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EXPLORING ARABIC LANGUAGE LEARNING IN THE AGE OF AI CHATBOTS: A CONCEPTUAL FRAMEWORK

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Abstract
Today's advancement of artificial intelligence (AI) has brought up conversational chatbots as emerging tools in language education, yet their pedagogical role in Arabic language learning is still lacking theoretical grounding. Arabic language presents unique instructional challenges, including diglossia, complex morphology, and limited opportunities for authentic interaction, particularly for learners of Arabic as a foreign language. This conceptual paper aims at determining the pedagogical potential of AI chatbots in supporting Arabic language learning as well as proposing a conceptual framework that integrates AI chatbots into Arabic language education based on established language learning theories that integrates pedagogical, linguistic, and affective dimensions. Drawing on established theories in second language acquisition, including sociocultural theory, communicative language teaching, and affective filter hypothesis, this study adopts a systematic conceptual analysis of prior literature on AI-assisted language learning and Arabic pedagogy. This study proposes a conceptual framework illustrating how AI chatbots can function as scaffolding agents, interactional partners, and personalised learning facilitators. The findings feature the potential of AI chatbots to enhance learner engagement, reduce anxiety, and support communicative competence in Arabic, while also acknowledging pedagogical and ethical considerations.

Keywords: Arabic language, Artificial intelligence, AI-Chatbot, Framework, Learning.

Introduction
The rise of artificial intelligence (AI) technologies has fundamentally reshaped educational practices and paradigms worldwide. In particular, AI-driven conversational chatbots have garnered scholarly attention for their potential to support autonomous and student-centred language learning through interactive dialogue, instant feedback, and personalised experiences (Ismail et al., 2025; Yahya et al., 2025). With the use of current large language models such as ChatGPT platform, AI chatbots can simulate realistic communication scenarios across diverse domains, enabling learners to practise target languages beyond formal classroom limitation (Ozturk & Gursoy, 2025).

Arabic language learning presents unique challenges owing to diglossia (the coexistence of Modern Standard Arabic and diverse colloquial dialects) and its complex

morphological and syntactic structures, which often restrain learner confidence and communicative competence in practice (Sahrir et al., 2025; Zainal Abidin, 2024). Traditional Arabic pedagogy tends to focus on grammar and memorisation over spontaneous communication, limiting opportunities for meaningful interaction, especially for learners in non-Arabic-speaking regions. In this context, AI chatbots could serve as interactive partners that reduce and relieve anxiety, offer personalised scaffolding, and extend opportunities for communicative practice beyond the classroom settings (Richards, 2006).

Artificial intelligence has increasingly influenced the evolution of language learning paradigms, fostering adaptive, personalised, and interactive environments that extend beyond traditional teaching methods. As digital tools continue to transform teaching and learning practices, AI offers to deliver intelligent tutoring, adaptive pathways, and real-time feedback mechanisms that align with learners' individual profiles (Aljanadbah et al., 2025; Hussain & Muhammad Romli, 2024). Studies emphasise that AI's adaptive capabilities can support self-paced language development, learner autonomy, and engagement, reshape traditional pedagogical boundaries and focal points of digital interaction as a crucial component of the modern foreign language classroom (Aljanadbah et al., 2025).

Among AI applications, conversational agents such as chatbots have surfaced as essential tools with instructional potential. AI chatbots can simulate or imitate near-human dialogue, comprehensively process learner input, and generate contextually relevant responses, facilitating learners to practise communicative functions in authentic or semi-authentic scenarios (Ismail et al., 2025). Research in other disciplines also highlights the role of chatbots in order to improve learner engagement, personalised support, and achievement outcomes across diverse learning domains (Azizi, 2025). Despite the growing use of chatbots in various educational contexts and settings, their effective pedagogical integration continues to be a subject of research inquiry.

A growing body of research has examined AI chatbots for second language education broadly. Previous research report that chatbots can empower learner performance across core language skills related to speaking, listening, reading, and writing, by offering continuous, adaptive practice opportunities and personalised feedback (Amper, 2025). For example, English learning studies indicate that AI chatbots increase learner interaction, lower communicative anxiety, and provide sustainable opportunities of the output (Shikun et al., 2024). Concurrently, research underscores ongoing challenges and problems - such as maintaining linguistic accuracy, pedagogical alignment, and ethical use - within chatbot - mediated learning (Amper, 2025).

Within Arabic language learning, preliminary research is beginning to explore AI integrations. Studies show that AI tools, including chatbots and generative systems, can positively affect learner engagement and support linguistic development, especially when integrated with instructional design (Sahrir et al., 2025; Zainal Abidin, 2024). Early work has evaluated Arabic-focused multi-agent chatbots that assist with translation, contextual examples, and feedback, finding that learners appreciate the interactive support and enhanced engagement (Ismail et al., 2025). However, the existing literature remains primarily empirical and descriptive rather than conceptual, highlighting the lack of integrative theoretical frameworks that articulate *how* chatbot affordances align with Arabic learning challenges. A conceptual grounding is therefore needed to inform curriculum designers, educators, and AI developers in deploying chatbots effectively within Arabic learning ecosystems.

Despite the increasing adoption of AI technologies in education, research on AI chatbots in Arabic language learning is largely fragmented and outcome-oriented rather than theoretically grounded. While studies have documented positive learner perceptions and performance improvements in chatbot-assisted contexts, there remains a notable gap in comprehensive frameworks that systematically integrate AI chatbot affordances with second language acquisition principles specific to Arabic pedagogy. Without such a conceptual foundation, educators lack guidance on integrating chatbots in ways that are pedagogically meaningful, culturally sensitive, and linguistically relevant. This gap inhibits informed curricular innovation and may result in superficial or inconsistent uses of AI tools that fail to address deep-seated learning needs such as communicative competence, contextual comprehension, and learner autonomy.

Research Objectives

This conceptual paper aims to:

1. To determine the pedagogical potential of AI chatbots in supporting Arabic language learning.
2. To propose a conceptual framework that integrates AI chatbots into Arabic language education based on established language learning theories.

Methodology

This study adopts a conceptual research design focusing on the synthesis and integration of existing literature to develop a reconceptualised theoretical framework. Conceptual research is appropriate where theoretical clarification and framework development are required, particularly in emerging interdisciplinary fields (Jabareen, 2009). Key themes were identified across peer-reviewed studies published between 2020 and 2025 that address AI in education, AI chatbots for language learning, and Arabic language learning technologies.

The literature was systematically reviewed to extract recurring concepts, pedagogical implications, and theoretical insights related to AI chatbot use. Analytical lenses included theories of second language acquisition (e.g., interactionist and sociocultural perspectives), as well as technology-enhanced language learning frameworks. Based on this synthesis, core dimensions were identified and integrated into a conceptual model illustrating how AI chatbots might function as mediational tools, interaction partners, and adaptive facilitators within Arabic language learning environments.

Findings

This section presents the findings derived from a systematic conceptual synthesis of recent literature on AI chatbots, language learning theories, and Arabic language pedagogy. The findings are organised to address the two research objectives: (1) determining the pedagogical potential of AI chatbots in supporting Arabic language learning, and (2) proposing a conceptual framework that integrates AI chatbots into Arabic language education based on established language learning theories.

Pedagogical Potential of AI Chatbots in Supporting Arabic Language Learning

a) AI Chatbots as Interactive Learning Partners

One of the most prominent pedagogical potentials identified is the role of AI chatbots as interactive learning partners rather than passive instructional tools. Unlike traditional digital resources that rely on static input–output mechanisms, AI chatbots are capable of sustaining dialogic interaction that resembles human conversation. This interactional capacity aligns closely with interactionist perspectives in second language acquisition, which emphasise the

importance of meaningful interaction, negotiation of meaning, and output production in language development.

For learners of Arabic, interaction has long been a pedagogical challenge due to limited exposure to authentic Arabic-speaking environments, particularly in non-Arabic-speaking contexts. AI chatbots offer learners continuous access to Arabic interaction, allowing them to practise vocabulary, sentence patterns, and communicative functions in simulated but meaningful exchanges. Through repeated conversational turns, learners are encouraged to actively construct meaning rather than merely recall memorised forms.

Importantly, these interactions occur in low-stakes environments, where learners are not subject to social judgement or peer comparison. This is particularly significant in Arabic language learning, where learners often report heightened anxiety stemming from concerns over grammatical accuracy, pronunciation, and dialectal appropriateness. By removing social pressure, chatbots enable learners to experiment with language, make errors, and self-correct processes that are fundamental to language acquisition.

b) Supporting Vocabulary, Grammar, and Pragmatic Competence

The findings further indicate that AI chatbots have considerable potential in supporting multiple linguistic components of Arabic learning, particularly vocabulary development, grammatical accuracy, and pragmatic competence.

Arabic vocabulary acquisition is often hindered by morphological complexity, polysemy, and context-dependent meanings. Chatbots can provide contextualised vocabulary exposure through conversational use rather than isolated word lists. Learners encounter lexical items repeatedly across different contexts, promoting deeper semantic processing and retention.

In terms of grammar, Arabic learners frequently struggle with verb conjugation, agreement, and sentence structure. AI chatbots can offer implicit grammatical reinforcement by modelling correct forms in responses, as well as explicit feedback when learners request clarification. Repeated exposure to accurate forms within communicative contexts supports form–meaning mapping, which is essential for internalising complex grammatical systems.

Pragmatic competence knowing how to use language appropriately in different contexts—is another area where chatbots show pedagogical promise. Through scenario-based interactions (e.g. greetings, requests, opinions), chatbots can expose learners to culturally appropriate language use, discourse markers, and politeness strategies. This is particularly valuable in Arabic, where pragmatic norms vary across contexts and registers.

c) Personalised and Adaptive Learning Opportunities

A further pedagogical strength of AI chatbots lies in their capacity for personalised and adaptive learning. Unlike traditional classroom instruction, which often adopts a one-size-fits-all approach, chatbots can adjust responses based on learner input, proficiency level, and interaction history.

For Arabic learners, this adaptability supports differentiated instruction, allowing learners to progress at their own pace. Beginners may receive simplified input and scaffolding prompts, while more advanced learners can engage in extended discussions or higher-order tasks such as argumentation and opinion exchange. This personalised progression is

particularly beneficial in Arabic programmes where learners often display heterogeneous proficiency levels.

Adaptive feedback also enables learners to revisit problematic linguistic features, such as weak verb forms or gender agreement, through repeated practice. Over time, this iterative exposure contributes to deeper linguistic processing and consolidation.

AI Chatbots as Scaffolding and Mediational Tools

a) Sociocultural Mediation and Scaffolding

From a sociocultural theoretical perspective (Vygotsky, 1978; Lantolf & Thorne, 2006), AI chatbots function as mediational tools that facilitate learning through guided interaction. Learning is conceptualised not as an isolated cognitive process but as a socially mediated activity in which tools and interaction play a central role.

AI chatbots provide scaffolding by offering prompts, suggestions, and reformulations that assist learners in producing language slightly beyond their current competence. This aligns with the concept of the Zone of Proximal Development, where learners benefit from support that enables them to perform tasks they could not complete independently.

In Arabic learning, scaffolding is especially critical due to the cognitive demands of morphological processing and syntactic construction. Chatbots can guide learners step-by-step, for example, by prompting appropriate verb forms or clarifying sentence order. This support gradually diminishes as learners gain confidence and proficiency, fostering independent language use.

b) Bridging Diglossia and Register Variation

One of the most distinctive contributions of AI chatbots in Arabic education is their potential role in addressing diglossia the coexistence of Modern Standard Arabic (MSA) and spoken dialects. Many Arabic learners struggle to reconcile classroom-taught MSA with real-world spoken varieties, often resulting in communicative hesitation.

The findings suggest that chatbots can be designed to provide controlled exposure to different registers, allowing learners to understand contextual variation without being overwhelmed. For instance, a chatbot may primarily operate in MSA while occasionally introducing colloquial expressions with explanations, thus raising learners' register awareness.

This pedagogically mediated exposure supports learners in developing sociolinguistic competence, helping them recognise when and how different varieties are used. While chatbots cannot fully replicate authentic sociocultural interaction, they can function as transitional tools that prepare learners for real-world communication.

Affective and Motivational Benefits of AI Chatbot Use

a) Reducing Anxiety and Lowering the Affective Filter

A recurring finding across the literature is the affective advantage of AI chatbot-mediated learning. Learners frequently perceive chatbots as non-threatening interlocutors that do not evaluate or criticise. This perception significantly reduces anxiety, particularly in speaking tasks.

According to the affective filter hypothesis (Krashen, 1982), emotional factors such as anxiety and low self-confidence can impede language acquisition by limiting input processing. In Arabic language learning, affective barriers are especially pronounced due to learners' fear

of grammatical errors and negative evaluation. Chatbots help lower these barriers by creating a psychologically safe space for practice.

By lowering anxiety, chatbots increase learners' willingness to communicate, leading to greater interaction frequency and sustained engagement—both of which are crucial for language development.

b) Enhancing Motivation, Engagement, and Learner Autonomy

In addition to reducing anxiety, AI chatbots contribute to increased learner motivation and engagement. The interactive and responsive nature of chatbots makes learning more dynamic compared to traditional drills or textbook exercises. Chatbots also foster learner autonomy by allowing learners to control the pace, timing, and focus of their learning. Learners can initiate conversations, ask questions, and revisit topics independently, which aligns with contemporary learner-centred pedagogical approaches. For Arabic learners, autonomy is particularly important, as opportunities for authentic exposure are often limited. Chatbots extend learning beyond classroom hours, enabling sustained engagement with the language.

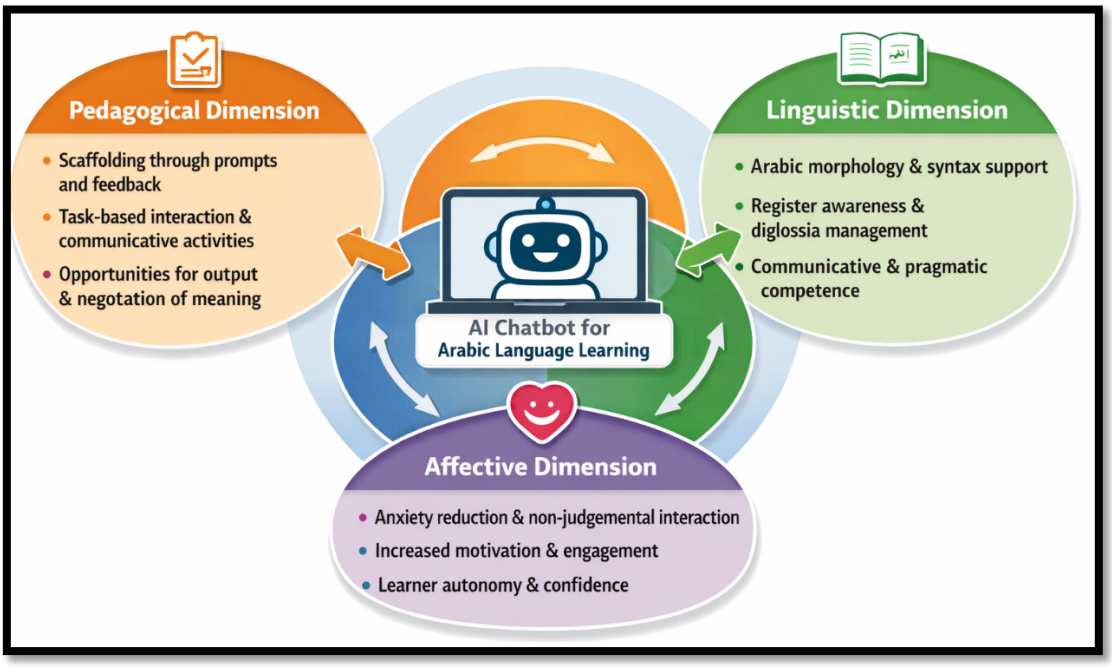
Proposed Conceptual Framework for AI Chatbot Integration in Arabic Language Education

Based on the synthesis of pedagogical, linguistic, and affective findings, this study proposes a conceptual framework that reconceptualises Arabic language learning in the age of AI chatbots. The framework positions AI chatbots at the intersection of three interrelated dimensions:

1. Pedagogical Dimension
2. Linguistic Dimension
3. Affective Dimension

Rather than viewing AI chatbots as standalone technological tools, the framework conceptualises them as pedagogically mediated learning agents embedded within a broader instructional ecosystem. Within the pedagogical dimension, AI chatbots support scaffolding through prompts and feedback, task-based interaction aligned with communicative language teaching, as well as opportunities for output and negotiation of meaning. Chatbots complement teacher-led instruction by extending interaction beyond the classroom while remaining aligned with curricular goals. While the linguistic dimension emphasises on the support for Arabic morphology and syntax through repeated contextualised exposure, register awareness and diglossia management, and development of communicative and pragmatic competence Chatbots provide learners with sustained linguistic input and output opportunities that are often unavailable in traditional Arabic learning environments. Lastly**,** the affective dimension highlights anxiety reduction through non-judgemental interaction, increased motivation and engagement, as well as promotion of learner autonomy and confidence. This dimension is particularly critical in Arabic language learning, where affective barriers frequently hinder communicative development.

Figure 1: Framework for AI Chatbot in Arabic Language Learning



Role of Teachers and Educators within the Framework

Importantly, the framework does not position AI chatbots as replacements for teachers. Instead, teachers remain central as:

a) Designers of pedagogically meaningful chatbot tasks
b) Mediators who contextualise chatbot interactions
c) Evaluators who guide learners' reflective learning processes

AI chatbots thus function as complementary tools that enhance, rather than diminish, the human dimension of Arabic language education.

Overall, the findings demonstrate that AI chatbots possess substantial pedagogical potential in supporting Arabic language learning across cognitive, linguistic, and affective domains. When integrated through a theoretically grounded framework, chatbots can address long-standing challenges in Arabic education, including limited interaction, diglossia, learner anxiety, and uneven proficiency development.

The proposed conceptual framework provides a structured lens for understanding how AI chatbots can be meaningfully embedded into Arabic language curricula, offering guidance for educators, curriculum designers, and researchers. Future empirical research is necessary to validate and refine the framework across diverse Arabic learning contexts.

Discussion

This conceptual study shows that AI chatbots have strong potential to support Arabic language learning and contribute to research on technology-based language education. Similar to previous studies, the findings confirm that AI chatbots can act as interactive learning partners. They allow learners to practise Arabic meaningfully beyond the classroom. However, this study adds new insight by focusing on challenges specific to Arabic learning, such as diglossia,

complex morphology, and learner anxiety, which are often overlooked in general AI language learning research.

The study also shows that AI chatbots fit well with sociocultural and interactionist theories of language learning. Chatbots function as mediational tools that support learner interaction through prompts, reformulations, and feedback. This helps learners develop accurate Arabic sentences and manage different language registers. Unlike earlier studies that mainly report learning outcomes, this study explains *how* chatbot interaction supports Arabic language development from a theoretical perspective.

The affective aspect is a key contribution of this study. In line with the affective filter hypothesis, chatbot use can reduce learner anxiety and increase willingness to communicate. This is especially important for Arabic learners, who often lack confidence in speaking. The non-judgemental nature of chatbots makes learners more comfortable practising the language.

Based on these findings, the proposed conceptual framework integrates pedagogical, linguistic, and affective dimensions into a single model. It positions AI chatbots as tools that support teachers rather than replace them. This framework provides educators and curriculum designers with clear guidance for using AI chatbots in Arabic language education. Future research is needed to test and improve the framework in different learning contexts.

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Conflict of Interest
The authors declare no conflict of interest in this study.

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