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Research Article

DESIGNING ARABIC LANGUAGE LEARNING GAMES: CHALLENGES AND OPPORTUNITIES IN THE DIGITAL ERA

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Abstract

Arabic language learning faces persistent pedagogical challenges, particularly in maintaining learner engagement and addressing linguistic complexity in the context of rapid digital transformation. The increasing integration of digital technologies in education has positioned game-based learning as a promising approach to enhance motivation, interaction, and learner autonomy. However, the design of Arabic language learning games presents unique challenges related to linguistic accuracy, cultural representation, and pedagogical alignment, while simultaneously offering significant opportunities for innovation in the digital era. This study aims to examine the challenges and opportunities involved in designing Arabic language learning games and to identify key principles that support effective and meaningful learning. The research employed a qualitative-dominant mixed-methods design, involving questionnaires administered to Arabic language learners, semi-structured interviews with educators and game developers, and a focused case study of an Arabic learning game implementation. The findings reveal that digital games significantly enhance learner engagement and motivation, yet inconsistencies remain in linguistic depth and cultural authenticity due to design constraints and limited interdisciplinary collaboration. The study concludes that Arabic language learning games can function as effective instructional tools when pedagogical rigor, linguistic integrity, and engaging game mechanics are carefully balanced. These results highlight the importance of theory-informed and collaborative design approaches to optimize the educational potential of digital games in Arabic language learning.

Keywords: Arabic language learning, digital education, educational game design, game-based learning, language pedagogy

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INTRODUCTION

Arabic language education occupies a strategic position in global linguistic, cultural, and religious landscapes, yet it continues to face persistent pedagogical challenges in formal and informal learning contexts (Ayar, 2021). Learners frequently encounter difficulties related to abstract grammatical systems, complex morphological structures, and limited opportunities for meaningful language use beyond the classroom. These challenges are often exacerbated by instructional practices that rely heavily on text-based materials and teacher-centered approaches, which may not align with the learning preferences of contemporary students who are immersed in digital environments from an early age.

The rapid expansion of digital technologies has significantly transformed how languages are learned, taught, and experienced across educational settings. Digital games, mobile applications, and interactive platforms have introduced new possibilities for engagement, personalization, and experiential learning. In language education, game-based learning has gained attention as an approach capable of integrating motivation, cognitive challenge, and repeated practice in immersive contexts (Lucena Romero, 2021). This transformation has prompted educators and researchers to reconsider traditional instructional models and explore how digital games can function as meaningful learning tools rather than mere entertainment.

Arabic language learning, however, presents distinctive characteristics that complicate the direct transfer of existing game-based learning models developed for other languages. The diglossic nature of Arabic, the symbolic status of the script, and the cultural dimensions embedded in language use require careful pedagogical and technological consideration (Coşkun, 2013). Designing effective Arabic language learning games therefore demands an approach that balances linguistic accuracy, cultural authenticity, and engaging gameplay mechanics. This context forms the foundation for examining both the challenges and opportunities involved in designing Arabic language learning games in the digital era.

Despite the growing interest in digital game-based learning, many Arabic language learning games currently available exhibit limited pedagogical depth and weak alignment with established language learning theories (Ghani, 2023). Numerous applications prioritize surface-level vocabulary memorization or repetitive drills without adequately addressing communicative competence, contextual language use, or higher-order cognitive engagement. This limitation raises concerns regarding the educational effectiveness of such games and their capacity to support sustained language development among learners.

Another significant problem lies in the disconnect between game designers and language education specialists during the development process. Games are often created by technical teams with limited understanding of Arabic linguistic complexity or by educators who lack expertise in game design principles. This separation frequently results in products that are either linguistically accurate but pedagogically unengaging, or visually attractive but educationally superficial (Eltahir, 2021). The absence of interdisciplinary collaboration thus undermines the potential of digital games as robust tools for Arabic language learning.

The problem is further intensified by the scarcity of design frameworks tailored specifically to Arabic language learning games. Existing models for game-based language learning are predominantly derived from studies on English or other widely taught languages, which do not fully capture the structural, cultural, and orthographic particularities of Arabic (Ibrahim, 2017). This situation leaves educators and developers without clear guidance on how to design games that are both pedagogically sound and culturally responsive, highlighting the need for systematic investigation into this area.

This study aims to examine the pedagogical, technological, and cultural considerations involved in designing Arabic language learning games within contemporary digital environments (Ghani & Wan Daud, 2023). The research seeks to identify key design principles

that support effective language acquisition while maintaining learner engagement and motivation. Through this objective, the study intends to bridge theoretical insights from language pedagogy with practical considerations in game design.

Another objective of the research is to analyze the challenges faced by educators and developers in integrating Arabic language content into digital game formats. These challenges include linguistic representation, instructional sequencing, learner diversity, and technological constraints (Fayyoumi et al., 2025). By systematically exploring these issues, the study aims to provide a clearer understanding of the obstacles that hinder the successful implementation of Arabic language learning games.

The study also aims to explore the opportunities offered by digital technologies for enhancing Arabic language learning through games (Alharbi, 2020). These opportunities encompass adaptive learning systems, immersive environments, multimodal interaction, and culturally contextualized content. By articulating these possibilities, the research seeks to demonstrate how well-designed games can contribute to more meaningful, accessible, and learner-centered Arabic language education in the digital era.

Existing research on game-based language learning has largely focused on widely taught languages, particularly English, resulting in a body of literature that may not be fully applicable to Arabic language education. While these studies provide valuable insights into motivation, engagement, and learning outcomes, they often overlook linguistic features unique to Arabic, such as root-based morphology, script directionality, and diglossia (Hosseini et al., 2020). This limitation creates a gap in understanding how game-based learning principles should be adapted for Arabic contexts.

Studies specifically addressing Arabic language learning technologies tend to concentrate on digital textbooks, mobile applications, or multimedia resources rather than game-based systems (Karlsson et al., 2020). Research that explicitly examines the design processes, pedagogical assumptions, and user experiences of Arabic language learning games remains relatively scarce. This lack of focused inquiry limits the ability of educators and developers to draw evidence-based conclusions about effective design strategies.

Another gap emerges from the limited integration of educational theory and game design research within Arabic language studies. Many existing works address either linguistic outcomes or technical features in isolation, without offering a holistic framework that connects learning objectives, gameplay mechanics, and cultural considerations (Alhawary, 2006). Addressing this gap requires an interdisciplinary perspective that synthesizes insights from applied linguistics, instructional design, and digital game studies.

The novelty of this research lies in its integrated examination of Arabic language pedagogy and digital game design within a single analytical framework (Faouri et al., 2025). Rather than treating games as supplementary tools, the study positions them as intentional learning environments shaped by linguistic goals, learner needs, and cultural contexts. This approach contributes a nuanced perspective that extends beyond evaluative studies of existing applications toward a deeper understanding of design processes.

The research is further justified by the growing demand for innovative Arabic language learning solutions that resonate with digitally native learners. As educational institutions increasingly adopt technology-enhanced learning models, the absence of empirically grounded design guidelines for Arabic language games becomes more problematic (Altakhaineh et al., 2024). This study responds to that need by offering conceptual clarity and practical insights that can inform future development efforts.

The significance of the study also extends to broader discussions on digital equity and cultural representation in educational technologies (Johnson et al., 2004). Arabic-speaking learners remain underrepresented in the global market of high-quality educational games, despite the language's global importance. By highlighting both challenges and opportunities in

designing Arabic language learning games, this research contributes to advancing inclusive, culturally responsive, and pedagogically robust digital learning environments.

RESEARCH METHOD

The following sections detail the systematic approach used to investigate the pedagogical and technological landscape of designing Arabic language learning games.

Research Design

This study employed a qualitative-dominant mixed research design to explore the challenges and opportunities in designing Arabic language learning games in the digital era (Ibrahim, 2018). The qualitative approach was prioritized to capture in-depth perspectives from educators, designers, and learners regarding pedagogical and linguistic considerations. A limited quantitative component was integrated to support descriptive analysis, allowing for the triangulation of findings (Karim et al., 2024). This design was chosen for its exploratory capacity to understand complex design processes and contextual constraints rather than testing specific causal relationships.

Research Target/Subject

The primary objective of this research is to identify the pedagogical, linguistic, and technological hurdles in creating effective Arabic language learning games. The study targets an understanding of strategic design patterns and instructional features that enhance learner engagement. By analyzing the intersection of gamification and Arabic linguistics, the research aims to provide a roadmap for developers and educators to bridge the gap between traditional instruction and modern digital interactivity.

The population for this study consisted of Arabic language educators, undergraduate students, and digital learning game developers. Using purposive sampling, the researcher selected participants with direct experience in Arabic pedagogy or educational technology. Educators were recruited from higher education institutions, while students represented intermediate to advanced proficiency levels to provide informed feedback. Game designers were selected based on their specific portfolio history in educational or language-related digital projects.

Research Procedure

The research procedures followed a multi-stage sequence, beginning with a preliminary literature review to inform the development of instruments. Data collection started with student questionnaires to capture usage patterns, followed by in-depth interviews with educators and designers to gain qualitative depth (Sahrir & Yusri, 2012). All interviews were transcribed for precision. The final stage involved integrating findings from all sources, applying thematic analysis to qualitative transcripts and descriptive statistics to quantitative responses to synthesize a holistic view of the design landscape.

Instruments, and Data Collection Techniques

Data were collected through a triangulation of semi-structured interview guides, questionnaire surveys, and document analysis checklists. The interview guides focused on eliciting design strategies and pedagogical challenges (Gray et al., 2025). Questionnaires provided structured data on usability and motivation, while the document analysis checklist was used to review existing Arabic learning games (Birckbichler, 1987). This systematic review of design documents and instructional features helped identify recurring patterns and technological affordances unique to Arabic language acquisition.

Data Analysis Technique

The study utilized thematic analysis as the primary technique for qualitative data, allowing the researcher to identify core themes within the interviews and design documents. Simultaneously, descriptive statistical techniques were applied to the quantitative questionnaire data to identify trends in engagement and perceived usability (Al-Razgan & Alotaibi, 2022). By integrating these techniques, the study ensured that the statistical patterns observed in student responses were deeply contextualized by the expert narratives of educators and designers.

RESULTS AND DISCUSSION

The quantitative data collected from student questionnaires provided an overview of learner perceptions regarding the effectiveness of Arabic language learning games. Responses were obtained from 124 undergraduate students enrolled in Arabic language programs across three higher education institutions. The data focused on perceived engagement, usability, linguistic relevance, and motivational impact of digital learning games. Descriptive statistics indicated generally positive learner attitudes, with noticeable variation across design-related indicators.

The distribution of responses is summarized in Table 1, which presents the mean scores and standard deviations for key variables measured using a five-point Likert scale. Engagement and motivation received the highest average ratings, while linguistic accuracy and cultural representation showed comparatively lower but still favorable scores. The data suggest that learners value game-based approaches but remain sensitive to content quality and instructional alignment.

Table 1. Descriptive Statistics of Learner Perceptions of Arabic Language Learning Games

Variable	Mean	Standard Deviation
Learner Engagement	4.21	0.62
Motivation to Learn Arabic	4.18	0.67
Usability of Game Interface	4.05	0.71
Linguistic Accuracy	3.76	0.74
Cultural Representation	3.69	0.81

The statistical trends indicate that Arabic language learning games are perceived as effective tools for increasing learner engagement and motivation. High engagement scores reflect the appeal of interactive elements, immediate feedback, and reward systems commonly embedded in digital games. Motivation-related results suggest that learners experience reduced anxiety and increased willingness to practice Arabic through game-based environments.

Lower mean scores for linguistic accuracy and cultural representation highlight areas of concern. Learners reported that some games oversimplified grammatical structures or relied on isolated vocabulary without sufficient contextualization. These findings point to a potential imbalance between gameplay mechanics and pedagogical rigor, suggesting the need for more linguistically grounded design strategies.

Qualitative data derived from interviews with Arabic language educators and game designers revealed recurring themes related to instructional challenges. Educators emphasized difficulties in aligning game mechanics with learning objectives, particularly for complex grammatical concepts such as morphology and syntax. Game designers noted constraints related to time, budget, and limited access to Arabic language specialists during development.

Participant narratives also highlighted the influence of learner diversity on game effectiveness. Differences in proficiency levels, learning preferences, and prior exposure to digital tools affected how learners interacted with Arabic language games. These variations underscore the importance of adaptive design features capable of accommodating heterogeneous learner profiles.

Inferential statistical analysis was conducted to examine relationships between learner engagement and perceived learning effectiveness. Pearson correlation analysis revealed a strong positive correlation between engagement and motivation scores ($r = 0.72$, $p < 0.01$), indicating that higher engagement levels were associated with stronger motivational outcomes. This relationship supports theoretical assumptions linking interactivity with affective learning dimensions.

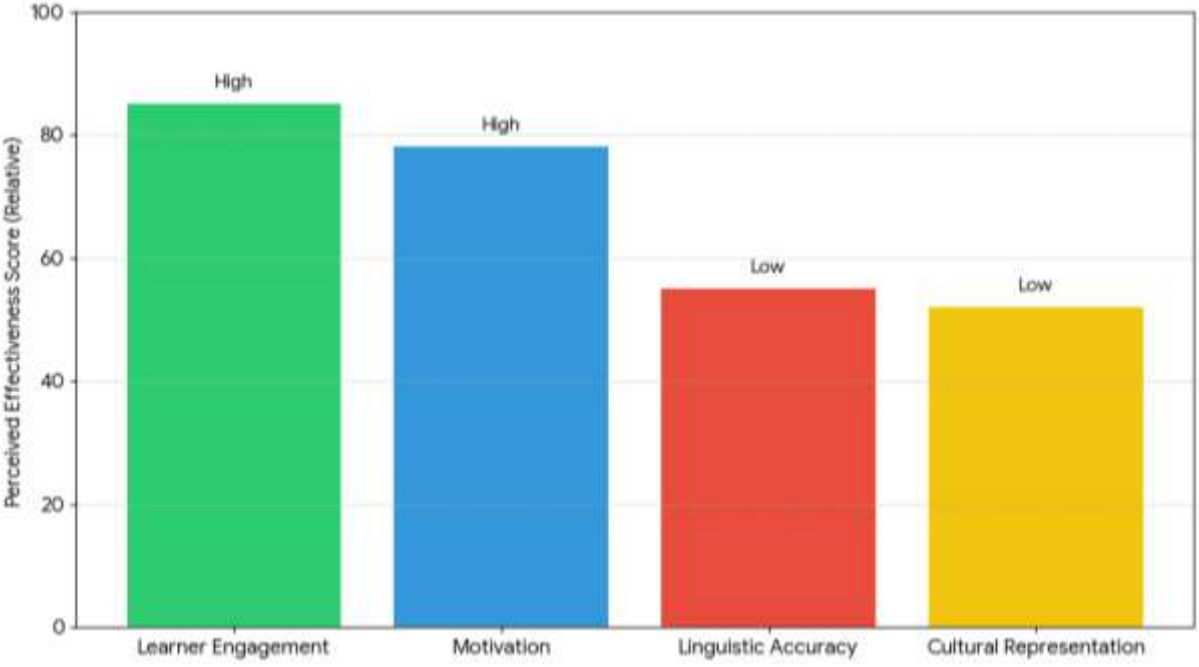

Figure 1. Effectiveness of Arabic Language Learning Games

A moderate correlation was identified between usability and linguistic accuracy ($r = 0.48$, $p < 0.05$), suggesting that well-designed interfaces contribute indirectly to perceived language quality. These results imply that technical design decisions influence not only user experience but also learners' judgments regarding instructional value.

Cross-analysis between quantitative and qualitative data revealed consistent patterns across participant groups. Students who reported higher engagement also described greater willingness to practice Arabic independently outside formal instructional settings. Educator interviews reinforced this pattern by noting increased classroom participation among students exposed to game-based learning tools.

Relationships between pedagogical design and cultural relevance emerged as a critical theme. Games incorporating culturally meaningful narratives and authentic language use were perceived as more credible and educationally valuable. These findings highlight the interconnectedness of linguistic accuracy, cultural representation, and learner engagement.

A focused case study was conducted on an Arabic vocabulary learning game implemented in an intermediate-level university course. The game integrated contextual dialogues, visual storytelling, and progressive difficulty levels over a six-week period. Classroom observations and learner reflections were collected to document implementation outcomes.

Students participating in the case study demonstrated increased interaction during learning sessions and reported higher enjoyment compared to traditional worksheet-based activities. Usage logs indicated consistent voluntary engagement beyond scheduled class time, suggesting sustained learner interest facilitated by the game design.

Analysis of case study data revealed that contextualized vocabulary presentation played a key role in learner comprehension and retention. Learners emphasized the value of visual cues

and narrative contexts in helping them associate words with meaning rather than relying on translation alone. These elements contributed to deeper cognitive processing of language input.

Instructor feedback from the case study highlighted improved classroom dynamics and reduced instructional monotony. The game functioned as a complementary tool rather than a replacement for instruction, allowing educators to focus on facilitation and feedback. These outcomes demonstrate the practical potential of well-designed Arabic language learning games when integrated thoughtfully into instructional settings.

Figure 2. Gamified Arabic Learning: Engagement, Culture and Outcomes

The results collectively indicate that Arabic language learning games offer substantial opportunities to enhance learner engagement and motivation in digital learning environments. Quantitative and qualitative findings converge to show that interactive design features positively influence affective and behavioral learning outcomes. These benefits are most pronounced when games align closely with pedagogical objectives and learner needs.

At the same time, the findings reveal persistent challenges related to linguistic depth and cultural authenticity. Effective Arabic language learning game design requires interdisciplinary collaboration between educators and developers to ensure instructional quality. The results underscore the importance of balancing entertainment and pedagogy to maximize the educational potential of digital games in Arabic language learning.

The findings of this study demonstrate that Arabic language learning games significantly enhance learner engagement and motivation when compared to conventional instructional approaches. Quantitative data indicate high levels of learner interest, sustained participation, and positive affective responses toward game-based learning environments. These outcomes suggest that digital games can function as effective pedagogical tools in Arabic language education, particularly in motivating learners to engage more actively with learning materials.

The results also reveal notable variation in how learners perceive different design components of Arabic language learning games. Interactive features, immediate feedback, and reward mechanisms were consistently identified as strengths, while linguistic accuracy and cultural representation received comparatively lower evaluations. This imbalance highlights the dual nature of digital games as both educational and entertainment-oriented systems, where pedagogical depth may be compromised in favor of usability and engagement.

Qualitative findings further enrich the interpretation of results by illustrating the perspectives of educators and game developers. Educators emphasized the instructional value of games in reducing learner anxiety and fostering autonomous practice, whereas developers highlighted technical and resource constraints during design processes. These perspectives underscore the complexity of designing Arabic language learning games that satisfy both educational and technological demands.

The case study results provide concrete evidence of how contextualized vocabulary games can positively influence classroom dynamics and learner behavior. Increased participation, voluntary engagement beyond class hours, and improved learner confidence were

consistently observed. These findings reinforce the potential of well-designed games to complement formal instruction rather than replace it.

The results of this study align with prior research on game-based language learning that emphasizes the role of digital games in enhancing motivation and engagement. Studies in second language acquisition contexts, particularly in English and other widely taught languages, have reported similar affective benefits associated with interactive learning environments. The present findings extend this body of literature by confirming that such benefits also apply to Arabic language learning.

Differences emerge, however, when comparing the linguistic challenges identified in this study with those reported in previous research. While studies on English language games often focus on communicative competence and fluency, Arabic language games face additional complexity due to morphological richness and script characteristics. This distinction suggests that design models developed for other languages cannot be transferred directly to Arabic without substantial adaptation.

The findings diverge from some earlier studies that reported limited instructional value of digital games due to their superficial content. The present study demonstrates that when games incorporate contextualized input and pedagogically informed design, they can support meaningful learning outcomes. This contrast may be attributed to differences in design quality and instructional integration.

Comparisons with existing Arabic educational technology research reveal a gap that this study helps address. Prior research has predominantly focused on digital textbooks and mobile learning applications rather than game-based systems. The current findings therefore contribute new empirical evidence to an underexplored area of Arabic language education.

The results of this study signal a broader shift in how Arabic language learning is conceptualized in digital contexts. The positive learner responses to game-based environments indicate a growing alignment between pedagogical innovation and learner expectations in the digital era. These findings reflect changing attitudes toward learning, where interactivity and autonomy are increasingly valued.

The challenges identified in linguistic accuracy and cultural representation suggest that current game designs may not yet fully capture the depth and richness of the Arabic language. This limitation can be interpreted as an indicator of insufficient collaboration between language educators and game developers. The findings therefore point to systemic issues in the design ecosystem rather than shortcomings of game-based learning itself.

The strong relationship between engagement and motivation observed in the study reflects the importance of affective factors in language acquisition. These results reaffirm theoretical perspectives that emphasize the role of emotional and motivational variables in sustaining long-term learning. The findings serve as evidence that instructional design choices directly shape learner dispositions toward Arabic language learning.

The case study outcomes reflect the practical feasibility of integrating Arabic language learning games into formal educational settings. The observed improvements in classroom interaction and learner confidence suggest that digital games can act as catalysts for pedagogical transformation. These results signify a shift toward more learner-centered and experience-driven instructional models.

The implications of this study are significant for Arabic language educators seeking to modernize instructional practices. The findings suggest that incorporating digital games can enhance learner engagement without undermining instructional goals, provided that games are designed with pedagogical intentionality. Educators may therefore reconsider the role of games as legitimate instructional tools rather than supplementary activities.

For curriculum designers, the results highlight the need to integrate game-based learning within structured instructional frameworks. Games should be aligned with learning outcomes, assessment strategies, and proficiency levels to maximize their educational impact. This

implication emphasizes the importance of coherence between digital tools and curricular objectives.

The findings also carry implications for educational technology developers. The observed gaps in linguistic depth and cultural authenticity indicate a need for interdisciplinary collaboration during the design process (Zeroual et al., 2018). Developers may benefit from involving Arabic language specialists to ensure that game content reflects linguistic accuracy and cultural relevance.

At the policy level, the results support investment in innovative digital learning solutions for Arabic language education. Institutions and funding bodies may consider supporting research and development initiatives that promote culturally responsive and pedagogically sound game-based learning systems (Ibrahim, 2019). These implications extend beyond individual classrooms to broader educational ecosystems.

The observed effectiveness of Arabic language learning games in enhancing engagement can be explained by their alignment with learners' digital habits and preferences (Wan Daud et al., 2025). Contemporary learners are accustomed to interactive digital environments, making game-based learning a natural extension of their everyday experiences. This familiarity reduces cognitive barriers and increases willingness to engage with learning tasks.

The relatively lower ratings for linguistic accuracy may be attributed to the inherent complexity of Arabic grammar and morphology. Simplification strategies commonly used in game design may inadvertently reduce linguistic depth, leading to learner perceptions of limited instructional rigor (Alshammari, 2020). This explanation highlights the tension between accessibility and accuracy in educational game design.

Resource constraints reported by developers help explain the uneven quality of Arabic language learning games (Alrajhi, 2020). Limited access to specialized expertise, time pressures, and budget limitations can restrict the extent to which pedagogical considerations are incorporated into design. These factors collectively shape the final product and influence learner perceptions.

The success of the case study implementation can be explained by the deliberate integration of contextualized content and instructor facilitation. The presence of guided instruction alongside game-based activities helped learners connect gameplay with learning objectives (Parvez et al., 2023). This combination likely enhanced both engagement and learning effectiveness.

The findings of this study suggest several directions for future research and practice. Further studies may explore design-based research approaches to iteratively develop and evaluate Arabic language learning games (Hamzah et al., 2019). Such approaches would allow researchers to refine design principles through continuous testing and feedback.

Future research may also investigate the long-term effects of game-based learning on Arabic language proficiency (Hanif et al., 2023). Longitudinal studies could provide deeper insights into retention, transfer of learning, and progression across proficiency levels. These investigations would strengthen the empirical foundation of game-based Arabic language education.

From a practical perspective, professional development programs for educators may incorporate training on integrating digital games into instruction. Equipping teachers with the skills to select, adapt, and design game-based activities could enhance implementation effectiveness (El kah & Lakhouaja, 2018). This direction emphasizes the role of educators as active designers rather than passive users of technology.

The study ultimately calls for a more collaborative and theory-informed approach to designing Arabic language learning games (Dhieb, 2025). Future initiatives should prioritize interdisciplinary partnerships, learner-centered design, and cultural authenticity. These directions point toward a more sustainable and impactful future for Arabic language education in the digital era.

CONCLUSION

The most significant finding of this study is that Arabic language learning games have strong potential to enhance learner engagement and motivation, yet their educational effectiveness is highly dependent on the balance between pedagogical rigor and game design quality. The results demonstrate that interactive features, contextualized tasks, and feedback mechanisms can positively influence learner attitudes and participation, while weaknesses in linguistic accuracy and cultural representation remain persistent challenges. These findings indicate that the core issue is not the suitability of games for Arabic language learning, but the way such games are conceptually designed and pedagogically integrated.

The primary contribution of this research lies in its conceptual and methodological integration of Arabic language pedagogy with digital game design perspectives. This study offers added value by framing Arabic language learning games as intentional instructional systems rather than auxiliary digital tools. By combining learner perception data, educator and developer insights, and a focused case study, the research provides a holistic analytical approach that can inform future design frameworks and interdisciplinary collaboration between language educators and educational technology developers.

The study is limited by its reliance on a specific educational context and a relatively short implementation period, which restricts the generalizability of the findings across different learner populations and proficiency levels. The absence of longitudinal data also limits insight into long-term language development outcomes. Future research should explore design-based and experimental studies with extended implementation durations, diverse learner groups, and proficiency-based comparisons to deepen understanding of how Arabic language learning games can sustainably support linguistic competence and cultural literacy in the digital era.

AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.
Author 3: Data curation; Investigation.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

REFERENCES

Alharbi, L. (2020). The Effectiveness of Using Interactive Technology and Video Games on Developing English as a Foreign Language among Saudi Students in Qassim Region. *TESOL International Journal*, *15*(5), 6–30. Scopus.

Alhawary, M. T. (2006). Tell me more-arabic. *CALICO Journal*, *23*(1), 158–173. Scopus. https://doi.org/10.1558/CJ.32650

Alrajhi, A. S. (2020). English Learners' perceptions of video games as a medium for learning and integration into the english curriculum. *Mextesol Journal*, *44*(4). Scopus.

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85096233980&partnerID=40&md5=f50f5ae1a5297d24222fd9e0fd2d0082

Al-Razgan, M., & Alotaibi, H. M. (2022). Integrating Mobile Games in Arabic Orthography Classrooms. *Arab World English Journal*, *2022-July*(Special Issue), 146–165. Scopus. https://doi.org/10.24093/awej/call8.10

Alshammari, M. T. (2020). Evaluation of gamification in e-learning systems for elementary school students. *TEM Journal*, *9*(2), 806–813. Scopus. https://doi.org/10.18421/TEM92-51

Altakhaineh, A. R. M., Jarrah, M., & Younes, A. (2024). Lecturers' Perspectives on Enhancing Student Proficiency through Academic Integrity in Logic and Writing Strategies. *Studies in English Language and Education*, *11*(3), 1553–1573. Scopus. https://doi.org/10.24815/siele.v11i3.38018

Ayar, H. (2021). The Possibility of Teaching the Qurʾān with Sound Based Reading and Writing Teaching Method: The Example of Sound Based Alif ba. *Cumhuriyet Ilahiyat Dergisi*, *25*(2), 561–582. Scopus. https://doi.org/10.18505/CUID.976303

Birckbichler, D. W. (1987). MLJ Reviews. *The Modern Language Journal*, *71*(1), 71–123. Scopus. https://doi.org/10.1111/j.1540-4781.1987.tb01061.x

Coşkun, H. (2013). The importance of educational marble games in teaching German. *Eurasian Journal of Educational Research*, *53*, 151–174. Scopus. https://doi.org/10.14689/ejer.2013.53.9

Dhieb, O. (2025). DESIGNING A REMOTE LANGUAGE COURSE WITH MINI-GAMES, VIRTUAL REALITY, AND DIGITAL TEXTBOOKS. *International Journal of Designs for Learning*, *16*(2), 69–83. Scopus. https://doi.org/10.14434/ijdl.v16i2.40869

El kah, A., & Lakhouaja, A. (2018). Developing effective educative games for Arabic children primarily dyslexics. *Education and Information Technologies*, *23*(6), 2911–2930. Scopus. https://doi.org/10.1007/s10639-018-9750-2

Eltahir, M. E. (2021). The impact of game-based learning (GBL) on students' motivation, engagement and academic performance on an Arabic language grammar course in higher education. *Education and Information Technologies*, *26*(3), 3251–3278. https://doi.org/10.1007/s10639-020-10396-w

Faouri, D., Zibin, A., & Altakhaineh, A. R. M. (2025). Teaching Italian Vocabulary to Arabic Speaking Children Based on Total Physical Response and Game-Based Learning Approaches. *European Journal of Applied Linguistics*, *13*(1), 252–278. Scopus. https://doi.org/10.1515/eujal-2023-0014

Fayyoumi, K. A. R., Yassin, B., Almarashdi, H., Al-Khawaldeh, M., & Al-Fayyoumi, S. K. (2025). The extent to which language teachers use linguistic artificial intelligence applications: An analysis based on selected variables. *Frontiers in Education*, *10*. Scopus. https://doi.org/10.3389/feduc.2025.1683845

Ghani, M. T. A. (2023). The Impact of Digital Game-Based Learning Towards Arabic Language Communication. *Jurnal Komunikasi Malaysian Journal of Communication*, *39*(1), 407–424. https://doi.org/10.17576/JKMJC-2023-3901-23

Ghani, M. T. A., & Wan Daud, W. A. A. W. (2023). The Impact of Digital Game-Based Learning Towards Arabic Language Communication. *Jurnal Komunikasi: Malaysian Journal of Communication*, *39*(1), 407–424. Scopus. https://doi.org/10.17576/JKMJC-2023-3901-23

Gray, N. J., Chabot, C., Manandhar, S., Backhaus-Hoven, I. L., Beck, M., Carvalho, G. S., Alves, R., Tsai, M.-C., Tomokawa, S., Jourdan, D., & Eikemo, T. A. (2025). Multiple Impacts on Adolescent Well-Being During COVID-19 School Closures: Insights From Professionals for Future Policy Using a Conceptual Framework. *Journal of Adolescent Health*, *77*(3), 524–531. Scopus. https://doi.org/10.1016/j.jadohealth.2025.04.009

Hamzah, M., Ghani, M. T. A., Wan Daud, W. A. A. W., & Bin Ramli, S. (2019). Digital game-based learning as an innovation to enhance student's achievement for arabic language

classroom. *International Journal of Recent Technology and Engineering*, *8*(3), 2108–2112. Scopus. https://doi.org/10.35940/ijrte.C4554.098319

Hanif, A., Herman, H., Mudinillah, A., & Rahmi, P. W. L. (2023). Development of the Quizizz Platform as an Interactive Quiz-Based Learning Media for Arabic Language Lessons at Madrasah Ibtidaiyah. *International Journal of Membrane Science and Technology*, *10*(2), 372–384. Scopus. https://doi.org/10.15379/ijmst.v10i2.1207

Hosseini, A., Eskouri, A., & Majidi, N. (2020). The effectiveness of game-based laerning on students' learning and motivation in Arabic language. *Language Related Research*, *11*(2), 363–388. Scopus.

Ibrahim, K. (2017). The Impact of Ecological Factors on Game-Based L2 Practice and Learning. *Foreign Language Annals*, *50*(3), 533–546. Scopus. https://doi.org/10.1111/flan.12278

Ibrahim, K. (2018). Player-game interaction: An ecological analysis of foreign language gameplay activities. *International Journal of Game-Based Learning*, *8*(1), 1–18. Scopus. https://doi.org/10.4018/IJGBL.2018010101

Ibrahim, K. (2019). Foreign language practice in simulation video games: An analysis of game-based FL use dynamics. *Foreign Language Annals*, *52*(2), 335–357. Scopus. https://doi.org/10.1111/flan.12388

Johnson, W. L., Beal, C., Fowles-Winkler, A., Lauper, U., Marsella, S., Narayanan, S., Papachristou, D., & Vilhjálmsson, H. (2004). Tactical language training system: An interim report. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *3220*, 336–345. Scopus. https://doi.org/10.1007/978-3-540-30139-4_32

Karim, K., Ben Ammar, L., Krichen, M., Alamro, M. A., Mihoub, A., & Mrabet, M. (2024). Optimal Ensemble Learning Model for Dyslexia Prediction Based on an Adaptive

Genetic Algorithm. *IEEE Access*, *12*, 64754–64764. Scopus. https://doi.org/10.1109/ACCESS.2024.3395803

Karlsson, A., Nygård Larsson, P., & Jakobsson, A. (2020). The continuity of learning in a translanguaging science classroom. *Cultural Studies of Science Education*, *15*(1), 1–25. Scopus. https://doi.org/10.1007/s11422-019-09933-y

Lucena Romero, M. Á. (2021). The playful component in teaching Arabic as a foreign language. *Anaquel de Estudios Arabes*, *32*, 155–166. Scopus. https://doi.org/10.5209/anqe.70196

Parvez, M. T., Alsuhibani, A. M., & Alamri, A. H. (2023). Educational and Cybersecurity Applications of an Arabic CAPTCHA Gamification System. *Ingenierie Des Systemes d'Information*, *28*(5), 1275–1285. Scopus. https://doi.org/10.18280/isi.280516

Sahrir, M. S., & Yusri, G. (2012). Online vocabulary games for teaching and learning Arabic. *GEMA Online Journal of Language Studies*, *12*(3), 961–977. Scopus.

Wan Daud, W. A. A. W., Ghani, M. T. A., Rahman, A. A., Mohd, A., Mohamad, Y., Ghani, H. A., & Mohamed, Z. (2025). Exploring the Challenges and Strategies of Learning Arabic Language among Primary School Teachers. *Forum for Linguistic Studies*, *7*(2), 94–103. Scopus. https://doi.org/10.30564/fls.v7i2.8002

Zeroual, I., El kah, A., & Lakhouaja, A. (2018). Integrating corpus-based analyses in language teaching and learning: Challenges and guidelines. *Communications in Computer and Information Science*, *872*, 534–545. Scopus. https://doi.org/10.1007/978-3-319-96292-4_42