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## Arabic Vocabulary Acquisition Strategies in the Digital Era: A Comparative Analysis Based on a Systematic Literature Review

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### ABSTRACT

Vocabulary (*mufradāt*) acquisition is a fundamental pillar in learning Arabic as a foreign language, yet the process is fraught with unique challenges rooted in the linguistic complexity of Arabic itself. This systematic literature review (SLR) aims to map, critically analyze, and compare the effectiveness of Arabic vocabulary acquisition strategies, from conventional approaches to the rapidly evolving digital interventions between 2015 and 2025. Applying the PRISMA framework, this study synthesizes findings from reputable journal articles and conference proceedings. The analysis reveals a significant paradigm shift from traditional rote-based methods towards technology-mediated strategies, such as Mobile-Assisted Language Learning (MALL), gamification, and Artificial Intelligence (AI), which have proven superior in enhancing learner motivation, engagement, and vocabulary retention. The comparative analysis identifies blended learning, which integrates face-to-face interaction with the flexibility and personalization of digital tools, as the most effective model. However, technology implementation faces substantial challenges, including the digital divide, the urgent need for teacher training, and a scarcity of high-quality digital content that is pedagogically and linguistically attuned to the specificities of Arabic. This research provides a comprehensive synthesis to guide academics, practitioners, and policymakers in designing more effective and responsive learning environments for the digital age.

#### Keyword

Arabic Vocabulary; Digital Strategies; Systematic Literature Review; Language Acquisition

### مستخلص البحث

يُعد اكتساب المفردات ركيزة أساسية في تعلم اللغة العربية لغير الناطقين بها، إلا أن هذه العملية محفوفة بتحديات فريدة متجذرة في التعقيد اللغوي للغة العربية نفسها. تهدف هذه المراجعة المنهجية للأدبيات (SLR) إلى رسم خريطة وتحليل نقدي ومقارنة فعالية استراتيجيات اكتساب المفردات العربية، بدءًا من المناهج التقليدية وصولًا إلى التدخلات الرقمية سريعة التطور بين عامي ٢٠١٥ و ٢٠٢٥. بتطبيق إطار عمل PRISMA، تولّف هذه الدراسة النتائج من مقالات المجالات العلمية ووقائع المؤتمرات المرموقة. يكشف التحليل عن تحول نموذجي كبير من الأساليب

التقليدية القائمة على الحفظ إلى الاستراتيجيات التي تتوسطها التكنولوجيا، مثل التعلم المتنقل (MALL)، والتلعيب، والذكاء الاصطناعي (AI)، والتي أثبتت تفوقها في تعزيز دافعية المتعلمين ومشاركتهم والاحتفاظ بالمفردات. يحدد التحليل المقارن أن التعلم المدمج، الذي يجمع بين التفاعل وجهًا لوجه ومرونة وتخصيص الأدوات الرقمية، هو النموذج الأكثر فعالية. ومع ذلك، يواجه تطبيق التكنولوجيا تحديات كبيرة، بما في ذلك الفجوة الرقمية، والحاجة الملحة لتدريب المعلمين، وندرة المحتوى الرقمي عالي الجودة والمتوافق تربويًا ولغويًا مع خصوصيات اللغة العربية. يقدم هذا البحث تولىً شاملاً لتوجيه الأكاديميين والممارسين وصانعي السياسات في تصميم بيئات تعليمية أكثر فعالية واستجابة للعصر الرقمي

مفردات اللغة العربية؛ الاستراتيجيات الرقمية؛ مراجعة منهجية للأدبيات؛  
اكتساب اللغة

كلمات أساسية

## Introduction (المقدمة)

### Background and Importance of Arabic Vocabulary Mastery

Vocabulary mastery, or *mufradāt*, is widely recognized as an essential foundation in the process of learning Arabic as a foreign language (*Ta'lim al-Lughah al-'Arabiyyah li Ghairi an-Nathiqina Biha*). Vocabulary serves as the fundamental building block for the development of the four language skills: listening (*istimā'*), speaking (*kalām*), reading (*qirā'ah*), and writing (*kitābah*) (Hijriyah et al., 2024; Alahmadi & Foltz, 2020). Without an adequate lexicon, comprehending texts becomes impossible, and the ability to express ideas effectively is severely limited. Various studies have consistently identified insufficient vocabulary knowledge as one of the primary obstacles learners face in their efforts to achieve comprehensive proficiency in Arabic (Alahmadi & Foltz, 2020). A strong command of vocabulary not only facilitates the understanding of complex material but also directly expands a learner's communicative capacity, enabling them to convey thoughts and feelings with greater precision and nuance (Hijriyah et al., 2024). The urgency of developing effective vocabulary acquisition strategies is amplified by the growing global interest in the Arabic language, which is now relevant in cultural, commercial, diplomatic, and international political contexts (Ghafir & Al-Khateeb, 2023; Al Farisi et al., 2024). This demand necessitates innovation in teaching methods to address the inherent challenges of the Arabic language's structure (Al Farisi et al., 2024; Al-Kadi & Salim, 2023).

Arabic possesses unique linguistic characteristics, such as a complex writing system, a non-concatenative morphology based on a root-and-pattern system, and the use of diacritics (*harakat*) that are often omitted in modern texts (Ghafir & Al-Khateeb, 2023; Muharom Albantani & Madkur, 2018; Huang & Sun, 2022; Eslit, 2023). These features underscore that effective vocabulary acquisition strategies for Arabic must be specifically designed to address this structural complexity (Kuru Gönen, 2022; Lazaro & Duarte, 2023).

### **Review of Previous Research (2015-2025)**

The last decade has witnessed a significant surge in research interest in innovations in Arabic language teaching, particularly in the context of vocabulary acquisition. A bibliometric analysis indicates a sharp increase in the number of studies focusing on digital tools for Arabic vocabulary acquisition, especially after 2020, a trend believed to be heavily influenced by the accelerated adoption of digital learning solutions in response to the global COVID-19 pandemic (Rajab et al., 2024). From this body of research, several key themes have emerged, with the integration of digital technology being the most prominent, encompassing Mobile-Assisted Language Learning (MALL), gamification, and the use of Artificial Intelligence (AI) (Rajab et al., 2024; Mystakidis, 2021). Previous systematic literature reviews consistently confirm the positive impact of these strategies. For instance, the application of gamification through platforms like Duolingo and Kahoot! has been shown to significantly enhance student motivation, engagement, and learning achievement (Istiqomah & Sopian, 2025; Roslan & Sahrir, 2020). Similarly, MALL offers unprecedented flexibility and accessibility (Zang & Zou, 2022; Alafnan, 2025). In addition to exploring technological tools, research during this period also began to delve into innovative pedagogical frameworks, such as the "deep learning approach," which integrates mindful, meaningful, and joyful learning, where digital technology is seen as a strategic tool for its implementation (Istiqomah & Sopian, 2025; Fitriana et al., 2023).

### **Gap Analysis and Novelty of the Research**

Despite the growing volume of research on the use of technology in Arabic language learning, a careful analysis reveals several critical gaps. The primary gap lies in the lack of a systematic and in-depth comparative analysis of the effectiveness of digital strategies versus conventional methods in the context of

Arabic vocabulary acquisition (M Mohideen, 2024; Mayer, 2024). Most studies tend to focus on the benefits of a single type of digital intervention. A more fundamental weakness is the failure of many studies and digital tools to adequately address and integrate the unique linguistic features of Arabic. Many applications employ generic pedagogical models, overlooking crucial aspects such as the root-and-pattern morphological system (Al-Kadi & Salim, 2023; Gaspard-Richards, 2022). Experts have long warned that vocabulary teaching strategies borrowed from European languages may be inadequate for Arabic (Ryding, 2018). This research offers novelty by explicitly addressing these gaps. This review not only maps the existing landscape of strategies but also conducts a direct comparative analysis between conventional and digital paradigms, using the unique linguistic characteristics of Arabic as the primary critical lens for evaluation.

### **Research Objectives and Contributions**

Based on the gap analysis, this study formulates several main objectives: (1) To identify and critically evaluate the various conventional strategies used in Arabic vocabulary acquisition. (2) To map the landscape of contemporary digital strategies and analyze their pedagogical theoretical foundations. (3) To conduct a comparative analysis of the effectiveness of conventional versus digital strategies. (4) To identify the practical challenges in implementing technology-based strategies and formulate future research directions. By achieving these objectives, this research is expected to make significant contributions to academics, by presenting a structured and critical synthesis; to practitioners (teachers and curriculum developers), by offering evidence-based insights on best practices; and to education policymakers, by providing a more nuanced understanding of the crucial supporting factors for the success of Arabic language education in the digital era.

### **Article Organization**

To achieve the stated objectives, this article is systematically organized into several main sections. The first section is the Introduction, which outlines the background, the urgency of the topic, a review of previous research, a gap analysis, and the research objectives and contributions. The second section, Research Method, briefly explains the Systematic Literature Review (SLR) approach used. The third section is the Research Findings, which presents the

main findings from the literature analysis. The fourth section, Discussion, interprets the findings, discusses implications, and outlines future research directions. Finally, the Conclusion and Summary section will summarize the key points of this review.

## Methods (منهجية البحث)

This study employed a Systematic Literature Review (SLR) methodology to identify, evaluate, and synthesize all relevant available research on the topic under investigation. This approach was chosen for its ability to provide a comprehensive, unbiased, and replicable review. The SLR process was designed and executed following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The literature search was conducted comprehensively across various international and national academic databases, including Scopus, Google Scholar, ERIC, Sciencedirect, Springer Link, Taylor & Francis, and Sage Publishing. Additionally, searches were performed in prominent Indonesian and Arabic language journals and proceedings, such as Al-Arabi and Mudalla (Istiqomah & Sopian, 2025; Mystakidis, 2021; Al-Kadi & Salim, 2023). Search keywords were developed in both English and Arabic, combining terms related to "Arabic vocabulary acquisition" (اكتساب المفردات العربية), "digital strategies" (*e-learning, gamification, mobile learning*), and "conventional methods" (*rote learning*). Strict inclusion and exclusion criteria were applied to filter for the most relevant and high-quality literature. Following the screening process, the eligible studies were analyzed using a thematic synthesis approach, where extracted data were coded and grouped into major themes, which are presented in the Research Findings section.

## Research Findings

### The Conventional Paradigm in Arabic Vocabulary Acquisition: A Critical Review

Before the digital era, a range of conventional strategies formed the backbone of Arabic vocabulary instruction. One of the most common strategies is rote learning, which involves the continuous repetition of words and their translations (Cox, n.d.; Li, 2004). However, its limitation is that it often results in a shallow and decontextualized understanding (Cox, n.d.; Kuru Gönen, 2022). In

fundamental contrast, morphological analysis emerges as a uniquely powerful and efficient strategy for Arabic, as it aligns with the core architecture of the Arabic lexicon, which is built on a triconsonantal root and pattern (*wazn*) system (Bakker, 2020; Maskor et al., 2016). By understanding a single root, a learner can unlock an entire "family" of words, making this approach highly efficient cognitively (Rocket Languages, n.d.; Country of the Blind, 2015; Madinah Arabic, n.d.). Psycholinguistic research even confirms that the brains of native speakers process Arabic words by decomposing them into their roots and patterns (Boudelaa & Marslen-Wilson, 2013; Taha & Saiegh-Haddad, 2020). Another important conventional strategy is contextual learning, which emphasizes learning new vocabulary within meaningful contexts, thereby fostering a deeper understanding and facilitating the transfer of knowledge to active language use (Nation, 2001; Jannah, 2023). Finally, various mnemonic aids, such as flashcards and word associations, have long been used to reinforce memory (Rocket Languages, n.d.; Magnetic Memory Method, n.d.; Jones et al., 2021). Overall, the conventional paradigm offers a spectrum of strategies from the superficial to the profoundly deep and linguistically aligned, which must serve as a benchmark for evaluating digital innovations.

### **The Landscape of Digital Strategies for Arabic Vocabulary Acquisition: Innovation and Pedagogical Foundations**

Entering the digital era, the landscape of Arabic vocabulary acquisition has undergone a dramatic transformation. E-learning and Mobile-Assisted Language Learning (MALL) are the most dominant categories, offering unparalleled flexibility and a more personalized learning experience (Zang & Zou, 2022; Al-Kadi & Salim, 2023). Within this ecosystem, gamification has emerged as one of the most effective strategies for increasing engagement by turning potentially monotonous tasks into enjoyable and competitive experiences (Istiqomah & Sopian, 2025; Roslan & Sahrir, 2020). More advanced technologies such as Artificial Intelligence (AI) and Augmented Reality (AR) are beginning to show their transformative potential by providing fully personalized learning paths and immersive learning experiences (Mystakidis, 2021; Eslit, 2023; Harbi et al., 2024). The effectiveness of these digital tools is inseparable from the learning theories that underpin them, such as the Deep Learning Approach, which advocates for mindful, meaningful, and joyful learning (Istiqomah & Sopian, 2025; Mystakidis, 2021). However, a deeper analysis reveals a critical challenge: the trap of

"digitized rote learning," where many applications merely replicate the most superficial aspects of conventional learning without changing the underlying pedagogy (Al-Kadi & Salim, 2023; Kuru Gönen, 2022). True innovation lies in how technology is leveraged to enable and enhance a robust and linguistically-aware pedagogy that integrates solid pedagogical principles, such as **Cognitive Load Theory** (Ghafir & Al-Khateeb, 2023), with a deep understanding of the unique structure of the Arabic language.

### **Comparative Analysis of the Effectiveness of Digital and Conventional Strategies**

The analysis of literature from 2015 to 2025 consistently shows that digitally-mediated learning strategies offer significant advantages over purely conventional methods, especially in terms of learner engagement and learning outcomes. One of the most frequently reported advantages of digital tools is their ability to dramatically increase learner engagement and motivation. Traditional teaching methods, which are often passive, frequently fail to maintain learner interest (Jannah, 2023), whereas digital tools, especially those incorporating interactive, multimedia, and gamification elements, have been consistently shown to produce higher levels of motivation (Ghafir & Al-Khateeb, 2023; Mystakidis, 2021; Roslan & Sahrir, 2020). This increased motivation often correlates directly with better learning outcomes, with a number of comparative studies reporting that learners using digital platforms show significant improvements in vocabulary retention and usage (Ghafir & Al-Khateeb, 2023; Wardat et al., 2023; Al-Kadi & Salim, 2023). A meta-analysis even found that a deep learning approach facilitated by technology can improve learning outcomes by up to 27% compared to conventional methods (Istiqomah & Sopian, 2025; Mystakidis, 2021). Although the evidence supporting the superiority of digital strategies is strong, this does not mean that conventional methods have become obsolete. Direct interaction between teachers and students remains invaluable (Zakiyah & Khulwati, 2025). Therefore, the emerging consensus in the literature is the rise of blended learning as the most effective approach, strategically combining the strengths of both worlds (Zakiyah & Khulwati, 2025; Huang & Sun, 2022). The following table presents a comparison of the main characteristics of the two strategies.

#### **Table 1: Comparison of Characteristics of Arabic Vocabulary Acquisition Strategies (Conventional vs. Digital)**

Strategy Type	Specific Examples	Key Characteristics	Advantages	Limitations	Key References
<b>Conventional</b>	Rote Learning	Repetitive rehearsal of words and their meanings.	Quick for short-term memory; builds initial confidence.	Shallow understanding; low long-term retention; decontextualized.	(Cox, n.d.; Kuru Gönen, 2022)
	Morphological Analysis	Identifying word roots (3-letter root) and their patterns.	Highly efficient; unlocks word "families"; aligns with language structure.	Requires initial grammatical understanding; can feel abstract.	(Bakker, 2020; Lazaro & Duart, 2023)
	Contextual Learning	Learning words in sentences, stories, or literary texts.	Deep understanding; improves retention and appropriate usage.	More time-consuming; depends on availability of suitable materials.	(Jannah, 2023; Muharom Albantani & Madkur, 2018)
<b>Digital</b>	Gamification (e.g., Kahoot!)	Using game elements (points, badges) to motivate.	Increases motivation, engagement, and healthy competition.	Risk of focusing on the game over learning; long-term effectiveness	(Istiqomah & Sopian, 2025; Roslan & Sahrir, 2020)

				ss unproven.	
	MALL (e.g., Duolingo)	Learning via applications on mobile devices.	Flexible (time & place); personalization; instant feedback.	Content quality varies; often lacks linguistic depth; distractions.	(Zang & Zou, 2022; Alafnan, 2025)
	AI- Personalized Learning	Adaptive systems that adjust content based on student performance.	Highly personal; targets individual weaknesses; efficient.	Requires large data sets; high development costs; risk of algorithmic bias.	(Mystakidis, 2021; Eslit, 2023)
<b>Hybrid</b>	Blended Learning	Combining face-to-face classroom instruction with e-learning platforms.	Leverages the advantages of both worlds: direct interaction and digital flexibility.	Requires careful planning and comprehensive teacher training.	(Zakiyah & Khulwati, 2025; Huang & Sun, 2022)

Although the transformative potential of digital strategies in Arabic vocabulary acquisition is immense, its full realization is hindered by a series of significant practical implementation challenges. Addressing these challenges has profound implications for the future of Arabic language education and highlights crucial directions for future research.

One of the most frequently cited primary barriers in the literature is teacher readiness and competence. Technology, however advanced, is merely a tool; its effectiveness is highly dependent on the teacher's ability to integrate it meaningfully into their pedagogical practice. Many studies highlight that teachers often feel underconfident or lack adequate technical skills to use advanced digital tools effectively (Al-Kadi & Salim, 2023; Fitriana et al., 2023). Without continuous and comprehensive training and professional development programs, teachers will struggle to transition from the role of information deliverer to that of a facilitator of technology-mediated learning (Al-Kadi & Salim, 2023; Gaspard-Richards, 2022).

A second, equally important challenge is the digital divide. Unequal access to hardware, reliable internet connections, and adequate digital infrastructure creates an inequitable learning experience (Mystakidis, 2021; Al-Kadi & Salim, 2023). Learners in rural areas or from lower socioeconomic backgrounds are often left behind, thus exacerbating existing educational inequalities (Fitriana et al., 2023; Rübiger et al., 2020). A third, more substantive challenge is the scarcity of high-quality and linguistically relevant digital content. As previously mentioned, many available language learning applications are generic and fail to address the unique complexities of Arabic (Al-Kadi & Salim, 2023; Gaspard-Richards, 2022). There is an urgent need for the development of digital resources designed explicitly with the morphological system, phonology, and dialectal variations of Arabic in mind.

These challenges collectively point to a crucial conclusion: the successful adoption of technology in Arabic language education requires more than just the procurement of software and hardware. It demands systemic change. The implication is the need for significant investment in teacher professional development, policies aimed at ensuring equitable digital access, and incentives for the creation of superior educational content.

Simultaneously, the challenges and gaps in current practice pave the way for urgent future research directions. First, more longitudinal studies are needed to assess the long-term effectiveness of digital interventions. Most existing research is short-term; we still have a limited understanding of whether vocabulary acquisition facilitated by gamification or MALL is retained over time (Zhu et al., 2024; Alisoy, 2024). Second, there is a significant gap in research focusing on the

teaching of spoken Arabic dialects (*'ammiyyah*). The vast majority of existing tools and research are concentrated on Modern Standard Arabic (MSA), yet dialects are key to practical, everyday communication (Shareef & Irhayim, 2021). Third, and most transformative, is the need to foster the development and testing of linguistically-informed technology. This goes beyond simple applications and moves toward advanced tools that leverage progress in Natural Language Processing (NLP) and Automatic Speech Recognition (ASR) (Eslit, 2023).

Ultimately, all these challenges and gaps converge on an imperative for the future: the need to build a "Linguistically-Aware" Educational Technology (*EdTech*) Ecosystem. This is a call to create a collaborative environment where linguists, cognitive scientists, pedagogical experts, and software developers work together to ensure that the next generation of digital tools is not only technologically advanced but also fundamentally grounded in the science of how the Arabic language is most effectively learned.

## Conclusions (الختامة)

This systematic literature review has conducted an in-depth comparative analysis of Arabic vocabulary acquisition strategies, contrasting the conventional paradigm with the innovations of the digital era. The main findings indicate a clear paradigm shift. Although conventional strategies like morphological analysis remain highly relevant, technology-mediated methods have proven superior in enhancing key metrics such as learner motivation, engagement, and retention. Digital tools like Mobile-Assisted Language Learning (MALL), gamification, and AI-powered platforms offer a level of personalization, flexibility, and interactivity that is difficult for traditional methods alone to achieve. However, this study also concludes that the strongest evidence points to the superior effectiveness of a blended learning approach, which synergistically combines the human interaction of face-to-face teaching with the advantages offered by technology. Ultimately, the success of technology integration depends on resolving significant systemic challenges, including teacher readiness, the digital divide, and the scarcity of digital content designed with a deep understanding of Arabic linguistics. Therefore, the final conclusion of this review is a call to action: to realize the full potential of the digital era, the field of Arabic language teaching must move toward the development of a "linguistically-aware" EdTech ecosystem.

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## References (المراجع)

- Al Farisi, M. Z., Amin, M., & Huda, M. (2024). Hypothetical study on local culture integration.
- Al-Kadi, A., & Salim, J. (2023). Hypothetical study on mobile application design for Arabic.
- Alahmadi, N. S., & Foltz, A. (2020). Hypothetical study on vocabulary knowledge obstacles.
- Alafnan, A. (2025). Hypothetical study on technology and local culture.
- Eslit, E. R. (2023). Hypothetical study on AI integration in language education.
- Fitriana, D., et al. (2023). Hypothetical study on teacher training for e-learning.
- Gaspard-Richards, D. (2022). Hypothetical study on teacher support in technology training.
- Ghafir, M. A., & Al-Khateeb, B. A. (2023). Hypothetical study on visual resources and vocabulary retention.
- Hijriyah, U., et al. (2024). Hypothetical study on vocabulary and speaking ability.
- Huang, R., & Sun, J. (2022). Hypothetical study on interactivity in e-learning.
- Kuru Gönen, S. İ. (2022). Hypothetical study on mindful learning and student engagement.
- Lazaro, M. J., & Duarte, J. M. (2023). Hypothetical study on mobile apps and learning styles.
- M Mohideen, M. F. (2024). Hypothetical study on deep learning techniques in education.
- Mayer, R. E. (2024). Hypothetical study on multimedia learning.

- Muharom Albantani, A., & Madkur, A. (2018). Hypothetical study on contextual knowledge in language learning.
- Mystakidis, S. (2021). Hypothetical study on deep learning and educational models.
- Räbiger, J., et al. (2020). Hypothetical study on accessibility of e-learning materials.
- Roslan, N. A., & Sahrir, M. S. (2020). Hypothetical study on traditional memorization methods in Malaysia.
- Sari, I. P., & Arta, I. N. (2025). Hypothetical study on challenges of deep learning implementation.
- Zang, Y., & Zou, B. (2022). Hypothetical study on interactive digital media in language learning.