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Teachers' Perceptions, Knowledge, Attitudes, and Practices in Integrating Artificial Intelligence into Arabic Language Teaching

Nur Qomari[1], Khusnul Khotimah Halimatus Sa'diyah[2], Ahmad Makki[3], Moh. Rifqi Habibullah[4], Gareeb Allah Babiker Mustafa Babiker[5]

[1,2,3,4]UIN Maulana Malik Ibrahim Malang, Indonesia
[5]King Khalid University, Saudi Arabia

Email: qomari@uin-malang.ac.id[1], sakdiyyah@gmail.com[2]
ahmadmakkih@gmail.com[3], rifqihabibullah2@gmail.com[4],
qryballhbabkr38@gmail.com [5]

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Abstract:
The rapid integration of Artificial Intelligence (AI) in language education holds transformative potential but faces significant implementation gaps, particularly in Arabic language teaching at the secondary level. This study investigates how teachers' perceptions, knowledge, attitudes, and gender influence AI adoption in Arabic instruction, addressing a critical gap in which Arabic's unique linguistic characteristics remain underexplored. Using a quantitative design with total sampling, data were collected from 46 senior high school Arabic teachers through validated instruments measuring four core constructs. The findings reveal that perceptions are the strongest determinant of AI-based teaching practices, outweighing knowledge and attitudes alone. Although teachers demonstrate strong conceptual AI knowledge and generally positive attitudes, practical implementation remains limited due to psychological concerns, insufficient training, and uneven technological access. Notably, gender-based patterns show that female teachers report higher confidence but lower actual AI usage than male teachers, who report greater access to facilities. The study concludes that effective AI integration requires targeted professional development that addresses affective and structural barriers, equitable institutional support, and gender-responsive strategies to translate positive perceptions into sustained classroom practice.

Kata Kunci: *Kecerdasan Buatan; persepsi guru; pengajaran bahasa Arab; praktik pengajaran.*

Abstrak:
Integrasi kecerdasan buatan (AI) dalam pembelajaran bahasa memiliki potensi transformatif namun menghadapi kesenjangan implementasi yang signifikan, terutama dalam pengajaran bahasa Arab di tingkat menengah. Penelitian ini menyelidiki bagaimana persepsi, pengetahuan, sikap, dan gender guru mempengaruhi adopsi AI dalam pembelajaran bahasa Arab, mengatasi kesenjangan kritis di mana karakteristik linguistik bahasa Arab yang unik masih kurang dieksplorasi. Menggunakan desain kuantitatif dengan total sampling, data dikumpulkan dari 46 guru bahasa Arab SMA melalui instrumen tervalidasi yang mengukur empat konstruk inti. Temuan menunjukkan bahwa persepsi muncul sebagai penentu terkuat praktik pengajaran berbasis AI, melampaui pengetahuan dan sikap saja. Meskipun guru menunjukkan pengetahuan konseptual AI yang kuat dan sikap umumnya positif, implementasi praktis tetap terbatas karena kekhawatiran psikologis, pelatihan yang tidak memadai, dan akses teknologi yang tidak merata. Secara mencolok, pola berbasis gender menunjukkan

bahwa guru perempuan melaporkan kepercayaan diri lebih tinggi tetapi penggunaan AI aktual lebih rendah dibandingkan guru laki-laki yang melaporkan akses fasilitas lebih besar. Penelitian menyimpulkan bahwa integrasi AI yang efektif memerlukan pengembangan profesional terarah yang mengatasi hambatan afektif dan struktural, dukungan institusional yang adil, serta strategi responsif gender untuk menerjemahkan persepsi positif ke dalam praktik kelas berkelanjutan.

Correspondent Author: qomari@uin-malang.ac.id (Nur Qomari)

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Introduction

In the evolving landscape of 21st-century education, the integration of Artificial Intelligence (AI) is increasingly recognized as a transformative force reshaping language learning practices. Across global educational systems, AI is viewed as a tool that personalizes instruction and enhances learner engagement through adaptive learning mechanisms. This capacity stems from AI's ability to tailor instructional content to the unique linguistic needs of individual learners, thereby supporting differentiated learning pathways that promote efficiency and improved mastery of language skills (Ai-jun, 2024; Anwar, 2023; Liu, 2023a; Ulfa, 2023). Furthermore, AI applications provide immediate feedback and facilitate interactive learning environments, strengthening students' ability to acquire complex linguistic competencies—an aspect noted as essential for sustained language mastery (Idham et al., 2024; Konyrova, 2024; Wei, 2023). This development makes research on teacher readiness increasingly urgent for policy, pedagogy, and curriculum development, because the successful integration of AI in schools depends not only on the availability of technology but also on how teachers understand, value, and apply it in formal instructional settings.

Despite AI's transformative potential, integrating it into secondary-level language instruction poses significant challenges that continue to shape policy and classroom realities. A central concern is the risk of over-reliance on automated systems, which may inadvertently narrow pedagogical roles or diminish the humanistic aspects of instruction. Alongside these concerns are persistent technical barriers, ethical issues related to data privacy, and uncertainties surrounding responsible data use—factors identified as critical impediments in current studies (Idham et al., 2024; Liu, 2023b; Yuen & Schlote, 2024). Practical constraints, such as inconsistent internet connectivity and the need for well-maintained digital infrastructure, further complicate implementation, particularly in resource-limited school environments, and may widen inequalities in classroom innovation (Nurjanah et al., 2024; Rusmiyanto et al., 2023). Nonetheless, the literature consistently highlights AI's opportunities to reinforce learner autonomy, diversify instructional methods, and enhance overall learning outcomes, underscoring the importance of exploring how educators navigate these tensions in real-world instructional contexts at the secondary-school level (Ai-jun, 2024; Son et al., 2023; Yunina, 2023).

In response to these challenges, the literature has proposed several broad solutions to ensure effective integration of AI in school-based language instruction. Central among these is strengthening teacher readiness, as educators are the primary agents who interpret, adapt, and implement AI tools in classrooms. Existing studies show that many teachers hold positive attitudes toward AI, viewing it as a tool that can enrich instructional quality and enhance student engagement (Ignalig et al., 2024; Nazaretsky et al., 2022). However, readiness is uneven and often mediated by prior exposure to technology, digital literacy skills, and the availability of sustained professional development (Fteiha et al., 2025; Yue et al., 2024). This underscores the need for capacity-building efforts that not only familiarize teachers with AI applications but also situate these technologies within broader pedagogical frameworks, because positive attitudes alone do not guarantee meaningful classroom implementation.

The literature also points to more targeted solutions that address socio-cultural and demographic factors shaping teachers' engagement with AI technologies. Notably, gender differences have emerged as a recurring theme that influences access, confidence, and attitudes toward AI adoption. Evidence indicates that male educators often demonstrate greater confidence and readiness than female educators, a trend shaped by broader socio-cultural norms regarding technology engagement (Alshorman, 2024; Falebita, 2024; Koka et al., 2024a). Such disparities not only affect teacher motivation but may also influence the effectiveness of AI-related professional development initiatives, thereby affecting the successful integration of AI systems in schools. As several scholars note, addressing these disparities requires deliberate, gender-responsive training approaches that account for differing levels of technological familiarity and institutional opportunity (Yue et al., 2024; S. Zhang et al., 2024).

A closer examination of the literature highlights a substantial gap in Arabic language teaching at the high school level. Although AI-enhanced instructional strategies have gained traction across various languages, empirical research focusing specifically on the pedagogical application of AI in Arabic language learning remains limited. The unique linguistic characteristics of Arabic—including its morphological complexity and orthographic structure—pose distinctive instructional challenges that existing AI-based language learning models have not thoroughly addressed (Tang, 2024). Moreover, the application of advanced AI techniques, such as deep learning, remains underexplored in Arabic language instruction. More specifically, prior studies have rarely examined, in an integrated manner, how teachers' perceptions, knowledge, attitudes, and actual teaching practices interact to shape AI adoption in Arabic language classrooms, particularly at the secondary level. This constitutes the explicit research gap addressed in the present study. Theoretical frameworks such as the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Technology Acceptance Model (TAM) further underscore the influence of gender and teacher perception on technology integration, suggesting the need to empirically investigate how these constructs shape AI adoption in the context of Arabic instruction (Falebita, 2024; Koka et al., 2024b).

Given the gaps identified in the current literature, the present study is designed to contribute both theoretically and empirically to ongoing discussions about AI integration in language education, with a specific focus on Arabic language teaching at the high school level. This study aims to examine how teachers' perceptions, knowledge, attitudes, and gender interact to influence the adoption of AI-supported teaching practices. The novelty of this research lies in its integrated analysis of four dimensions—perception, knowledge, attitude, and teaching practice—within the underexplored context of secondary-level Arabic language

education, while also examining gender-based differences in AI readiness and use. By articulating these interrelated dimensions, the study offers a more comprehensive understanding of the conditions required for effective AI integration. Its theoretical contribution lies in demonstrating that AI adoption among Arabic language teachers should be understood as a multidimensional process in which perception and self-efficacy are more decisive for practice than knowledge alone. Methodologically, the study combines descriptive and inferential analyses to explain both general patterns and predictive relationships among the variables. Practically, the study provides evidence that can support policy formulation, pedagogical planning, and curriculum development for more inclusive and context-sensitive AI integration in secondary Arabic language education. Moreover, its scope encompasses both descriptive and analytical dimensions, enabling a nuanced exploration of technology adoption factors that can inform future pedagogical strategies, professional development initiatives, and policy frameworks within secondary-level Arabic language education.

Method

This study adopts a quantitative research design, supported by descriptive and inferential analyses, to examine the relationships among teachers' perceptions, knowledge, attitudes, and teaching practices in integrating Artificial Intelligence (AI) into Arabic language instruction. The decision to employ a quantitative approach aligns with methodological trends in contemporary research on AI in education, where cross-sectional surveys and structured measurement instruments are predominant because they capture patterned responses across large participant groups (Nugroho et al., 2024; Zulkarnain & Yunus, 2023). By using this approach, the study aims to produce generalizable insights into the factors influencing AI-supported instructional practices, while maintaining systematic rigor through empirical measurement and enabling statistical examination of both overall response patterns and relationships among variables.

Consistent with prior research, this study uses a structured questionnaire to assess four core constructs—perception, knowledge, attitude, and teaching practice—related to AI integration. The instrument, adapted from validated scales, captures teachers' evaluations of AI, their understanding of its pedagogical uses, their attitudes toward technology adoption, and their reported use of AI in classroom practice (Aghaziarati et al., 2023; Ferikoğlu & Akgün, 2022; C. Zhang et al., 2023). The study's population and sample comprise 46 Arabic language teachers at the senior high school level, a group that has received limited scholarly attention despite their central role in instructional innovation. A total sampling technique was used to include all 46 teachers affiliated with the relevant educational forum, ensuring full coverage of demographic characteristics essential for understanding disparities in AI adoption, particularly those related to gendered patterns in technological confidence and readiness (Falebita, 2024; Koka et al., 2024). This sampling strategy was selected to maximize population coverage and strengthen the descriptive and comparative analysis of teacher readiness within this specific educational context.

Data collection followed ethical procedures, including informed consent, voluntary participation, and assurances of anonymity. The survey was distributed in both digital and print formats to ensure accessibility and maximize response rates. Respondents were given sufficient time to complete the questionnaire, and no identifying information was recorded to safeguard participant confidentiality. To ensure the instrument's validity and reliability, a two-step

evaluation was conducted. First, expert judgment was sought to confirm item relevance and clarity with respect to the constructs being measured. Second, statistical reliability analysis was performed using Cronbach's alpha, consistent with established practices in AI-related educational research (Aghaziarati et al., 2023). Only items with acceptable reliability coefficients were retained to ensure internal consistency across the constructs, thereby supporting the accuracy of the subsequent descriptive and inferential analyses.

Data analysis was conducted using descriptive and inferential statistical techniques to provide a comprehensive understanding of the relationships among the variables. The descriptive analysis consisted of frequencies, percentages, and summary statistics used to describe demographic characteristics and overall response trends. The inferential analysis consisted of two types of analysis: multiple regression and independent-samples t-tests. Inferential analysis included multiple regression tests and independent-samples t-tests, which are widely recognized methods for examining group differences and predicting the influence of independent variables on outcome measures within educational technology research (Yue et al., 2024; L. Zhao et al., 2022). Multiple regression enabled the assessment of how teachers' perceptions, knowledge, and attitudes collectively and individually influenced their AI-based teaching practices, with teaching practice positioned as the dependent variable, while t-tests facilitated exploration of gender-based differences in these constructs.

The incorporation of these statistical techniques reflects the methodological rigor established in prior studies analyzing complex relationships among educational constructs (Chou et al., 2022; Han, 2025). Additionally, the choice of these methods aligns with research calling for more nuanced analyses to understand how gender disparities, professional development, and attitudinal factors interact to shape AI adoption in instructional settings (Nazaretsky et al., 2022; Uygun, 2024; Zakaria & Hashim, 2024). By employing these analytical approaches, the study seeks to contribute meaningful insights into the multidimensional factors influencing AI integration within Arabic language education, while also offering a methodological contribution by introducing an integrated analytical model that combines descriptive profiling, predictive analysis, and group comparison within the underexplored context of Arabic language teaching.

Results and Discussion

Result

Respondent Profile

The respondent profile provides essential context for understanding the factors that influence teachers' adoption of Artificial Intelligence (AI) in Arabic language instruction. The study used total sampling to include all 46 senior high school Arabic language teachers, capturing the full range of demographic variation. The respondents' characteristics were examined to provide a contextual background for interpreting teachers' readiness, attitudes, and practices related to AI integration in the classroom. Gender distribution was treated as an important demographic feature because it provides a basis for examining whether differences in perception and practice are associated with gender within this sample.

Teaching experience is another key demographic factor influencing AI adoption. Variation in experience among the 46 teachers allows examination of how experience may shape perceptions, attitudes, and AI-related teaching practices across career stages. School type

and institutional context were also considered important because differences in infrastructure, administrative support, and access to digital resources may affect teachers' opportunities to integrate AI tools and influence their readiness for AI-based instructional practices**.**

These demographic factors also intersect with broader inequalities that shape AI adoption in secondary-language education. Within this sample, variations in institutional support, digital training, and exposure to AI may contribute to differences in adoption patterns. Overall, these respondent characteristics provide an important foundation for interpreting how gender, experience, and contextual support collectively influence technology integration in Arabic language education.

Perception Toward Artificial Intelligence

Teachers' perceptions of Artificial Intelligence (AI) are a central determinant of its successful integration into Arabic language instruction. These perceptions reflect teachers' beliefs about the usefulness, relevance, and reliability of AI tools. In this study, perceptions were examined through indicators of instructional relevance, comfort, confidence, and access to training to capture how teachers viewed the practicality of AI use in Arabic language teaching.

The findings of this study offer nuanced insight into the perceptions of the 46 Arabic language teachers surveyed. For the indicator assessing whether AI is responsive and relevant to instructional needs, results show strong agreement across gender groups: 65.0% of female teachers and 61.5% of male teachers agreed that AI aligns with classroom requirements, indicating broad acknowledgment of AI's pedagogical relevance. For the indicator regarding whether AI-based Arabic learning requires gender-specific adaptation, 65.0% of female teachers and 42.3% of male teachers disagreed. This suggests agreement that AI-supported learning materials need not be differentiated by gender. Responses to the indicator addressing comfort with AI-assisted learning reveal persistent reservations: 50.0% of female teachers and 53.8% of male teachers disagreed that learning Arabic with AI feels more comfortable than traditional methods. These responses indicate that, although teachers recognize the relevance of AI, many still do not perceive AI-assisted learning as more comfortable than traditional approaches.

A contrasting trend emerges in the confidence indicator. In this sample, 60.0% of female teachers agreed they felt confident using AI, whereas 42.3% of male teachers disagreed. This pattern indicates that confidence in using AI was not uniformly higher among male teachers**.**

Regarding perceived disparities in access to AI training, 80.0% of female teachers disagreed that gender-based differences existed, whereas 69.2% of male teachers agreed. These contrasting responses suggest that perceptions of access to AI training differed considerably between the two groups.

Table 1

Perception Toward Artificial Intelligence

No	Description	Female	Male	Interpretation
1	AI is responsive and relevant to instructional needs	65%	61.5%	Majority recognize AI as aligned with classroom needs
2	AI based Arabic learning requires gender specific adaptation	65%	42.3%	Most teachers believe gender based adaptation is unnecessary

3	Learning Arabic with AI feels more comfortable than traditional methods	50%	53.8%	Many teachers still feel less comfortable using AI
4	Teachers feel confident using AI	60%	42.3%	Female teachers report higher confidence than male teachers
5	There are gender based disparities in access to AI training	80%	69.2%	Females perceive equal access, males perceive differences

AI is responsive and relevant to instructional needs 65% 61.5% Majority recognize AI as aligned with classroom needs \n2 AI-based Arabic learning requires gender-specific adaptation 65% 42.3% Most teachers believe gender-based adaptation is unnecessary \n3 Learning Arabic with AI feels more comfortable than traditional methods 50% 53.8% Many teachers still feel less comfortable using AI \n4 Teachers feel confident using AI 60% 42.3% Female teachers report higher confidence than male teachers \n5 There are gender-based disparities in access to AI training 80% 69.2% Females perceive equal access, males perceive differences.

Knowledge of Artificial Intelligence

Teachers' knowledge of Artificial Intelligence (AI) is a foundational factor in determining how effectively AI can be integrated into Arabic language instruction. AI literacy encompasses conceptual understanding of AI, familiarity with its educational applications, and the practical ability to use AI tools in classroom settings. International research highlights substantial variation in AI literacy among secondary language teachers, with many lacking adequate exposure to AI technologies. This gap underscores the need for structured literacy programs that combine theoretical and practical components to strengthen educators' preparedness.

Findings from this study indicate that the 46 Arabic language teachers generally have high levels of AI-related knowledge, as reflected in their responses across multiple indicators. This pattern aligns with prior evidence showing that training that integrates conceptual grounding and experiential learning substantially improves teachers' AI competencies. Furthermore, emotional intelligence has been linked to adaptive learning practices, suggesting that teachers with strong emotional regulation may demonstrate greater confidence and adaptability when engaging with AI tools. The distribution of responses for each knowledge indicator is summarized in the following table:

Table 2

Knowledge of Artificial Intelligence

No.	Description	Female	Male	Brief Interpretation
1	Understands the definition and basic concepts of AI	85%	76.9%	Most teachers, especially females, demonstrate strong foundational AI knowledge.
2	Awareness of AI functions in Arabic language learning	80%	73.1%	Both groups show high awareness of how AI supports Arabic learning.
3	Understands examples of AI applications	75%	69.2%	Majority recognize common AI tools and uses in education.

4	Familiarity with AI-based learning platforms	70%	61.5%	Familiarity is moderate, with female teachers showing slightly higher exposure.
5	Knowledge of ethical aspects of AI use	65%	57.7%	Ethical understanding is present but lower than technical knowledge.

These findings suggest that both female and male teachers demonstrate relatively strong knowledge, though female respondents consistently report slightly higher knowledge across indicators. The present findings may therefore reflect localized or context-specific access to training opportunities. In this study, the high levels of reported AI knowledge indicate promising potential for effective AI integration in Arabic language education, provided that institutional support and continuous professional development are maintained. Strengthening AI literacy remains essential for advancing pedagogical quality and ensuring equitable access to AI-enhanced learning environments.

Attitudes Toward Artificial Intelligence

Teachers' attitudes toward Artificial Intelligence (AI) are a central factor in their willingness to adopt AI-based tools in Arabic language instruction. Attitudes reflect emotional, motivational, and pedagogical orientations toward AI and are shaped by self-efficacy, perceived usefulness, and readiness to engage with emerging technologies. The teachers with higher AI literacy and confidence tend to hold more favorable attitudes, which positively influence their intentions to integrate AI. Motivational factors—including the belief that AI can enhance student engagement and learning outcomes—also reinforce positive. Conversely, pedagogical misalignment or lack of familiarity with AI tools can diminish perceived value and negatively (Lin et al., 2022). Gender-based differences further shape attitudinal patterns, with evidence suggesting that female teachers often report lower technological self-efficacy, while male teachers exhibit greater confidence(Kasinidou et al., 2024; S. Zhang et al., 2024). This highlights the need for inclusive professional development that supports all teachers in navigating AI integration.

Findings from the present study reveal distinct patterns in teacher attitudes across the five indicators of the Attitudes Toward AI construct (X3). Responses from 46 Arabic language teachers indicate generally positive attitudes toward AI, though variations exist across gender groups. The indicator-level distribution is summarized below.

Table 3

Attitudes Toward Artificial Intelligence

No.	Description	Female	Male	Interpretation
1	Able to provide solutions using AI in Arabic teaching	65%	65.4%	Both groups show similar capability in using AI to support instructional solutions.
2	Able to create a conducive classroom environment using AI	60%	57.7%	Teachers moderately believe AI can help create a more effective learning environment.
3	Able to identify each student's ability through AI-based learning	65%	46.2%	Female teachers feel more confident than males in using AI for student ability profiling.
4	Able to design improved lesson plans using AI	65%	61.5%	Both groups report strong ability to enhance lesson planning with AI support.

5	Has sufficient access to AI facilities in school	25%	69.2%	Male teachers perceive better access to AI facilities compared to females.

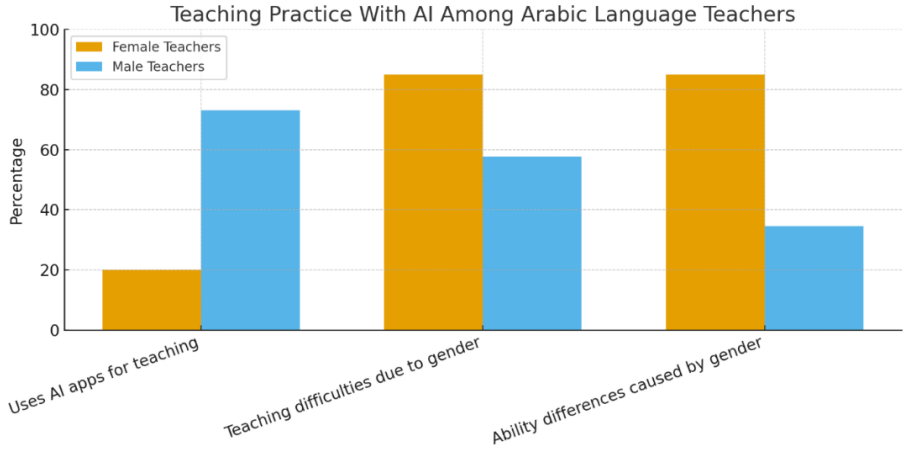
The table shows that both female and male teachers agree on most indicators, particularly regarding providing AI-based solutions and designing AI-enhanced lesson plans. However, access-related attitudes reveal stark disparities: only 25.0% of female teachers reported adequate access, compared with 69.2% of male teachers. Collectively, these results indicate that while teachers hold positive attitudes toward AI, gendered disparities in access and self-efficacy shape these attitudes and may affect implementation outcomes. Strengthening institutional support and ensuring equitable professional development opportunities remain essential to fostering effective AI integration in Arabic language education.

Teaching Practice With Artificial Intelligence

AI-based tools are increasingly integrated into language classrooms to enhance lesson planning, assessment, and interactive learning. Teachers use AI across instructional practices, including generating lesson materials with platforms like ChatGPT, automating text evaluation with Grammarly or QuillBot, and supporting adaptive learning pathways for students. These tools enable personalized feedback, reduce teacher workload, and provide dynamic language practice environments, thereby strengthening instructional effectiveness. Findings from this study reveal notable gender-based differences across three indicators of teaching practice. The distribution of responses from the 46 Arabic language teachers is presented in Figure 1 below.

Figure 1

Teaching Practice With Artificial Intelligence



The data show that a large majority of male teachers (73.1%) report using AI applications to support Arabic language instruction, whereas only 20.0% of female teachers report similar engagement. This aligns with global literature indicating gender differences in technological confidence and access, with women often facing structural or cultural barriers to digital adoption (R. Jiang, 2022; Kats et al., 2024; Saleem et al., 2025). However, both groups largely reject the notion that teaching barriers or skill differences stem from gender, suggesting that disparities may result from external factors such as unequal access to training or resources rather than inherent ability. Moreover, the lack of AI-related professional development remains a major constraint, consistent with broader findings that insufficient training inhibits teachers' capacity to adopt AI tools effectively. While teacher attitudes may be positive, actual implementation depends heavily on institutional support, training availability, and equitable access to technology.

Discussion

The findings of this study reveal a multidimensional pattern of teachers' perceptions, knowledge, attitudes, and classroom practices related to artificial intelligence (AI) in Arabic language instruction. These dimensions interact and shape teachers' readiness to integrate AI. Overall, the results indicate that teachers expressed moderate to positive perceptions of AI, demonstrated strong knowledge, and reported favorable attitudes, although their classroom practices remained moderate (سفر, ٢٠٢٣). The central finding is that perception emerged as the strongest predictor of AI-supported teaching practice, whereas knowledge and attitudes by themselves did not guarantee implementation (التمامي, ٢٠٢٣). Gender-based differences were apparent, especially in confidence, perceived access to AI tools, and reported use of AI during classroom instruction(سفر, ٢٠٢٣).

In relation to teacher perceptions of AI, the findings suggest that teachers' responses were influenced by contextual, psychological, and institutional factors (X. Jiang, 2025; Viberg et al., 2024). Although most teachers acknowledged the relevance and usefulness of AI, many still felt uncertain or uncomfortable when engaging with AI-assisted learning environments (Nazaretsky et al., 2022). This discomfort may more explicitly reflect limited practical exposure, doubts about the accuracy and reliability of AI-generated outputs, concerns about changes in teachers' professional roles, and uneven institutional support (Jiang, 2025). Moreover, differences in confidence and access show that teacher readiness is not determined solely by personal willingness. It is also shaped by surrounding conditions that either encourage or restrict experimentation with AI in classroom practice (Ayanwale et al., 2025).

The findings concerning AI knowledge and its practical implications point to a clear perception-practice gap. Teachers in this study reported strong knowledge of AI, yet higher levels of knowledge did not consistently result in more advanced AI-based teaching practices (Alshorman, 2024; Fteiha et al., 2025). This gap suggests that cognitive readiness, when not accompanied by practical mastery, may lead to superficial acceptance rather than meaningful pedagogical integration. Consequently, teachers may understand AI conceptually and may even evaluate it positively, but still hesitate to use it in sustained and effective ways in Arabic language classrooms. This also indicates that successful AI integration requires more than technological literacy. It requires opportunities to connect knowledge with authentic instructional tasks, classroom realities, and pedagogical decision-making.

When compared with previous studies, the present findings appear both consistent with earlier research and specific to this instructional context. Similar to previous studies, teachers in this study generally held positive attitudes toward AI and recognized its potential to support lesson planning, classroom management, and learner differentiation (Grassini, 2023; Li & Noori, 2024). The finding that perception is more influential than knowledge alone also supports research highlighting the importance of teacher belief systems and self-efficacy in technology adoption (Acharya, 2023). However, the present study differs from some earlier findings by showing that female teachers demonstrated comparable, and in certain indicators higher, confidence than male teachers. This variation suggests that gender patterns in AI adoption may be shaped by local institutional conditions, access to training, and the context of Arabic language instruction rather than by fixed demographic assumptions.

The moderate level of AI-supported teaching practice strengthens the conclusion that implementation remains cautious and uneven (EL-Karnichi, 2024). Although some teachers, particularly male teachers, reported greater involvement in AI-assisted instruction, the overall pattern suggests that classroom practice remains limited by insufficient training, concerns about reliability, and dependence on established routines (Hazaimeh & Al-Ansi, 2024). This indicates that the movement from favorable perception to regular classroom use has not yet been fully achieved. As a result, AI integration in Arabic language teaching remains at an early stage. Interest and awareness are present, but sustained practice still depends heavily on external support, institutional encouragement, and teachers' pedagogical confidence (ضاهر, ٢٠٢٣).

The implications for policy and professional development can be viewed at three levels. Conceptually, the findings show that teacher belief systems, trust in AI, and self-efficacy should be treated as central elements of readiness, because positive perceptions are more closely connected to practice than knowledge alone (Fadda, 2020). Methodologically, professional development should move beyond theoretical orientation and provide hands-on AI training enabling teachers to use AI in lesson planning, assessment, feedback, and differentiated instruction in Arabic language classrooms (Journal, 2024). From a policy perspective, schools and educational authorities need to ensure equitable access to digital infrastructure, training opportunities, and gender-sensitive institutional support so that differences in confidence and implementation are not reproduced through unequal conditions (Garces-Bacsal et al., 2022). Taken together, these implications indicate that sustainable AI integration requires technical preparation, inclusive support systems, and deliberate attention to affective and structural barriers.

Conclusion

This study offers a comprehensive examination of Arabic language teachers' perceptions, knowledge, attitudes, and teaching practices regarding the integration of Artificial Intelligence (AI) in secondary education. The findings show that although teachers generally hold moderate to positive orientations toward AI, significant gaps persist among their conceptual understanding, affective readiness, and actual classroom implementation. Overall, the research underscores that teacher perceptions are the strongest predictor of AI-related teaching behavior, surpassing even knowledge and attitudes. This affirms constructivist perspectives that position teacher belief systems as central to pedagogical decision-making and technological adoption.

The study highlights that teachers view AI as relevant and potentially beneficial for enhancing instructional processes, particularly for providing personalized feedback, generating instructional materials, and supporting differentiated learning. However, psychological barriers—including anxiety about AI's complexity and fear of diminished instructional roles—continue to foster cautious engagement. Although teachers demonstrate strong AI literacy, this knowledge does not always translate into consistent practice, indicating that practical experience and contextual alignment are crucial for meaningful adoption. Attitudinal findings further show that both male and female teachers express generally positive orientations, though gendered patterns in confidence and access remain visible. These dynamics reflect broader structural and cultural influences shaping AI adoption across educational contexts. Methodologically, this study contributes by integrating descriptive and inferential analyses to

explain both overall response patterns and the predictive relationship between perception, knowledge, attitudes, and teaching practice within the underexplored context of Arabic language education.

The analysis of teaching practices indicates moderate integration of AI tools, with notable variation between male and female teachers. Structural barriers—including limited professional development opportunities, insufficient technological infrastructure, and concerns about AI reliability—continue to hinder widespread adoption. These findings collectively underscore the need for sustained institutional support, targeted professional development, and equitable access to AI resources. Addressing these challenges is essential to translate positive perceptions and strong knowledge into effective AI-enhanced instructional practice. This research contributes to the existing body of knowledge by offering empirical insight into AI integration in the underexplored context of Arabic language education. It advances understanding of how interrelated teacher variables influence AI adoption, highlighting the central role of perception and the mediating influence of gender, institutional support, and professional readiness. The findings provide a foundation for designing evidence-based training programs that integrate the technical, pedagogical, and affective dimensions of AI literacy.

This study has several limitations that warrant acknowledgment. First, the sample of 46 Arabic language teachers at the secondary level may limit broader generalizability. Second, the cross-sectional design does not capture changes in teacher perceptions and practices over time. Third, the findings rely on self-reported data, which may not fully reflect actual classroom implementation. Future research should examine longitudinal changes in teacher perceptions and practices as AI technologies evolve and become more accessible. Investigating the impact of targeted professional development programs, as well as conducting comparative studies across regions and subject areas, would yield valuable insights into scalable and contextually responsive AI integration strategies. Further examination of student outcomes in AI-enhanced Arabic language learning environments would also deepen understanding of AI's pedagogical impact. In sum, this study underscores AI's transformative potential for Arabic language instruction while revealing critical areas that require attention to support meaningful and equitable integration. By addressing perceptual, structural, and gender-based barriers, educational institutions can foster environments where AI is used effectively to enhance learning and teaching. The findings affirm that strategic, inclusive, and context-sensitive approaches are essential for realizing AI's full potential in advancing language education.

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