O : Writing - Original Draft

Fu : Funding acquisition

Fo : Formal analysis

E : Writing - Review & Editing

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

REFERENCES

- Ady, Muhajir, & Irvani. (2024). Meningkatkan keterampilan berpikir kritis siswa SMA melalui model problem based learning berbantuan permainan tradisional. *Jurnal Pendidikan MIPA*, 14(3), 772–785. [10.37630/jpm.v14i3.1775](https://doi.org/10.37630/jpm.v14i3.1775).
- Aidah, A. N., Hidayat, A. F. S., & Annisa, M. N. (2023). Pengaruh metode Tamyiz terhadap penguasaan kosakata mata pelajaran bahasa Arab siswa kelas V SDI Al-Azhar 47 Samarinda. *Borneo Journal of Islamic*, 3(1), 101–116. <http://journal.uinsi.ac.id/index.php/bjie/article/view/6468>
- Al Kamli, H. M. (2019). The effect of using mind maps to enhance EFL learners' writing achievement and students' attitudes towards writing at Taif University. *Arab World English Journal*, 232, 1–92. <https://doi.org/10.24093/awej/th.232>
- Aldhuwaihi, H., & Albawardi, A. (2024). St Style shifting on X: A comparison of Saudi male and female academics. *3L: Language, Linguistics, Literature*, 30(4), 33–46. <https://doi.org/10.17576/3L-2024-3004-03>
- Alquraini, T. A. (2012). Factors related to teachers' attitudes towards the inclusive education of students with severe intellectual disabilities in Riyadh, Saudi Arabia. *Journal of Research in Special Educational Needs*, 12(3), 170–182. <https://doi.org/10.1111/j.1471-3802.2012.01248.x>
- Amalia, D., Shopia, Z., & Ferdiyansyah, A. (2025). Identifikasi keaktifan belajar siswa melalui penerapan model pembelajaran team games tournament (studi kasus pembelajaran IPS kelas 4 SDN Telaga Biru 7). *Jurnal Cahaya Edukasi*, 3(3), 6–12. [10.63863/jce.v3i3.75](https://doi.org/10.63863/jce.v3i3.75).

- Amrina, A., Amelia, A., & Nicholas, T. (2024). A review of integrated curriculum models in language teaching. *Lingeduca: Journal of Language and Education Studies*, 3(2), 71–86. <https://doi.org/10.70177/lingeduca.v3i2.1339>
- Baharudin, H., & Rahman, N. F. A. (2025). The impact of metacognitive awareness on Arabic listening proficiency among religious secondary school students. *Open Psychology Journal*, 18(1), 1–25. <https://doi.org/10.2174/0118743501422272251006211402>
- Bilqis, S. M. (2025). Code-switching di pembelajaran bahasa Inggris: Solusi atau hambatan imersi? *Journal of Information Systems and Management*, 4(5), 6–13. 10.4444/jisma.v4i5.1222.
- Chasanah, N. (2023). Upaya peningkatan penguasaan mufradat baru dengan metode menyanyi pada siswa kelas VIII Madrasah Tsanawiyah Negeri 2 Semarang. *SECONDARY: Jurnal Inovasi Pendidikan Menengah*, 3(3), 219–226. <https://doi.org/10.51878/secondary.v3i3.2397>
- Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (Fourth Edi). Sage Publications.
- Faridah, S. (2025). Penggunaan smart game card dalam menghafal kosakata bahasa Arab di MTs Nurul Iman NW Kembang Kerang tahun pelajaran 2024–2025. *Al-Kalam: Jurnal Pendidikan Bahasa Arab*, 1(1), 8–15.
- Fauzi, I., Hartono, R., Widhiyanto, W., & Pratama, H. (2022). Mengatasi anxiety dalam berbicara bahasa Inggris melalui pembelajaran berbasis web. In *Prosiding Seminar Nasional Pascasarjana Universitas Negeri Semarang*, 550–556.
- Haddad, A., Hasaniyah, N., & Al-Anshory, A. (2025). Peng Pengaruh media visual terhadap peningkatan kosakata bahasa Arab. *Jurnal Teknologi Pendidikan Dan Pembelajaran (JTPP)*, 02(04), 1111–1117.
- Hanifa, U. A. (2025). Fashāhatul Qur'an dan pengembangan mahārah kalām bagi pembelajar non-native: Sebuah kajian literatur. *Jurnal El-Badr Institute*, 2(1), 97–104.
- Hendra & Rohaeti. (2025). Pengaruh project based learning berbasis games word search puzzles terhadap pemahaman kosakata baku dan motivasi siswa sekolah dasar. *Estetik: Jurnal Bahasa Indonesia*, 8(2), 197–222. 10.29240/estetik.v8i2.13847.
- Hermanto, B., & Arifin, S. (2023). Pengaruh metode student-centered learning dalam pembelajaran bahasa Arab. *Kariman: Jurnal Pendidikan Keislaman*, 11(2), 265–282. 10.52185/kariman.v11i2.340.
- Husen, A., Rahmat, G., & Chadidjah, S. (2026). Analisis teori konstruktivisme terhadap pengembangan pemikiran kritis pada kurikulum deep learning. *Jurnal Media Akademik (JMA)*, 4(2), 1–15. 10.62281/w00eyp96.
- Indriyani, V., Triana, N., & Putri. (2025). Model game-oriented problem exploration (GOPE) dalam pembelajaran bahasa: Analisis kebutuhan siswa. *Jurnal Onoma: Pendidikan, Bahasa Dan Sastra*, 11(1), 266–276. 10.30605/onoma.v11i1.4556.
- Kajentheran, N. (2023). The level of knowledge and readiness of teachers towards the application of mind maps in Malay language learning and facilitation. *Jurnal Pengajian Melayu*, 34(2), 123–134. <https://doi.org/10.22452/jomas.vol34no2.8>

- Luciana, O., Santosa, T. A., Rofi'i, A., Taqiyuddin, T., & Nasution, B. (2023). Meta-analysis: The effect of e-learning-based mind mapping on students' critical thinking skills. *Edumaspul: Jurnal Pendidikan*, 7(2), 2058–2068. <https://doi.org/10.33487/edumaspul.v7i2.6473>
- Maula, K., & Fitriani. (2022). Pembelajaran bahasa Arab berbasis fun learning dengan media permainan ular tangga di MI Al-Muhtadin Arso VI. *Tsaqofiya: Jurnal Pendidikan Bahasa Dan Sastra Arab*, 4(2), 291–302. <https://doi.org/10.21154/tsaqofiya.v4i2.82>
- Mei, S. Y., Ju, S. Y., & Adam, Z. (2018). Implementing Quizizz as game-based learning in the Arabic classroom. *European Journal of Social Science Education and Research*, 9563(1), 194–198. <https://doi.org/10.2478/ejser-2018-0022>
- Moybeka, S., Daik, & Un. (2023). Pendampingan pembelajaran bahasa Inggris dasar untuk anak SD menggunakan game sebagai media. *ABDIKU: Jurnal Pengabdian Masyarakat*, 6(1), 45–52.
- Nurfauzan, Iqram, & Ridlo. (2026). Evaluasi pembelajaran bahasa Arab sebagai bahasa asing: Konsep, tantangan, dan strategi. *JejaK Digital: Jurnal Ilmiah Multidisiplin*, 2(1), 564–573.
- Osman, T., Khalil, H., Milton, M., Shaalan, K., & Alfrjani, R. (2023). Exploiting functional discourse grammar to enhance complex Arabic relation extraction using a hybrid semantic knowledge base–machine learning approach. *ACM Transactions on Asian and Low-Resource Language Information Processing*, 22(8). <https://doi.org/10.1145/3610581>
- Rahmawati, R. D. & A. S. (2020). Strategi pembelajaran menulis bahasa Arab untuk mahasiswa program studi bahasa Inggris. *Jurnal Education and Development Institut Pendidikan Tapanuli Selatan*, 8(3), 298–303. <https://journal.ipts.ac.id/index.php/ED/article/view/1902>
- Rayhan, N., Ananda, R., Rizal, M. S., & Sutiyan, O. S. J. (2023). Peningkatan keterampilan berbicara menggunakan metode bermain peran pada siswa sekolah dasar. *Autentik: Jurnal Pengembangan Pendidikan Dasar*, 7(1), 42–56. <https://doi.org/10.36379/autentik.v7i1.274>
- Rosyadi, I., & Fata, B. S. (2025). Revitalisasi pembelajaran bahasa Arab dalam pendidikan Islam Indonesia. *Al-Fikrah: Jurnal Pemikiran Dan Pendidikan Islam*, 5(2), 183–200.
- Sari, M., Rachman, H., Juli Astuti, N., Win Afgani, M., & Abdullah Siroj, R. (2022). Explanatory survey dalam metode penelitian deskriptif kuantitatif. *Jurnal Pendidikan Sains Dan Komputer*, 3(01), 10–16. <https://doi.org/10.47709/jpsk.v3i01.1953>
- Setyaningsih, R. (2023). Peran permainan edukatif dalam mengembangkan keterampilan berbicara bahasa Inggris pada anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 7(6), 7299–7307. <https://doi.org/10.31004/obsesi.v7i6.5773>
- Siballi, M., Anwar, M., & Astri. (2025). Tinjauan literatur intercultural communicative competence (ICC) dalam pendidikan bahasa Inggris maritim. *Journal of Indonesian Scholars for Social Research*, 5(1), 14–28.
- Siregar, Sukma, & Kharisma. (2026). Strategi guru dalam mengembangkan motivasi literasi bahasa pada siswa di sekolah dasar. *Didak: Jurnal Ilmiah FKIP Universitas Mandiri*, 12(2), 278–290. [10.36989/didaktik.v12i02.12812](https://doi.org/10.36989/didaktik.v12i02.12812).
- Sugiyono. (2020). *Metodologi Penelitian Kuantitatif, Kualitatif dan R & D* (19th ed.). ALFABETA.
- Syahrizal, H., & Jailani, M. S. (2023). Jenis-jenis penelitian dalam penelitian kuantitatif dan kualitatif. *Jurnal QOSIM: Jurnal Pendidikan, Sosial & Humaniora*, 1(1), 13–23.

<https://doi.org/10.61104/jq.v1i1.49>

- Uluum, C., Baroroh, U., & Umasugi, M. K. (2025). Inovasi penilaian pembelajaran bahasa Arab berbasis HOTS (higher order thinking skills) dengan media audio visual untuk meningkatkan keterampilan menyimak. *JIEPP: Journal of Innovation, Evaluation, and Learning Development*, 5(2), 194–203. 10.54371/jiepp.v5i2.863.
- Urmaulidiah, D., & Soro. (2025). Implementasi micro speaking skill dalam meningkatkan kosakata bahasa Inggris siswa sekolah menengah (studi kasus di SMPN 1 Plered). *Pendas : Jurnal Ilmiah Pendidikan Dasar*, 10(4), 318–333. 10.23969/jp.v10i04.37489.
- Yam, J. H., & Taufik, R. (2021). Hipotesis penelitian kuantitatif. *Perspektif: Jurnal Ilmu Administrasi*, 3(2), 96–102. 10.33592/perspektif.v3i2.1540.