



Artificial Intelligence-Driven Gamification in Arabic Learning: A Literature Review and Conceptual Framework in Digital Era

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Abstract Advances in Artificial Intelligence (AI) have opened up new opportunities for the development of more adaptive and personalized Arabic language learning, but its application still requires integration with pedagogical strategies capable of enhancing learner engagement. Gamification offers interactive learning mechanisms, while AI provides diagnostic capabilities, personalization, analytics, and data-driven feedback. However, research on these two approaches still tends to develop separately and has not yet focused significantly on formulating a conceptual framework that specifically integrates both into Arabic language learning. This article aims to synthesize the literature on AI, gamification, language learning, and Arabic language learning to formulate a conceptual framework for AI-Driven Gamification for Arabic language teachers. This study employs an integrative literature review using Publish or Perish for literature search, selection based on relevance, and analysis via thematic synthesis. The results of the synthesis indicate that the integration of AI and gamification can be built through six main components: Learner Diagnosis, Adaptive Instructional Design, Gamified Learning Experience, AI-Powered Feedback and Assessment, Arabic Learning Outcomes, and Teacher Reflection and Continuous Adaptation. The conceptual contribution of this article lies in the integration of AI's adaptive capabilities with gamification mechanisms within a single pedagogical cycle that maintains the teacher's role as the controller of learning decisions. This framework can serve as a foundation for the development of media, instructional materials, adaptive assessments, and further empirical research in Arabic language learning.

Keywords Artificial Intelligence; Gamification; Arabic Learning

ملخص البحث لقد فتح تطور الذكاء الاصطناعي (AI) آفاقاً جديدة لتطوير تعليم اللغة العربية ليصبح أكثر تكيفاً وتخصيصاً، لكن الاستفادة منه لا تزال تتطلب التكامل مع استراتيجيات تربوية قادرة على تعزيز مشاركة المتعلمين. توفر «التلعيب» آلية تعليمية تفاعلية، في حين يوفر الذكاء الاصطناعي قدرات التشخيص والتخصيص والتحليل والتقييم القائم على البيانات. ومع ذلك، لا تزال الدراسات المتعلقة بهذين النهجين تميل إلى التطور بشكل منفصل، ولم توجه بعد بشكل كبير نحو صياغة إطار مفاهيمي يدمج كلا النهجين بشكل خاص في تعلم اللغة العربية. يهدف هذا المقال إلى تجميع الأدبيات المتعلقة بالذكاء الاصطناعي، والتلعيب، وتعلم اللغات، وتعلم اللغة العربية من أجل صياغة إطار مفاهيمي لـ «التلعيب المدعوم بالذكاء الاصطناعي» لمعلمي اللغة العربية. استخدم هذا البحث مراجعة أدبيات تكاملية مع البحث في الأدبيات بمساعدة أداة "Publish or Perish"، والاختيار بناءً على الصلة بالموضوع،



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والتحليل باستخدام التوليف الموضوعي. أظهرت نتائج التوليف أن تكامل الذكاء الاصطناعي والتلعيب يمكن بناؤه من خلال ست مكونات رئيسية، وهي: تشخيص المتعلم، وتصميم التعليم التكيفي، وتجربة التعلم الملعبة، والتغذية الراجعة والتقييم المدعومان بالذكاء الاصطناعي، ونتائج تعلم اللغة العربية، بالإضافة إلى تأمل المعلم والتكيف المستمر. تكمن المساهمة المفاهيمية لهذه المقالة في دمج القدرات التكيفية للذكاء الاصطناعي مع آليات التلعيب في دورة تربوية واحدة، مع الحفاظ على دور المعلم باعتباره المتحكم في قرارات التعلم. ويمكن أن يشكل هذا الإطار أساساً لتطوير الوسائط والمواد التعليمية والتقييم التكيفي، فضلاً عن إجراء المزيد من الأبحاث التجريبية في مجال تعلم اللغة العربية.

كلمات أساسية: الذكاء الاصطناعي؛ التلعيب؛ تعليم اللغة العربية

The development of artificial intelligence (AI) has now become one of the key drivers of educational transformation in the 21st century, shifting the educational paradigm from a one-size-fits-all learning model toward learning that is increasingly adaptive, personalized, and data-driven. The role of AI is no longer limited to automation; it has evolved into an integral part of the pedagogical ecosystem capable of supporting the analysis of learning needs, providing feedback, and enabling more responsive learning decisions (Aman, 2026). The development of intelligent tutoring systems further strengthens this transformation, as AI can process information regarding the performance of all students and tailor learning support to individual needs (Batsaikhan & Correia, 2024). On the other hand, the development of generative AI expands the role of technology in education, ranging from the provision of learning resources to the creation of more flexible and personalized learning experiences (Zhang et al., 2026). This transformation demonstrates that AI has evolved from merely a technological tool to a pedagogical component with the potential to reshape the patterns of interaction among teachers, students, instructional materials, and the learning environment. Consequently, this transformation opens opportunities to develop learning experiences that are more interactive, adaptive, and tailored to the individual needs of students.

The use of AI is also beginning to have a significant impact on the development of language learning, including Arabic language learning. AI-based technology enables the learning process to be supported through the personalization of materials, the provision of feedback, the development of language activities, and assistance in the learning assessment phase (Sa'Idah et al., 2024). At a more specific level of implementation, AI is being utilized as a tool for creating Arabic language learning content, enabling teachers to generate more diverse materials tailored to learners' needs (Attarbashi et al., 2026). Furthermore, the use of AI can also open opportunities for developing more adaptive learning strategies for learners of Arabic as a second or foreign language through the integration of intelligent technology with various language skill-building activities (Muhsini, 2025). However, these developments do not automatically make AI integration an effective pedagogical solution. The use of AI in Arabic language learning still faces various challenges related to pedagogical readiness, user competence, technological accuracy, and the need to maintain a balance between technological efficiency and human interaction in the learning process (Yusuf et al., 2026). Thus, the main issue is no longer simply how AI is used in Arabic language learning, but rather how AI technology is integrated with pedagogical strategies capable of producing meaningful learning experiences.

Among the approaches with the potential to bridge this gap is gamification. This approach incorporates game elements into the learning context to increase learner activity, motivation, and engagement without turning the learning process into a game entirely (Almelhes, 2024). In the context of Arabic language learning, the application of gamification has shown potential for enhancing learning interactions, including through digital platforms that incorporate challenges, points, rewards, and competitive activities (Laiya, 2025). This becomes increasingly relevant when applied to productive skills, as a more enjoyable and safe learning experience can help reduce students' anxiety when actively using Arabic (Kholifia et al., 2025). Specifically, gamification is also seen as capable of increasing learner engagement by creating learning experiences that are more challenging, participatory, and engaging (Todorova, 2025). Therefore, gamification is not merely viewed as a decorative element of learning technology but as a pedagogical strategy designed to direct learning behavior toward specific learning objectives.

The potential of gamification becomes even stronger when combined with AI capabilities. Through the integration of AI and gamification, game elements are no longer static but can be customized based on data and learners' responses. In the context of language learning, AI-driven gamification can combine game mechanics with personalization capabilities, allowing difficulty levels, feedback, and challenges to be adjusted more dynamically (Alenezi, 2023). This approach is beginning to gain traction in language learning through the use of AI to enrich interactions and gamification within digital learning environments (Wu et al., 2024). The combination of these two approaches also has the potential to enhance learner engagement, as AI's adaptive nature can be integrated with gamification's motivational characteristics (Kayyali, 2025). Research developments on the integration of AI and gamification across various educational fields increasingly demonstrate that the two can complement each other, with AI providing analytical and adaptive capabilities while

gamification provides mechanisms for interaction and motivation (Wei et al., 2025). In Arabic language learning, the development of digital game-based media also reveals various opportunities to systematically integrate smart technology with language learning activities (Zahra et al., 2026). Thus, AI-driven gamification has the potential to become an approach that not only enhances learning engagement but also connects data-driven personalization with a more interactive learning experience.

Nevertheless, the development of this research still reveals conceptual gaps that need to be clarified. The literature on gamification in Arabic language learning has grown significantly and demonstrates various benefits regarding motivation, interactivity, and language skills; however, much of the research still focuses on the application of specific media or platforms (Laiya, 2025). On the other hand, studies on AI in Arabic language learning more often highlight the use of AI for content creation, language interaction, skill development, or general learning support (Zeiny et al., 2024). Research addressing AI and gamification has indeed begun to demonstrate the relationship between the adaptive capabilities of technology and game mechanics; however, most of these discussions remain within the context of language learning or educational fields other than Arabic language learning (Kayyali, 2025). This situation indicates a need to synthesize the various scattered findings on AI, gamification, and Arabic language learning within a more integrated pedagogical framework. This need becomes increasingly important given that the effectiveness of educational technology is determined not only by the technology's features but also by teachers' ability to connect the technology with learning objectives, learner characteristics, and language skill needs (Rokhmansyah et al., 2025). Therefore, a conceptual synthesis is needed to clarify the role of AI-driven gamification in Arabic language learning while providing a pedagogical foundation for teachers to design and implement it.

Given this gap, this study aims to synthesize the literature on AI, gamification, and language learning to formulate a conceptual framework for Artificial Intelligence-Driven Gamification in Arabic language learning. This study is not intended to test the effectiveness of a specific platform through field data, but rather to integrate various research findings into a framework that explains the relationship between learning needs assessment, AI-based personalization, gamification mechanisms, language skill activities, feedback, and the role of the teacher. Thus, the main contribution of this research lies in the effort to shift the discussion from the separate use of AI or gamification toward an understanding of how AI and gamification can be designed as a single adaptive pedagogical ecosystem for Arabic language learning. Consequently, the conceptual framework formulated in this study is expected to serve as a foundation for teachers and researchers in developing Arabic language learning that is more interactive, personalized, and responsive to advancements in digital technology. Thus, this study does not position teachers as passive users of technology but rather as pedagogical designers capable of determining how AI capabilities and gamification mechanisms can be directed to achieve Arabic language learning objectives.

1. METHODES (طريقة البحث)

This study employs an integrative literature review approach to synthesize empirical and conceptual findings related to Artificial Intelligence (AI), gamification, and language learning, with the aim of developing a conceptual framework for AI-driven gamification in Arabic language learning. This approach is considered appropriate for conceptual research because it allows for the integration of empirical studies, theoretical reviews, and review articles from various fields to gain a comprehensive understanding and generate new conceptual insights (Whittemore & Knafl, 2005).

Thus, the purpose of this study is not to test the effectiveness of a specific platform, but rather to integrate various research findings and theoretical perspectives to formulate a coherent conceptual framework for how AI-driven gamification can be designed and implemented pedagogically in Arabic language learning. The review and synthesis process was conducted through five iterative stages, namely: (1) identification of relevant literature, (2) screening and selection of literature, (3) data extraction, (4) thematic synthesis, and (5) development of a conceptual framework. An overview of the entire process is presented in Figure 1 below:

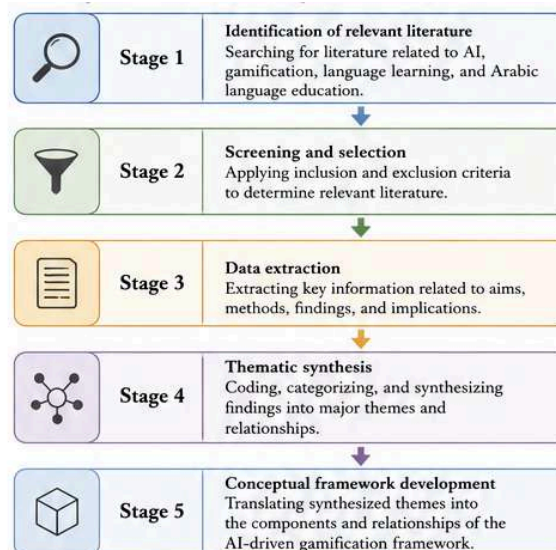


Figure 1. Overview of the Integrative Literature Review Process

Data Sources

The literature used in this study includes peer-reviewed journal articles, systematic reviews, book chapters, and conference proceedings relevant to the research topic, as described in Table 1 below:

Table 1. Types and Characteristics of Literature Sources

Type of Source	Purpose in Review	Examples of Content
Journal Articles (empirical)	Provide evidence on implementation, strategies, outcomes, and challenges	Studies on AI in education, gamification in Arabic learning, AI tools, learner engagement, skills development
Review Articles / Systematic Reviews	Offer synthesis of trends, gaps, and emerging directions	Reviews on AI in education, gamification effectiveness, AI for language learning
Book Chapters	Provide theoretical foundations, models, and conceptual insights	Theories of learning, gamification principles, assessment, ethics, and teacher roles
Proceedings	Capture recent innovations and exploratory studies	Emerging tools, pilot implementations, and conceptual proposals

Furthermore, this table confirms that the literature for this study was obtained by searching for scholarly articles using Publish or Perish as a tool for searching and managing bibliographic information. The search focused on literature related to Artificial Intelligence (AI) in education, AI in language learning and Arabic language learning, gamification in education and Arabic language learning, the integration of AI and gamification, language skills, assessment and feedback, as well as the role of teachers and the ethical aspects of AI use. Priority was given to publications from 2023–2026 to ensure the research reflects the current state of the art, while older sources were retained if they served a fundamental function as a methodological or conceptual foundation.

Literature selection was conducted by considering the relevance of the content to the focus of the study. Studies were included if they addressed AI, gamification, language learning, Arabic language learning, assessment, feedback, ethics, or the role of teachers in education. Sources that lacked

substantive relevance to the focus of the study, did not provide sufficient academic information, or discussed only the technical development of AI without pedagogical implications were excluded from the synthesis. The inclusion and exclusion criteria are presented in more detail in Table 2.

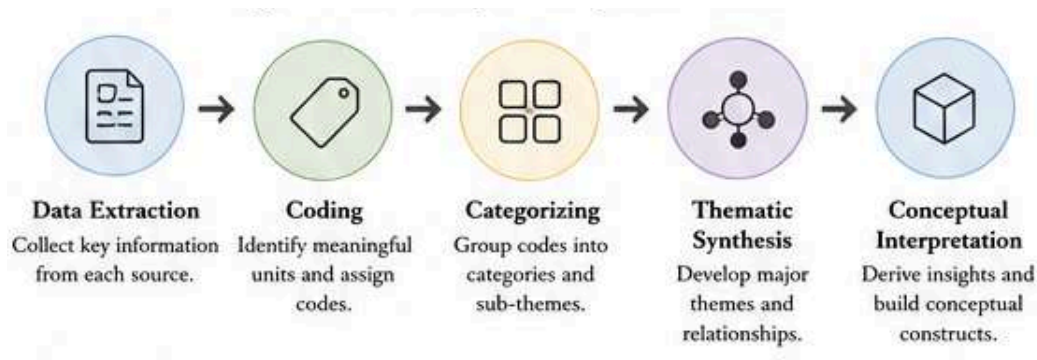
Table 2. Inclusion and Exclusion Criteria

Inclusion Criteria		Exclusion Criteria
1	Published in peer-reviewed journals, reputable proceedings, or book chapters.	Non-academic sources such as blog posts, opinion pieces, or unverified reports.
2	Directly related to at least one of the domains: AI in education; AI in language learning; AI in Arabic learning; gamification in education; gamification in Arabic learning; AI and gamification; language skills; assessment and feedback; ethics; teacher roles.	Not relevant to the research domains or only tangentially related.
3	Published between 2018 and 2026 (foundational studies prior to 2018 are included when essential).	Published before 2018 and not considered foundational.
4	Available in full text and written in English or Indonesian.	Not available in full text.
5	Provide empirical data, conceptual models, theoretical discussions, or comprehensive reviews.	Studies with insufficient methodological transparency or unclear data.
6	Address Arabic language learning or general language learning in connection with AI, gamification, or both.	Focus solely on technical AI development without educational or learning implications.

The literature search for this study used keywords developed based on the focus of the study, such as artificial intelligence, AI in language learning, AI in Arabic language learning, gamification in language learning, Arabic language gamification, and combinations of the keywords “AI” and “gamification”. The search results were then reviewed based on title, abstract, topic relevance, and the availability of information necessary for the synthesis process. Since this study is an integrative literature review and not a PRISMA-protocol-based systematic review, it does not make claims regarding the number of articles identified, selected, and excluded through the PRISMA workflow.

Data Analysis Techniques

The literature review was conducted using a thematic synthesis approach, as illustrated in Figure 2 below (Thomas & Harden, 2008):



Gambar 2. Data Analysis and Synthesis Process

Using the diagram in the initial stage, all key information from each source was extracted, including the research objectives, methods, main findings, practical implications, and research limitations. Next, meaningful units of information were assigned codes inductively. These codes were then grouped into broader categories and subthemes before being synthesized into main themes. The next step involved identifying relationships between themes to construct a coherent conceptual narrative.

Based on the above process, the main themes identified include: (1) AI’s ability to personalize learning, (2) the mechanisms of gamification and motivational pathways, (3) the integration of AI and gamification, (4) skills and activities in Arabic language learning, (5) assessment and feedback, (6) ethics and the responsible use of AI, and (7) the role and professional development of teachers. Thus, the themes identified through the synthesis process were then translated into components and inter-component relationships to develop a framework for AI-driven gamification in Arabic language

learning. This framework depicts a dynamic cycle that begins with AI-assisted diagnosis and mapping of learner characteristics, followed by the design of gamified learning, adaptive learning experiences, the provision of feedback and assessment, the achievement of learning outcomes, and continuous improvement of learning based on data.

2. RESULT (نتائج البحث)

The results of this study are presented as a thematic synthesis of the literature on AI, gamification, and language learning, particularly Arabic. In keeping with the nature of an integrative literature review, the findings are not treated as a mere accumulation of separate research results but are integrated to identify patterns, relationships, and conceptual constructs that can explain the role of AI-driven gamification in Arabic language learning. This approach aligns with the nature of an integrative review, which allows for the combination of various types of evidence and theoretical sources to produce a more comprehensive conceptual understanding (Whittemore & Knafl, 2005). The synthesis process is further directed toward the development of analytical themes that go beyond the description of individual findings and establish conceptual relationships among themes (Thomas & Harden, 2008).

AI Capabilities as the Foundation of Adaptive Learning

A review of the literature indicates that AI's primary contribution to learning lies in its ability to process learning information to create more personalized and adaptive experiences. In an educational context, AI can be used to analyze student performance, identify individual needs, and support the adaptation of learning based on different learning characteristics (Aman, 2026). These capabilities are further enhanced through intelligent tutoring systems, which enable the provision of dynamic learning support based on information collected during the learning process (Batsaikhan & Correia, 2024).

In language learning, these adaptive capabilities are particularly significant because language acquisition is a gradual process that involves various skills. AI can help provide exercises tailored to learners' proficiency levels while offering support throughout the learning process (Ebrahimi et al., 2025). In Arabic language learning, the use of AI is primarily focused on developing materials, learning strategies, and various activities to support language skills (Muhsini, 2025). The use of AI in content creation also provides opportunities for teachers to produce more varied materials and tailor them to learning needs (Attarbashi et al., 2026).

These findings show that the primary pedagogical value of AI lies not in its ability to automatically generate content, but in its capacity to adaptively shape the learning cycle. AI receives data about learners, interprets that information, generates tailored responses or materials, and then uses new data from subsequent interactions to update its learning support. This pattern aligns with developments in generative AI and educational technology, which increasingly position personalization as a key feature of AI-based learning (Zhang et al., 2026).

Through Arabic language learning, these adaptive capabilities can be implemented across several components simultaneously, such as vocabulary selection, sentence structure complexity, listening and reading exercises, writing practice, and communication simulations. However, these technical capabilities do not automatically result in effective learning. The use of AI still requires pedagogical design that takes into account learning objectives, the validity of the material, and the need for human interaction in Arabic language learning (Yusuf et al., 2026). Thus, AI should be positioned as a pedagogical adaptation tool, while teachers remain the ones who determine the direction and objectives of technology use. The following table summarizes AI capabilities in Arabic language learning.

Table 3. A Synthesis of AI Capabilities in Arabic Language Learning

AI Capabilities	Pedagogical Functions	Potential in Arabic Language Learning
Diagnosis and Analytics	Identifying proficiency levels and learning difficulties.	Mapping proficiency in vocabulary, grammar, and the four language skills (listening, speaking, reading, and writing)
Personalization	Tailoring content and difficulty levels.	Different exercises based on the learner's level.
Content Generation	Generating learning materials and activities.	Creating texts, dialogs, questions, and practice materials.
Feedback	Providing responses to performance.	Language correction and support during practice.
Intelligent Interaction	Providing a communication environment.	Simulated dialogs and language production exercises.
Predictions and Recommendations	Determining next steps in learning.	Remedial instruction, enrichment, and activity recommendations.

Gamification as a Mechanism for Engagement and Learning Activation

Gamification provides a pedagogical mechanism for fostering learner engagement. Unlike AI, which primarily excels in personalization and data processing, gamification works by designing learning experiences that incorporate elements such as challenges, points, rewards, competition, and progress to influence learner participation (Almelhes, 2024).

In Arabic language learning, gamification is particularly relevant because language learning often requires repetitive practice and active participation. The implementation of gamification via digital platforms can enhance motivation and interactivity through activities that feature clear objectives, challenges, and immediate feedback (Laiya, 2025). Furthermore, gamification also has affective implications, as a safer and more enjoyable learning environment has the potential to reduce anxiety when learners must actively use Arabic (Kholifia et al., 2025).

Thus, the utility of gamification should not be reduced to mere rewards or competition. Gamification mechanisms become pedagogical when each game element is linked to learning objectives. For example: points can be used to track progress in vocabulary mastery; challenges can be used to encourage language production; and badges can be used to reinforce the attainment of specific competencies. This perspective aligns with the view that gamification can serve as a strategy to increase engagement among all learners when game elements are intentionally designed into the learning experience (Todorova, 2025).

A study specifically focused on developing digital game-based media for Arabic language learning also indicates that the direction of gamification research is shifting from the use of simple games toward systems that are more integrated with digital technology (Zahra et al., 2026). In fact, the application of the audio-oral method with Wordwall gamification demonstrates that game mechanics can be directly linked to speaking and grammar practice, not just to vocabulary acquisition or assessment (Zubair, 2026). This expands the possibilities for gamification design across all four language skills and various linguistic components.

The Convergence of AI and Gamification: From Static Gamification to Adaptive Gamification

A synthesis of the literature reveals a complementary relationship between AI and gamification. AI has the capacity to support diagnosis, personalization, analytics, and adaptive learning (Batsaikhan & Correia, 2024). Furthermore, gamification provides mechanisms for learning experiences that can enhance learners' activity, motivation, and engagement (Almelhes, 2024). When these two approaches are combined, game mechanics no longer need to be static, as the learning experience can be tailored to data and learner responses (Alenezi, 2023). This convergence offers the potential to create more adaptive and interactive language learning experiences (Kayyali, 2025).

Based on this synthesis, the concept of AI-driven gamification in this study is not understood as a mechanical combination of AI and games, but rather as an adaptive learning design capable of utilizing gamification mechanisms to implement data-driven pedagogical decisions. Thus, in this context, AI plays a role in identifying needs and tailoring learning support, while gamification serves as a medium capable of packaging these adaptations into a challenging, interactive, and meaningful learning experience.

Research on AI-driven gamification has shown that the use of AI can enrich gamification systems by enabling them to tailor the learning experience based on learners' responses (Alenezi, 2023). In language learning, the integration of AI with gamification is also viewed as a combination that enables language games to become increasingly adaptive, while AI serves as a driver of personalization in the learning experience (Kayyali, 2025). Findings on language and literacy learning in blended learning environments further demonstrate that the combination of AI and gamification can support a more interactive and adaptive learning environment (Wu et al., 2024).

This trend is not limited to language education. Studies in other fields have shown that AI can expand the capabilities of gamification by linking game mechanics with data analysis, personalization, and learning decision-making (Sangishetti & Bharatha, 2025). Thus, these developments have demonstrated that the relationship between AI and gamification is cross-domain in nature and can also be applied in the context of Arabic language learning, provided that the technological mechanisms are adapted to the characteristics of language learning.

Based on this synthesis, the concept of AI-driven gamification in this study is understood not as AI and games in a mechanical sense, but rather as an adaptive learning system that uses gamification mechanisms to implement AI-based pedagogical decisions. In this sense, AI determines how learning can be adapted, while gamification determines how that adaptation is experienced and responded to by all learners. This formulation represents a key distinction from the use of gamification platforms that merely add points, rankings, or quizzes without adaptively utilizing learner data.

AI-Driven Gamification in Arabic Language Skills Development

AI-driven gamification is most effective when designed based on language skills and learning objectives, rather than on the available platforms. The use of technology for Arabic language learning has expanded across various skills and activities, but its effectiveness depends on the alignment of the technology with pedagogical needs. Studies on AI in Arabic language courses have shown that the use of AI has begun to enter the context of learning Arabic as a second language, but its implementation still requires more systematic pedagogical development (Zeiny et al., 2024).

In terms of vocabulary, AI can be used to provide adaptive exercises based on words that learners have not yet mastered, while gamification can provide a mechanism for repetition through challenges, points, and progress. Meanwhile, in terms of grammar, AI can help generate exercises with varying levels of complexity, while gamification can transform repetitive exercises into mission or challenge-based activities. This approach aligns with findings that gamification can be used as a tool to support the mastery of language structures and audio-oral activities (Zubair, 2026).

In terms of listening skills, AI can enrich input exposure through speech synthesis technology and the production of audio materials. Meanwhile, in terms of reading skills, AI can enrich input exposure through the production of reading materials. This integration can then be combined with game-based mechanisms such as quizzes, comprehension challenges, or tiered achievements. This digital approach expands learners' access to language input and allows for more flexible practice (Ruswandi et al., 2025).

In terms of speaking skills, the integration of AI has broader potential because students can access a communication practice environment without always having to wait for direct interaction with a teacher. For example, the use of ChatGPT in Arabic language learning highlights both opportunities and challenges in using AI to support language interaction and learning (Lelepary et al., 2023). Within the framework of gamification, such interactions can be developed into mission-based simulations, role-plays, or communication challenges that provide feedback at every stage.

In terms of writing skills, AI can assist students by providing examples, guidance, and feedback. Meanwhile, gamification can transform the writing process into a series of missions with incremental goals. The use of AI to generate learning content provides opportunities for teachers to design these activities more quickly and with greater variety (Attarbashi et al., 2026). However, teachers must still ensure that AI is used as a scaffold, not as a substitute for students' thinking processes and language production.

In summary, the following table presents the conceptual matrix of AI-Driven Gamification in Arabic language learning:

Table 4. Conceptual Mapping of AI-Driven Gamification Based on Arabic Language Learning Components

Arabic Language Learning Components	The Role of AI	Gamification Mechanisms	Example Activities
Vocabulary	Identification of unmastered words and practice recommendations	Points, levels, streaks, challenges	Vocabulary mastery missions
Grammar	Question generation and adaptation	Tiered challenges, rewards	Grammar challenge
Listening	Customization of audio materials	Points and quizzes	Listening mission
Reading	Text and question adaptation	Reading missions and progress	Reading quest
Speaking	Interaction simulation and feedback	Role-play, levels, badges	Communication mission
Writing	Composition assistance and feedback	Step-by-step missions and achievement	Writing challenge

Assessment, Feedback, and Learning Analytics

One of AI's key contributions to gamification is its ability to transform learner interaction data into information for instructional decision-making. In the context of Arabic language learning, technology-based assessment has evolved through various platforms that utilize quizzes, analytics, and digital feedback. A systematic review of Kahoot shows that gamification can be used as part of innovations in Arabic language assessment, particularly to support engagement and formative evaluation (Roziqi et al., 2026).

Within the framework of AI-driven gamification, assessment is not limited to the end of the learning process. Data on student responses during the game can be viewed as part of a continuous assessment process. AI can then identify patterns of errors, success rates, response speeds, or material that students consistently struggle to master to determine the next activities. Thus, this approach aligns with developments in AI for learning that position analytics and feedback as crucial components of pedagogical effectiveness (Sa'Idah et al., 2024).

Thus, the assessment functions within this AI-driven gamification framework are diagnostic, formative, adaptive, and reflective. Diagnostic assessment is used before activities begin; formative assessment is conducted while the game is in progress; AI adaptation uses assessment results to adjust the level of challenge; and reflective assessment is used by teachers to determine remedial and enrichment strategies. This model ensures that game data is not merely a competitive score, but is transformed into pedagogical information.

The Role of Teachers and Ethical Dimensions

The literature review also indicates that the success of AI-driven gamification still depends on the role of the teacher. Technological changes do not eliminate the need for teachers; rather, they transform the nature of the competencies required. Therefore, teachers need the ability to select technologies, design activities, evaluate AI outputs, adapt games to learning objectives, and critically interpret learning data. Teachers' strategies for fostering interest in learning Arabic in the digital age indicate that technology should be integrated into a pedagogical framework rather than used as the learning objective itself (Rokhmansyah et al., 2025).

Ethical considerations become increasingly important as AI begins to process data from students on an ongoing basis. Studies on students' experiences with AI-based language learning have shown that the convenience of technology can go hand in hand with ethical concerns, particularly regarding dependence on and the inappropriate use of AI (Chavez et al., 2026). Therefore, the framework for AI-driven gamification must incorporate the principles of transparency, data protection, human oversight, and the proportional use of AI.

The need for this balance is also relevant in the context of religious education and Arabic language learning, which have value- and culture-based dimensions. Studies on AI in Islamic education have shown that the integration of technology into the curriculum must take into account the compatibility between digital innovations and the pedagogical character of educational institutions (Susanto & Kiftiyah, 2025). In a broader context, Arabic language learning in religious settings also presents challenges and opportunities related to specific social and cultural contexts and learning objectives (Muthoifin & Elbanna, 2026). Therefore, AI should not replace the humanistic, affective, and exemplary roles of teachers in Arabic language learning (Smahi, 2026).

A Conceptual Framework for AI-Driven Gamification in Arabic Language Learning

Based on the results of the thematic synthesis, this study developed a literature synthesis matrix to map the relationships among the findings of previous research, pedagogical implications, and the constructs that form the basis for the development of the framework, as shown in the following table:

Table 5. Literature Synthesis Matrix

Source	Focus of the Study	Key Findings	Pedagogical Implications	Framework Components
Alenezi (2023)	AI-driven gamification	AI can support motivation and engagement	Gamification needs to be adaptive	Gamified Learning Experience
Almelhes (2024)	Gamification of Arabic Language Learning	Gamification supports motivation and Arabic language learning	Game elements need to be linked to language objectives	Gamified Learning Experience
Sa'Idah et al. (2024)	AI in Arabic Language Learning	AI supports the effectiveness of Arabic language learning	AI can be used to support learning	Adaptive Instructional Design
Batsaikhan and Correia (2024)	AI and Intelligent Tutoring Systems (ITS)	AI enables personalization	Learner data is used for adaptation	Learner Diagnosis
Laiya (2025)	Arabic Language Gamification	Gamification enhances motivation and interactivity	Digital activities can be designed in a game-based format	Gamified Learning Experience

Source	Focus of the Study	Key Findings	Pedagogical Implications	Framework Components
Kholifia et al. (2025)	Gamifikasi and language anxiety	Gamification has the potential to reduce anxiety	The game environment can serve as a safe learning environment	Gamified Learning Experience
Attarbashi et al. (2026)	AI content creation for Arabic language	AI assists in content creation	Teachers can produce more adaptive materials	Adaptive Instructional Design
Roziqi et al. (2026)	Gamification of Arabic Language Assessment	Gamification can support assessment	Game data can be utilized for evaluation	AI-Powered Feedback and Assessment
Zahra et al. (2026)	Digital Game-Based Media for Arabic Language Learning	A systematic implementation framework is needed	Gamification needs to be integrated with pedagogical design	Adaptive Instructional Design

Through this synthesis matrix, this study identifies patterns of relationships among AI capabilities, gamification mechanisms, Arabic language learning needs, assessment, and the role of teachers. The results of the synthesis are then interpreted into six main components that form the framework for AI-Driven Gamification in Arabic language learning. These six components are not viewed as linear stages but rather as a learning cycle that allows the results of interactions and assessments to be reused for diagnosing and adapting subsequent learning, as illustrated in the following diagram:

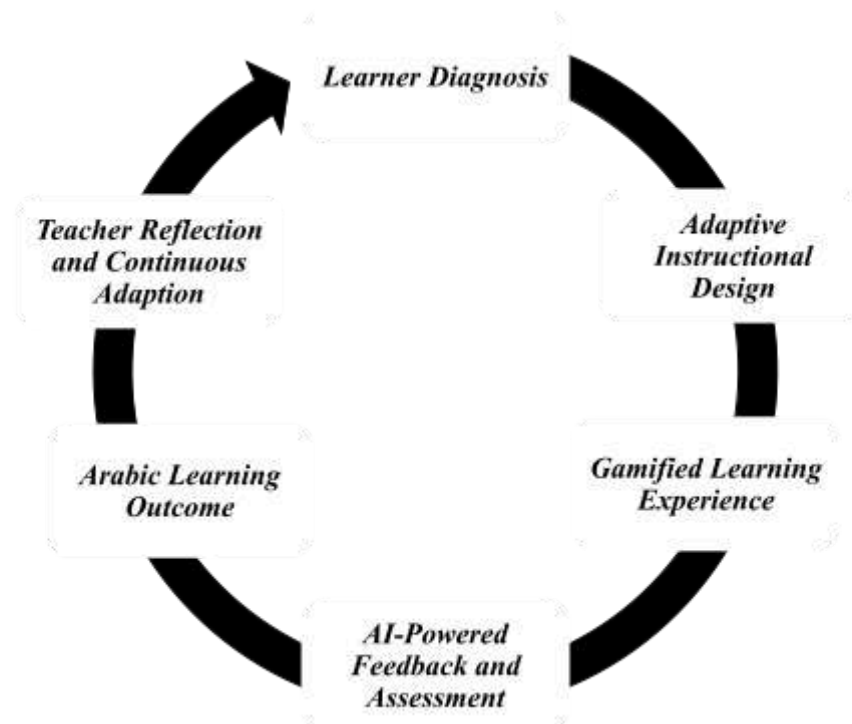


Figure 3. Conceptual Framework for AI-Driven Gamification in Arabic Language Learning

Thus, Arabic Learning Outcomes can be positioned as the learning outcomes that guide the entire process, while Teacher Reflection and Continuous Adaptation serve as a reflective mechanism that links learning outcomes to the next learning cycle. This structure enables the framework to move from diagnosis to design, gamified experiences, assessment and feedback, achievement of learning outcomes, and then back to teacher reflection and continuous adaptation.

Based on this framework, it is evident that AI plays a role throughout the entire learning cycle but does not replace the teacher's function. Thus, AI primarily focuses on data collection and interpretation, personalization, content generation, feedback, and recommendations, while teachers are responsible for pedagogical decisions, content validation, ethical oversight, and the interpretation of results. This structure synthesizes research trends highlighting the importance of AI-driven personalization (Aman, 2026), the motivational mechanisms of gamification (Almelhes, 2024), the integration of AI and gamification (Alenezi, 2023), and the need for pedagogical designs that remain centered on teachers and students.

Thus, the conceptual contribution of this study lies in repositioning gamification from merely a motivational mechanism to a layer of AI-driven adaptive learning experiences, as well as in repositioning teachers as pedagogical controllers within the AI-driven learning cycle. This framework can then serve as a foundation for developing digital instructional materials, Arabic language game-based media, adaptive assessments, and future empirical research. It is also consistent with emerging research on Arabic language digital game-based media, which highlights the need for a more systematic implementation model (Zahra et al., 2026).

3. DISCUSSION (المناقشة)

Conceptually, research findings have shown that the integration of AI and gamification should not begin with the platform to be used, but rather with the learning needs to be addressed. This shift in perspective is important because more technology does not necessarily lead to better learning. Therefore, as a teacher, one must first determine the competencies to be achieved, then identify the data that needs to be collected, and also determine the appropriate gamification mechanisms along with the forms of AI adaptation that are truly relevant.

The second implication relates to skills-oriented instructional design. Therefore, AI-driven gamification should be developed as a system that allows for differentiated instruction based on learning objectives. Activities for vocabulary do not have to use the same mechanisms as those for speech, just as grammar exercises do not have to use the same game structure as reading exercises. The literature on Arabic language gamification has shown that a more skill-specific approach can produce a more relevant learning experience (Kholifia et al., 2025).

The third implication is the need to develop teachers' competencies. In the age of AI, it is no longer enough for Arabic language teachers to simply be able to operate applications; they must also understand how to interpret data, evaluate AI outputs, select gamification mechanisms, ensure linguistic accuracy, and consider ethical aspects. A study on teachers' and students' perceptions of AI in language learning shows that acceptance of the technology is closely linked to users' understanding of its benefits, limitations, and the consequences of its use (Alharbi & Khalil, 2023).

Ultimately, AI-driven gamification is best understood as a pedagogical design approach rather than as a specific application or platform. This perspective ensures that the framework remains relevant even as technologies and platforms evolve. In the context of rapidly advancing AI, this kind of conceptual flexibility is crucial because it allows teachers to avoid relying on a single technology product and instead apply the same principles to select and adapt technologies to meet learning needs.

4. CONCLUSIONS (الاستنتاج)

The integration of Artificial Intelligence (AI) and gamification holds strong conceptual potential for creating Arabic language learning that is more adaptive, interactive, personalized, and oriented toward learners' needs. A literature review indicates that AI plays a crucial role, particularly in

addressing learning needs, personalizing instruction, generating content, providing feedback, analyzing data, and offering follow-up recommendations. Meanwhile, gamification also plays a vital role in providing mechanisms to enhance engagement through challenges, progress, rewards, and a more interactive learning experience. The convergence of these two approaches gives rise to the concept of AI-driven gamification—a learning design that leverages AI's adaptive capabilities to dynamically drive gamification-based learning experiences.

The main contribution of this study lies in the formulation of a conceptual framework for AI-driven gamification consisting of six interconnected components within a learning cycle, namely: (1) Learner Diagnosis, (2) Adaptive Instructional Design, (3) Gamified Learning Experience, (4) AI-Powered Feedback and Assessment, (5) Arabic Learning Outcomes, and (6) Teacher Reflection and Continuous Adaptation. This framework positions AI as the driver of data-driven adaptation, gamification as the mechanism for students' learning experiences and engagement, and teachers as the primary decision-makers in pedagogical matters. With this approach, technology is not positioned as a substitute for teachers, but rather as a tool that expands teachers' capacity to design more responsive Arabic language instruction.

From a pedagogical perspective, the implementation of this AI-driven gamification framework emphasizes that the process should not begin with the selection of a technology platform, but rather with the identification of learning needs, competency goals, learner characteristics, and the Arabic language skills to be developed. It is also necessary to consider the accuracy of the material, continuous assessment, data protection, the responsible use of AI, and the maintenance of humanistic interactions in learning. Thus, the AI-driven gamification framework is best understood as a pedagogical design approach rather than merely the use of game-based applications.

A limitation of this study is that the framework formulated is conceptual in nature and has not yet been tested through empirical research in the context of a specific Arabic language classroom. Therefore, future research needs to test the validity and practicality of this framework through development research, experiments, design-based research, or implementation studies across various levels and characteristics of Arabic language learners. Such empirical testing is necessary to determine how each component of the framework contributes to motivation, engagement, language proficiency, learning outcomes, and the experiences of students and teachers in an AI-based learning environment.

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