

Arabic Language Acquisition Through Augmented Reality: A Mini Review

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ABSTRACT

This mini-review aims to evaluate the current landscape of learning the Arabic language through Augmented Reality (AR) technologies among tertiary students, focusing on both the limitations and opportunities these technologies present in higher education settings. A systematic literature search was conducted using databases such as Scopus, Web of Science, ERIC, and Google Scholar. Keywords including “Arabic language learning,” “augmented reality,” “higher education,” and “tertiary students” were used. Studies published between 2013 and 2025 were screened for relevance based on inclusion criteria centered on the use of AR for Arabic language acquisition in post-secondary institutions. The review indicates that AR enhances engagement, motivation, and contextual understanding of the Arabic language, particularly in vocabulary retention and pronunciation accuracy. Opportunities include immersive learning environments, gamification, and real-time interaction with language elements. However, limitations persist, such as technical constraints, lack of teacher training, limited Arabic-specific AR content, and high implementation costs. A scarcity of longitudinal and large-scale empirical studies also limits generalizability. While Augmented Reality offers promising benefits for Arabic language acquisition among tertiary students, its broader adoption requires addressing technological, pedagogical, and content development challenges. Future research should focus on scalable, culturally relevant AR applications and long-term learning outcomes.

Keywords: Augmented Reality (AR); Arabic Language Learning; Tertiary Education; Higher Education; Language Acquisition; Educational Technology; Immersive Learning; Gamification; Mobile-Assisted Language Learning (MALL); AR Limitations and Opportunities.

1.0 INTRODUCTION

The integration of emerging technologies into education has significantly transformed language learning, with Augmented Reality (AR) gaining increasing attention as a tool for immersive and interactive instruction (Amiruddin et al., 2025; Parmaxi et al., 2024; Famarzi & Dayag, 2023). Within this broader context, AR is particularly relevant due to its ability to connect abstract linguistic concepts with real-world environments, thereby enhancing learner engagement, motivation, and comprehension (Ravichandran et al., 2024; Zheng, 2025). While AR has been extensively explored in global language learning especially in English as a foreign language context (Mohd Yusof et al., 2025; Ma et al., 2025; Esfandiari & Mazharpour, 2025) its application in Arabic language education remains relatively limited despite the language’s cultural and global significance. This gap, coupled with rapid advancements in immersive

technologies, highlights the timeliness and importance of investigating AR-supported Arabic language learning (Kojić et al., 2025; Godwin-Jones, 2023).

This mini review aims to critically examine the current state of research on the use of AR technologies in Arabic language learning among tertiary students, focusing on identifying key benefits, limitations, and areas requiring further exploration. In particular, it addresses notable knowledge gaps such as the scarcity of Arabic-specific AR applications, the lack of large-scale and longitudinal empirical studies, and limited evidence on long-term learning outcomes (Amalia & Rizal, 2025; Palamar et al., 2023). Furthermore, the review engages with ongoing debates regarding whether AR represents a transformative pedagogical innovation or merely a technological enhancement, alongside differing perspectives on its scalability, accessibility, and cost-effectiveness in higher education settings (Khasawneh, 2024; Pérez-Jorge et al., 2025; Mohammad Jailani, 2025).

The scope of this review encompasses several key thematic areas, including the current status of AR in Arabic language education, pedagogical strategies and learning outcomes, technological integration, and practical applications. Across these themes, existing literature suggests that AR can significantly improve vocabulary acquisition, learner motivation, and contextual understanding through immersive and interactive experiences (Kohnke, 2023; Žnideršič et al., 2025; Owoyale-Abdulganij et al., 2025; Ghani & Wan Daud 2023). However, challenges related to infrastructure, educator readiness, and content development remain prominent. Overall, this mini-review concludes that while AR offers promising opportunities for enhancing Arabic language education, its effective implementation requires addressing these limitations through culturally relevant design, educator training, and more rigorous, evidence-based research approaches.

2.0 METHODS

A comprehensive literature search was conducted using [list databases, e.g., PubMed, Scopus, ScienceDirect, Springer, Google Scholar]. Keywords such as “[("augmented reality" OR "AR" OR "mixed reality" OR "virtual reality") AND ("language learning" OR "language acquisition" OR "language education" OR "language instruction") AND ("interactive" OR "engagement" OR "immersion" OR "participation") AND ("technology" OR "tools" OR "applications" OR "resources") AND ("student" OR "learner" OR "educator" OR "teacher")]” were utilized to collect relevant articles. Various types of articles, including [specify types, e.g., original research, systematic reviews, meta-analyses, case studies, letters to the editor, commentaries], were considered for this mini review. Below, we provide the inclusion and exclusion criteria for studies in this review article.

2.1 Inclusion Criteria

- Studies discussing Arabic language learning through AR: Focus on vocabulary acquisition, pronunciation, and immersive learning environments. Explore use cases like AR flashcards, mobile applications, and instructional modules. Highlight increased learner motivation, engagement, and contextualized understanding.
- Studies focusing on the application of AR in Arabic education: Demonstrate that AR tools support interactive, multimedia-based learning. Emphasize accessibility through mobile devices and QR code integration. Examples include classroom use, self-paced learning, and gamified content delivery.

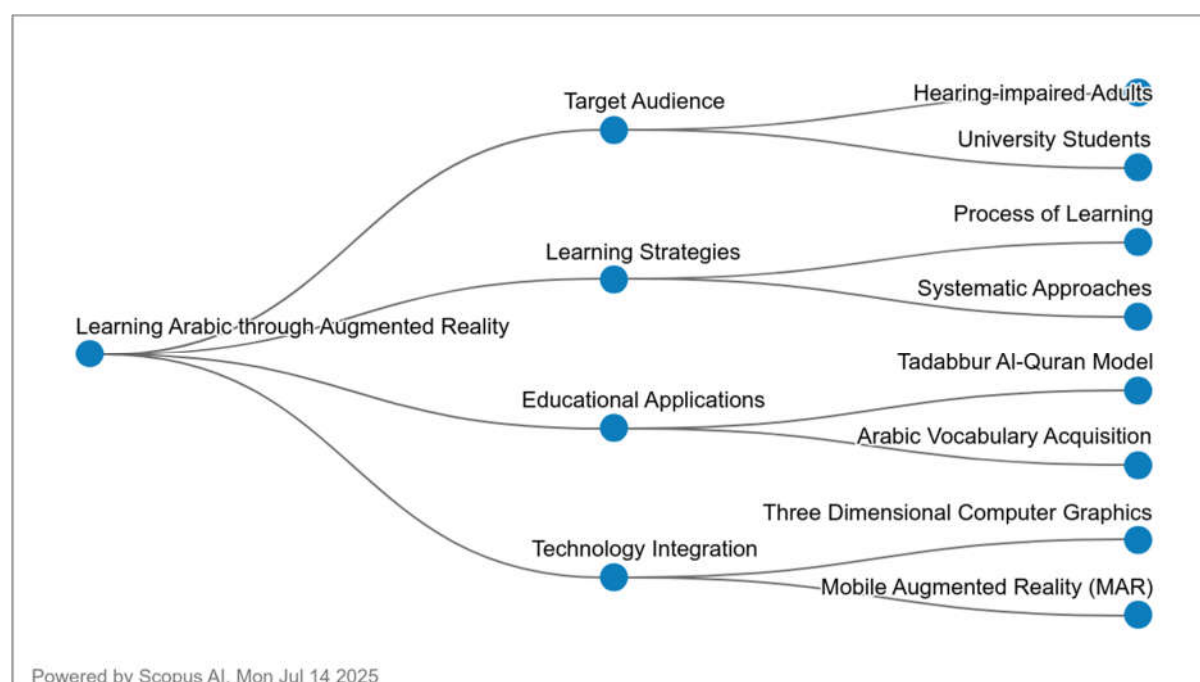
- Studies analyzing strengths, limitations, and potential applications: Strengths: Enhanced vocabulary retention, student motivation, real-world context, and multisensory engagement. Limitations: limited Arabic-specific AR content, lack of teacher training, infrastructure constraints, and high implementation costs. Potential applications: personalized learning, vocabulary modules, cultural immersion, and pronunciation support.
- Studies published in English: Agree on AR’s educational potential in Arabic learning. Identify key gaps: Lack of longitudinal and large-scale studies. Insufficient culturally adaptive AR resources. Limited evidence on long-term learning outcomes.

2.2 Exclusion Criteria

- Studies published in languages other than English were excluded to maintain accessibility and consistency in data interpretation.
- Studies that discussed Arabic language learning without explicit reference to augmented reality (AR) were excluded to ensure thematic relevance.
- Grey literature, including conference abstracts, unpublished reports, blogs, and non-peer-reviewed sources, was excluded to uphold the quality, credibility, and reliability of the review findings.
- Studies lacking empirical data or educational application context were also excluded to maintain a focused and evidence-based synthesis.

3.0 DISCUSSION AND RESULT

Figure 1: Learning Arabic Language Through Augmented Reality



3.1 Current Status of Learning Arabic Language Through Augmented Reality based on theme target audience

Learning Arabic through Augmented Reality (AR) offers tertiary students immersive, contextualized language acquisition. Key technologies mobile AR apps and gamified environments boost motivation and vocabulary retention. Benefits include engagement and real-time interaction, though challenges persist: high costs, limited Arabic-specific content, and teacher readiness. Current debates question AR's scalability and long-term efficacy. Despite promise, gaps remain in empirical research and culturally adapted tools. Future directions call for inclusive design, teacher training, and longitudinal studies to maximize AR's impact in Arabic language education.

3.2 Current Status of Learning Arabic Language Through Augmented Reality based on theme earning strategies

Augmented Reality (AR) supports active, visual, and contextual learning strategies in Arabic language education, aligning with modern pedagogical trends. AR enhances engagement and vocabulary acquisition but faces challenges like limited Arabic content and teacher readiness. Key technologies include mobile AR apps and marker-based tools. Practical applications span gamified tasks and cultural immersion. Debates focus on cost and scalability, with limited long-term data. Future research should explore culturally adaptive AR, teacher training, and sustainable models to expand its educational effectiveness.

3.3 Current Status of Learning Arabic Language Through Augmented Reality based on theme educational application

Augmented Reality (AR) in Arabic language education enables interactive, immersive learning applications, aligning with digital pedagogical shifts. Key technologies mobile AR, 3D objects, and gamified interfaces enhance motivation and contextual understanding. Benefits include improved vocabulary retention and engagement; challenges involve limited Arabic-specific content, technical constraints, and educator preparedness. Debates focus on scalability and cost-effectiveness. Gaps persist in longitudinal data and culturally tailored tools. Future directions call for inclusive AR design, teacher training, and robust evaluations to optimize educational impact in diverse learning environments.

3.4 Current Status of Learning Arabic Language Through Augmented Reality based on theme technology integration

Technology integration through Augmented Reality (AR) in Arabic language learning fosters immersive, interactive experiences aligned with modern digital education trends. Mobile AR apps and 3D visual tools enhance engagement and vocabulary retention. Benefits include contextual learning and motivation; challenges involve limited Arabic-specific content, high costs, and insufficient teacher training. Debates address AR's scalability and long-term efficacy. Research gaps include a lack of longitudinal studies and culturally adaptive tools. Future work should prioritize inclusive AR design, educator support, and evidence-based implementation strategies.

4. CONCLUSION

In conclusion, this mini-review highlights that the integration of Augmented Reality (AR) into Arabic language learning in tertiary education offers significant pedagogical value, particularly in enhancing student engagement, motivation, vocabulary retention, and contextual understanding. AR technologies enable immersive and interactive learning experiences that align with modern educational approaches, supporting both linguistic and cultural comprehension. However, several limitations remain evident, including high implementation costs, limited availability of Arabic-specific AR content, insufficient teacher training, and

technical constraints. Ongoing debates also question the scalability and long-term effectiveness of AR, while notable research gaps persist, particularly the lack of large-scale and longitudinal empirical studies and culturally adaptive learning tools. Moving forward, future research should prioritize the development of scalable, culturally relevant AR applications, alongside robust evaluations of long-term learning outcomes and educator readiness. Addressing these challenges will be crucial to fully harness AR's potential and ensure its sustainable and impactful integration into Arabic language education.

ACKNOWLEDGEMENT

This research was supported by the Ministry of Higher Education (MoHE) Malaysia through the Fundamental Research Grant Scheme (FRGS/1/2023/SSI10/UPSI/02/01). The authors also would like to thank Universiti Pendidikan Sultan Idris for assistance and support.

REFERENCES

- Amalia, M. N., & Rizal. (2025). *A systematic review of augmented reality applications in second language acquisition research*. Proceedings of the 4th International Conference on Creative Communication and Innovative Technology (ICCIT 2025). <https://doi.org/10.1109/ICCIT65724.2025.11167558>
- Amiruddin, A. Z., Ghani, M. T. A., Wan Daud, W. A. A., Hussein, N. H., Mat Yamin, N. H., & See Abdullah, Y. (2025). Empowering language learners: Innovations in CEFR-based language learning applications. *Edelweiss Applied Science and Technology*, 9(2), 352–359. <https://doi.org/10.55214/25768484.v9i2.4486>
- Esfandiari, S., & Mazharpour, D. (2025). *A systematic review of augmented reality and virtual reality integration in English as a foreign language education*. *Applied Research on English Language*, 14(4), 1–44. <https://doi.org/10.22108/are.2025.144750.2479>
- Faramarzi, S., & Dayag, J. D. (2023). *Augmented reality and virtual reality: New frontiers in technology-enhanced language learning*. In *Perspectives on Enhancing Learning Experience Through Digital Strategy in Higher Education* (pp. 166–189). <https://doi.org/10.4018/978-1-6684-8282-7.ch007>
- Ghani, M. T. A., & Wan Daud, W. 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>
- Godwin-Jones, R. (2023). *Presence and agency in real and virtual spaces: The promise of extended reality for language learning*. *Language Learning & Technology*, 27(3), 6–26.
- Khasawneh, M. A. S. (2024). *Analyzing the strategic effects of AI-powered virtual and augmented reality systems in English language education at the tertiary level*. *Research Journal in Advanced Humanities*, 5(3), 188–202. <https://doi.org/10.58256/j74yfg59>
- Kohnke, L. (2023). *Designing virtual reality and augmented reality microlearning activities*. Springer Briefs in Education (pp. 61–69). https://doi.org/10.1007/978-981-99-2774-6_6
- Kojić, T., Vergari, M., Benta, G.-M., Krupinski, J., Warsinke, M., Möller, S., & Voigt-Antons, J.-N. (2025). *Integrating virtual and augmented reality into public education:*

- Opportunities and challenges in language learning*. Lecture Notes in Computer Science, 15790, 130–144. https://doi.org/10.1007/978-3-031-93715-6_9
- Ma, C., Haire, G., Smith, S., & Newbutt, N. (2025). *Enhancing English as a foreign language education with virtual reality and augmented reality in K–12 classrooms: A systematic review from 2019 to 2023*. *Technology in Language Teaching and Learning*, 7(3). <https://doi.org/10.29140/tltl.v7n3.102535>
- Mohammad Jailani. (2025). The Effectiveness of Development of Brain-Based Arabic Learning Media with A Neuroscience Approach to Muhammadiyah Vocational High School Students in the COVID-19 Period. *SIBAWAYH Arabic Language and Education*, 6(1), 116-126. <https://doi.org/10.37134/sibawayh.vol6.1.9.2025>
- Mohd Yusof, M. A., Ismail, N., & Wan Daud, W. A. A. (2025). Exploring Arabic Language Learning in the Age of AI Chatbots: A Conceptual Framework. *SIBAWAYH Arabic Language and Education*, 6(2), 117-125. <https://doi.org/10.37134/>
- Owoyale-Abdulganily, I. S., Abdur-Rafiu, J., Yahya, I. O., Fasasi, B. O., & Uthman, A. A. (2025). Mother Tongue Interference on Arabic Language Communicative Skills among Junior Secondary School Islamic Studies Students in Asa, Kwara State, Nigeria. *SIBAWAYH Arabic Language and Education*, 6(1), 109-115. <https://doi.org/10.37134/sibawayh.vol6.1.8.2025>
- Palamar, S., Brovko, K., & Semerikov, S. (2023). *Enhancing foreign language learning in Ukraine: Immersive technologies as catalysts for cognitive interest and achievement*. CEUR Workshop Proceedings, 3624, 69–81.
- Parmaxi, A., Berns, A., Adinolfi, L., Gruber, A., Fominykh, M., Voreopoulou, A., Wild, F., Vassiliou, P., Christou, E., Valero-Franco, C., Aagaard, T., & Hadjistassou, S. (2024). *Augmented reality in language learning: Practical implications for researchers and practitioners*. Lecture Notes in Computer Science, 14724, 138–154. https://doi.org/10.1007/978-3-031-61691-4_10
- Pérez-Jorge, D., Olmos-Raya, E., González-Contreras, A. I., & Pérez-Pérez, I. (2025). *Technologies applied to education in the learning of English as a second language*. *Frontiers in Education*, 10. <https://doi.org/10.3389/educ.2025.1481708>
- Rahmanu, I. W. E. D., & Molnár, G. (2026). *Virtual reality in English language education: A systematic review of opportunities and challenges in higher education*. *Acta Psychologica*, 264. <https://doi.org/10.1016/j.actpsy.2026.106358>
- Ravichandran, K., Anita Virgin, B., Patil, S., Fatma, G., Rengarajan, M., & Kiran Bala, B. (2024). *Gamifying language learning: Applying augmented reality and gamification strategies for enhanced English language acquisition*. Proceedings of the 3rd International Conference on Smart Technologies and Systems for Next Generation Computing (ICSTSN 2024). <https://doi.org/10.1109/ICSTSN61422.2024.10670787>
- Zheng, S. (2025). *Research on the application of augmented reality in English vocabulary teaching: A study on improving learning outcomes through interactive experience*.

Journal of Computational Methods in Sciences and Engineering, 25(5), 4551–4565.
<https://doi.org/10.1177/14727978251337951>

Žnideršič, K., Špruk, N. J., Marolt, M., & Pesek, M. (2025). *Language learning with VR: The effects of immersive gamification on student motivation and knowledge*. Proceedings of the International Conference on Computer Supported Education (CSEDU), 1, 102–110.
<https://doi.org/10.5220/0013347400003932>