Integrating Artificial Intelligence into Instructional Practices and Teachers' Attitudes Toward It in HKJ

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Abstract

This study aimed to provide an analytical description of the current state of artificial intelligence (AI) integration in instructional practices, to examine teachers' attitudes toward its use, and to identify educational challenges related to the ethical dimensions accompanying AI implementation within the Jordanian educational context. The study adopted a descriptive–analytical approach and relied on quantitative data collected through a questionnaire administered to a large sample of 1,080 male and female teachers representing diverse educational stages and academic specializations, thereby enabling a comprehensive examination of prevailing attitudes and usage patterns.

The findings indicate that AI is predominantly employed in preparatory tasks associated with lesson planning and the development of instructional materials, whereas its use remains limited in evaluative tasks that require precise pedagogical judgment. This pattern reflects a relatively advanced level of professional awareness among teachers regarding the boundaries of AI's role and underscores the importance of maintaining core educational responsibility within the domain of human judgment and pedagogical expertise.

The results further reveal that teachers' attitudes toward AI are characterized by cautious positivity, as teachers acknowledge its potential educational value as a supportive tool rather than a substitute for the teacher. At the same time, increasing ethical and pedagogical concerns were identified, particularly those related to academic integrity, the accuracy of AI-generated outputs, and the potential impact of these technologies on students' higher-order thinking skills and cognitive autonomy.

Moreover, the findings demonstrate the presence of statistically significant differences in teachers' attitudes and patterns of AI use attributable to variables such as academic qualification, specialization, gender, and years of experience. In light of these findings, the study emphasizes the importance of adopting a balanced educational approach to AI integration—one that is grounded in structured professional development, sustained institutional support, and the establishment of clear ethical and regulatory frameworks to ensure responsible, human-centered educational use of AI technologies.

Keywords*:* Artificial intelligence; instructional practices; teachers' attitudes; education in Jordan.

Introduction

Contemporary educational systems are undergoing rapid transformations driven by the accelerating development of digital technologies, a phenomenon that has reshaped fundamental conceptions of teaching and learning and necessitated continuous reconsideration of the traditional roles of both teachers and learners. Within this context, artificial intelligence has emerged as one of the most influential technologies shaping modern educational environments, owing to its advanced capabilities in data processing, learning analytics, and the provision of adaptive instructional support tailored to learners' individual needs.

The integration of AI into education has contributed to a qualitative shift in instructional practices by providing intelligent tools that assist teachers in instructional planning, monitoring students' progress, and designing learning activities responsive to diverse learning styles and abilities. Furthermore, AI has facilitated the development of learner-

centered instructional models that enhance classroom interaction and positively influence the quality of educational experiences and learning outcomes.

Problem Statement

The integration of artificial intelligence technologies into instruction and learning processes is no longer an optional enhancement but rather an inevitable necessity imposed by the transformations of the digital age and the evolving demands of modern educational systems.

Research Questions

1. What is the current state of artificial intelligence use in the educational process from teachers' perspectives in Jordan?
2. What are teachers' attitudes toward integrating artificial intelligence into instruction and learning?
3. What are the most significant challenges teachers encounter when using artificial intelligence in education?
4. Are there statistically significant differences in teachers' perceptions of AI use in teaching, their attitudes toward AI integration, and the challenges they experience, attributable to demographic and professional variables (gender, years of experience, academic qualification, specialization, and school type)?

Objectives of the Study

- To assess the extent to which teachers rely on artificial intelligence technologies in their instructional practices.
- To explore teachers' perceptions and attitudes toward AI integration.
- To identify differences in AI use based on demographic and professional variables.
- To examine variations in teachers' attitudes toward AI.
- To analyze the relationship between teachers' levels of AI use and their attitudes.

Previous Studies

Recent educational literature indicates a growing interest in examining teachers' attitudes toward the integration of artificial intelligence technologies in education, given their central role in transforming technological potential into impactful instructional practices. However, an in-depth analysis of this body of literature reveals that such interest has not developed within a single coherent theoretical trajectory. Rather, it has been distributed across several major thematic strands, which can be classified as follows:

Patterns of Educational Use of Artificial Intelligence

Arabic and international studies demonstrate that the use of artificial intelligence is largely concentrated in preparatory and procedural tasks, such as lesson planning, instructional material development, and activity design, while its presence in direct classroom applications that foster qualitative transformation in instructional interaction and deep learning remains limited (WISE & USC Rossier School of Education, 2025). This pattern reflects a clear gap between administrative or supportive use and systematic pedagogical integration within classroom practice.

Teachers' Attitudes Toward the Integration of Artificial Intelligence

Most Arabic studies converge on the existence of generally positive teacher attitudes toward integrating artificial intelligence into the educational process. AI is commonly perceived as a supportive tool for improving teaching quality and facilitating planning and implementation processes, rather than as a substitute for the teacher's pedagogical role (Katana, 2025; Al-Zahrani, 2025; Melhem et al., 2025). Nevertheless, these positive attitudes often remain confined to the level of theoretical acceptance and do not necessarily translate into consistent classroom practices or clearly articulated models of pedagogical integration.

Challenges and Barriers Associated with Adoption

The literature reveals a recurring set of structural and professional challenges that hinder the transition from theoretical acceptance to actual implementation. Among the most prominent of these challenges are the lack of specialized training, weak technological infrastructure, increased professional pressures accompanying digital transformation processes, and anxiety related to technological complexity and loss of control over the instructional process (Al-Zahrani, 2025; Melhem et al., 2025; Zhai, 2024). These findings suggest that the challenge does not lie in rejecting artificial intelligence per se, but rather in the fragility of the conditions required to enable its safe and systematic pedagogical use.

Factors Influencing Readiness to Adopt Artificial Intelligence

International studies have focused more extensively on analyzing the cognitive, technical, and psychological factors influencing teachers' readiness to adopt artificial intelligence. For example, Lucas et al. (2024) identified a strong correlation between digital competence and teachers' trust in AI systems, showing that teachers with advanced digital skills demonstrate a higher level of readiness to integrate these technologies into education. These findings are reinforced by the systematic review conducted by Celik et al. (2022), which concluded that effective activation of artificial intelligence in education is contingent upon the integration of three key elements: digital readiness, clarity of ethical frameworks, and the availability of structured institutional support.

Research Gap

Despite broad consensus in the literature regarding the importance of artificial intelligence as a supportive tool for educational practice, and despite the generally positive attitudes held by teachers toward it, most studies—particularly within the Arab context—tend to focus on measuring attitudes and general perceptions without establishing a systematic link between these attitudes and actual patterns of classroom use.

More specifically, the literature reveals a lack of integrative field studies that examine the relationship between teachers' attitudes toward artificial intelligence, their digital competencies, the levels of professional pressure they experience, and the real-world patterns through which these technologies are employed in classroom practice within a culturally and institutionally specific educational context, such as that of Jordan.

Accordingly, the research gap is defined by the need for analytical studies that seek to understand the relationship between the theoretical acceptance of artificial intelligence and its actual use in education, in light of professional, organizational, and psychological variables. Such studies would enable a transition from superficial technological adoption toward conscious and sustainable pedagogical integration. The present study responds to this gap by offering an in-depth analytical examination of the reality of artificial intelligence use and teachers' orientations toward it within the Jordanian educational context.

Methodology

This study used a descriptive-correlational design to examine teachers' use of artificial intelligence (AI) and their attitudes toward it. To achieve the study objectives, a digital questionnaire was developed based on recent literature on AI adoption in education. The questionnaire was designed to capture teachers' behavioral intentions, attitudes, and perceived effort related to AI use.

The choice of the descriptive-correlational design and the use of an online questionnaire were methodologically aligned with the research topic and the target population. Recent studies on teachers' adoption of AI indicate that quantitative survey methods—particularly online questionnaires—are the predominant approach for measuring attitudes and practices in educational AI research (Xue et al., 2025)

Population and Sample

The study population consisted of male and female teachers working in public and private schools across the governorates of the Hashemite Kingdom of Jordan during the 2024/2025 academic year. The population is diverse in terms of gender, academic specialization, academic qualifications, and years of teaching experience, providing a broad perspective on teachers' use of AI and their attitudes toward its integration into instruction.

The study sample included 1,080 teachers selected through a stratified voluntary sampling approach, with stratification based on governorate and school type. Data were collected using an online questionnaire administered to teachers during the first semester of the 2024/2025 academic year. The questionnaire link was distributed electronically to facilitate participation from teachers across different governorates in Jordan. This approach enhances the representativeness of the sample and supports cautious generalization of the findings within the methodological boundaries of the study (Sekaran & Bougie, 2020). Table 1 presents the characteristics of the study sample.

Figure (1): Demographic Characteristics of the Study Participants

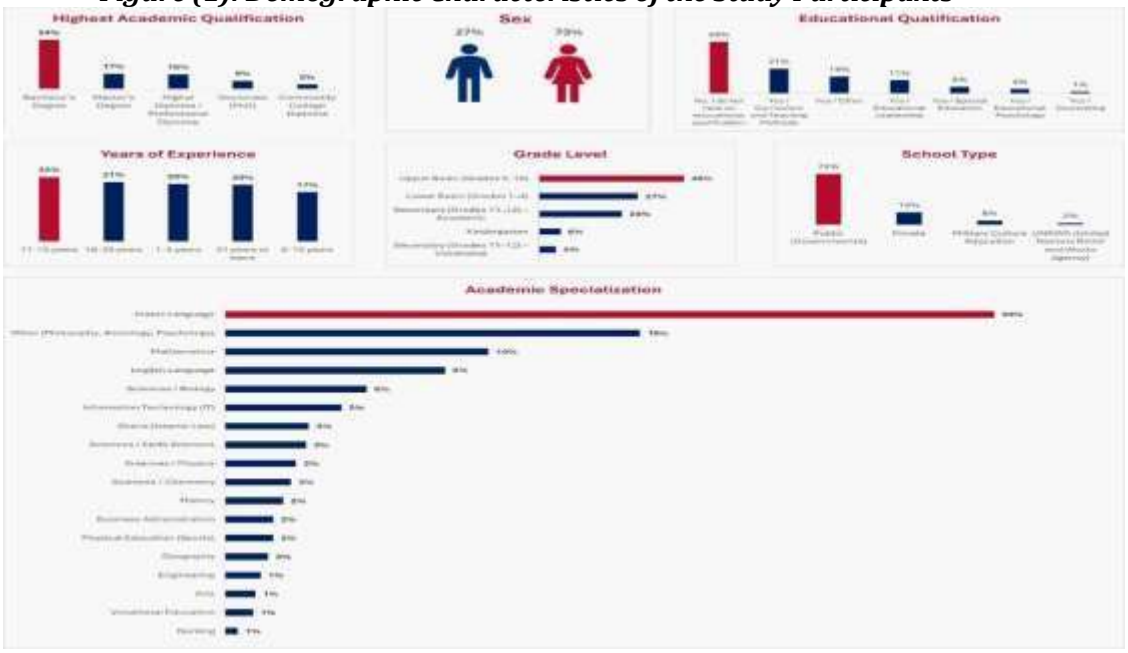


Figure (1) shows the demographic characteristics of the study sample. The results show that the majority of participants held a bachelor's degree (53.6%, n = 579), while the lowest proportion held a community college diploma (4.9%, n = 53). In terms of academic specialization, Arabic language teachers represented the largest group (30.4%, n = 328), whereas nursing teachers constituted the smallest group (0.5%, n = 5).
Female teachers accounted for 73.1% of the sample (n = 790), compared to 26.9% male teachers (n = 290). Regarding years of experience, the highest proportion of teachers had 11–15 years of teaching experience (22.4%, n = 242). Most participants worked in public schools (73.9%, n = 798) and taught at the basic education level.

Instrument of the Study

For the purpose of this study, researchers developed a digital questionnaire to measure teachers' use of artificial intelligence (AI) in instruction and their attitudes toward it. The questionnaire was developed based on a review of relevant and recent literature on AI adoption in education and aligned with the objectives of the study. It included 37 items and distributed across three main pillars: 1) use of AI in education, 2) teachers' attitude toward integrating Ai in education, 3) challenges of using Ai in instruction. Responses were measured using a five-point Likert scale**,** ranging from (1 = strongly disagree) to (5 = strongly agree).

Validity and Reliability of the Study Instrument

The validity and reliability of the study instrument were examined using appropriate statistical procedures. In terms of reliability, internal consistency was assessed using Cronbach's Alpha coefficient. The results indicated that the Cronbach's Alpha values for all dimensions of the instrument, as well as for the instrument as a whole, exceeded the minimum acceptable threshold of 0.70, indicating satisfactory internal consistency and reliability of the study instrument. Table 2 shows the results of reliability:

Table (1): Reliability Coefficients (Cronbach's Alpha) and Range of Corrected Item–Total Correlation

Dimension	Number of items	Range of Corrected Item–Total Correlation	Cronbach's Alpha
Use of AI in Education	9	0.637-0.436	0.84
teachers' attitude toward integrating AI in education	12	0.613-0.336	0.82
challenges of using AI in instruction	9	0.549-0.368	0.81
Overall Instrument	30		0.86

Note. All Cronbach's Alpha values exceeded the acceptable threshold of 0.70, and all corrected item–total correlation coefficients were above the minimum recommended value of 0.30.
With regard to construct validity, Pearson correlation coefficients were calculated between each item and the total score of the dimension to which it belongs, as well as with the total score of the instrument. Based on Patten and Newhart (2023), an item is considered to demonstrate acceptable construct validity if its correlation with the dimension and the overall instrument is positive and not less than 0.25. The findings showed that all correlation coefficients were positive and statistically significant, exceeding the minimum accepted

threshold. These results provide supportive evidence of the instrument's construct validity and confirm its suitability for

Table (2): Item–Dimension and Item–Total Correlation Coefficients

Dimension	Number of items	Range of Item–Dimension Correlation	Range of Item–Total Correlation
Use of AI in Education	9	0.728-0.564	0.492-0.433
teachers' attitude toward integrating AI in education	12	0.697-0.466	0.603-0.391
challenges of using AI in teaching	9	0.680-0.530	0.498-0.323

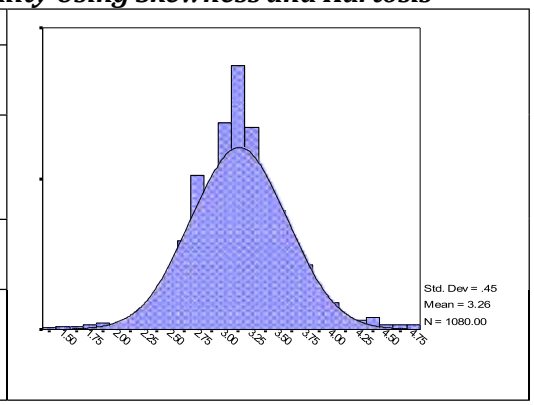
Note. All correlation coefficients were positive and statistically significant at the 0.01 level

Normality Assessment

To examine the normality of the data distribution, skewness and kurtosis values were calculated for all study dimensions. According to Hair et al. (2018), skewness and kurtosis values within ±1 indicate acceptable normality. As shown in Table X, all values fell within the acceptable range, indicating that the data were approximately normally distributed and suitable for subsequent parametric analyses.

Table (3): Assessment of Data Normality Using Skewness and Kurtosis

Dimension	**Skewness**	**Kurtosis**
Use of AI in Education	0.079	-0.159
teachers' attitude toward integrating AI in education	-0.275	1.703
challenges of using AI in teaching	-0.240	0.283
Overall Instrument	**0.144**	**1.524**



Data Analysis

Data were analyzed using SPSS. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to summarize teachers' responses. Mean scores were interpreted based on predefined cut-off points to describe response levels as low, moderate, or high. Statistical significance was set at the 0.05 level.

Results

Research Question 1

What is the extent of artificial intelligence use in the educational process from teachers' perspectives in Jordan?

To answer the first research question, means and standard deviations were calculated to examine teachers' use of artificial intelligence in the educational process. Table XX shows the descriptive statistics

Table (4): Descriptive Statistics for Teachers' Use of AI in Education in Jordan

#	Item	Mean	SD	Rank
1	I use AI tools and applications for lesson preparation and planning	3.13	0.98	2
2	I use AI tools and applications to design enrichment or remedial worksheets.	3.00	1.03	4
3	I use AI tools and applications to design differentiated activities that meet students' diverse learning needs.	3.06	0.98	3
4	I use AI tools and applications to design interactive classroom activities (e.g., games, competitions).	2.95	1.01	5
5	I use AI tools and applications to assess students' work (e.g., writing, activities, projects).	2.68	1.07	7
6	I use AI tools and applications to analyze monthly and semester examination results.	2.48	1.05	8
7	I use AI tools and applications to write feedback for students.	2.29	0.99	9
8	I use AI tools and applications to perform written administrative tasks required by the directorate and the MOE.	2.77	1.05	6
9	I use AI applications in my daily life (outside my teaching duties).	3.26	0.98	1
	The overall indicator of using AI in education in Jordan	2.85	0.77	Moderate

Table 4 indicates that the overall level of teachers' use of AI in the education in Jordan was moderate, with an overall mean score of 2.85 (SD = 0.68). The highest mean was reported for the item "I use AI applications in my daily life (outside my teaching duties)" (M = 3.26, SD = 0.98), followed by "I use AI tools and applications for lesson preparation and planning" (M = 3.13, SD = 0.98). In contrast, lower mean scores were observed for "I use AI tools and applications to analyze monthly and semester examination results" (M = 2.48, SD = 1.05), while the lowest mean was associated with "I use AI tools and applications to write feedback for students" (M = 2.29, SD = 0.99).

Research Question 2

What are the teachers' attitudes in Jordan towards integrating AI in teaching and learning?

To answer the second research question, means and standard deviations were calculated to examine teachers' attitudes in Jordan toward integrating AI in education.

Table (5): Descriptive Statistics for Teachers' Attitudes in Jordan Towards Integrating AI in Teaching and Learning Process

#	Item	Mean	SD	Rank
10	AI contributes to improving the quality of education by motivating both students and teachers	3.74	0.98	2
11	AI is a supportive tool for teachers.	3.83	1.03	1
12	AI will replace teachers one day.	2.30	0.98	12
13	I am confident in my ability to integrate AI into classroom management and teaching.	3.53	1.01	7
14	AI tools and applications enhance interaction between teachers and students.	3.55	1.07	6
15	Using AI tools and applications does not conflict with human and ethical values	3.58	1.05	5
16	Expanding the integration of AI in the teaching process will redefine the role of the teacher.	3.18	0.99	10
17	The use of AI in the teaching process affects my academic integrity.	2.88	1.05	11
18	The use of AI in the teaching process leads to a decline in students' thinking and analytical skills.	3.51	0.98	8
19	The use of AI in the teaching process leads to a decline in students' motivation for learning.	3.39	0.991	9
20	The use of AI in the teaching process benefits creative and talented students.	3.60	0.97	4
21	AI is a realistic and influential tool in education.	3.63	0.96	3
	The overall indicator of teachers' attitude toward integrating AI in instruction and learning process in Jordan	**3.39**	**0.55**	**Moderate**

Table 5 shows that teachers' attitudes toward integrating artificial intelligence (AI) in the teaching and learning process were at a moderate level, as indicated by the overall mean score (M = 3.39, SD = 0.55). The highest mean score was reported for Item 11, "Artificial intelligence (AI) is a supportive tool for teachers" (M = 3.83, SD = 0.85), followed by Item 10, "Artificial intelligence (AI) contributes to improving the quality of education by motivating both students and teachers" (M = 3.74, SD = 0.92). In contrast, Item 17, "The use of artificial intelligence (AI) in the teaching process affects my academic integrity," ranked second lowest (M = 2.88, SD = 0.99), while Item 12, "Artificial intelligence (AI) will replace teachers one day," recorded the lowest mean score (M = 2.30, SD = 0.85).

Research Question 3

What challenges do teachers in Jordan encounter when integrating AI into instruction?
To answer the third research question, means and standard deviations were calculated to examine teachers' attitudes in Jordan toward integrating AI in education.

Table (6): Descriptive Statistics for Challenges Teachers in Jordan Encounter When Integrating AI in Teaching

#	Item	Mean	SD	Rank
22	The weakness of technological infrastructure in my school (e.g., internet access, computers, etc.) makes it difficult to use AI tools and applications.	3.95	0.92	1
23	The lack of administrative support in my school limits the use of AI tools and applications	3.74	0.96	2
24	The lack of technical supervision in my school limits the use of AI tools and applications.	3.69	1.03	4
25	I lack sufficient time to effectively use AI tools and applications during instruction.	3.60	1.03	5
26	There is a cognitive and skills gap between teachers' competencies and the requirements of using AI in instruction.	3.70	0.91	3
27	I am concerned about violating students' privacy when using AI in teaching	3.20	1.03	8
28	I am concerned about violating data privacy regulations when using AI in instruction.	3.24	1.02	7
29	I lack confidence in the accuracy and reliability of the outputs generated by AI for use in instruction.	3.30	1.03	6
30	I experience challenges in using AI tools because of language barriers, such as reliance on English.	3.05	1.11	9
	The overall indicator of Challenges Teachers in Jordan Encounter When Integrating AI in Teaching	**3.50**	**0.633**	**Moderate**

Table 6 shows that the level of challenges teachers in Jordan encounter when using artificial intelligence (AI) in education was moderate, as indicated by the overall mean score (M = 3.50, SD = 0.63). The highest mean score was reported for Item 22, "The weakness of technological infrastructure in my school (e.g., internet access, computers) hinders the use of AI tools and applications" (M = 3.95, SD = 0.92), followed by Item 23, "The lack of administrative support in my school limits the use of AI tools and applications" (M = 3.74, SD = 0.96). In contrast, Item 27, "I am concerned about violating my privacy and my students' privacy when using AI in instruction," ranked second lowest (M = 3.20, SD = 1.03), while Item 30, "I face difficulties in using AI tools due to the language used in these tools (e.g., English)," recorded the lowest mean score (M = 3.05, SD = 1.11).

Research Question 4

Are there statistically significant differences in teachers' perceptions of AI use in teaching, their attitudes toward AI integration, and the challenges they experience, attributable to demographic and professional variables (gender, years of experience, academic qualification, specialization, and school type)?

To answer the fourth research question, a multivariate analysis of variance (MANOVA) was employed to test differences across demographic and professional groups on the three study

dimensions simultaneously. Significant multivariate effects were followed by univariate ANOVAs.

Table (7): Descriptive Statistics by Demographic Variables

Variable	Category	AI Use (M±SD)	Attitudes (M±SD)	Challenges (M±SD)	Overall (M±SD)
Gender	Male	2.88±0.67	3.41±0.60	3.52±0.63	3.28±0.46
	Female	2.83±0.67	3.39±0.53	3.49±0.63	3.25±0.44
School Type	Public	2.74±0.68	3.40±0.54	3.58±0.62	3.26±0.46
	Private	3.13±0.62	3.39±0.56	3.29±0.65	3.28±0.44
	Military	3.22±0.42	3.32±0.55	3.10±0.50	3.22±0.34
	UNRWA	3.10±0.67	3.27±0.59	3.29±0.50	3.22±0.33

The MANOVA results indicated no statistically significant multivariate effects for gender, years of experience, academic qualification, or specialization across all dependent variables ($p > .05$). These findings suggest that teachers' use of AI, their attitudes toward its integration, and the challenges they encounter are relatively consistent across demographic and professional groups.

Table (8): MANOVA Results by Demographic Variables

Variable	Wilks' Lambda	F	p
Gender	.998	0.529	.663
Years of Experience	.987	0.812	.639
Academic Qualification	.978	1.358	.179
Specialization	.917	1.240	.120
School Type	.971	1.979	.038*

However, a significant multivariate effect was found for school type (Wilks' Lambda = .971, $F = 1.979$, $p = .038$). Follow-up univariate analyses revealed significant differences in AI use ($p = .008$) and perceived challenges ($p = .004$), whereas attitudes did not differ significantly. Teachers in military schools reported higher levels of AI use, while teachers in public schools reported greater challenges.

Figure (2): Emerging patterns in teachers' adoption of digital platforms and generative AI tools within instructional practice.



Discussion

Discussion of the Findings in Light of Educational Literature

1 .Demographic and Professional Characteristics of the Study Sample

The results of the analysis indicate that the study sample (N = 1,080) represents a broad sector of teachers in Jordan, which enhances the explanatory power of the findings within their real-world context and reduces the impact of biases resulting from limited diversity. This diversity is evident across several variables, including academic qualification, academic specialization, pedagogical qualification, gender, years of experience, type of school, and educational stage.

With regard to academic qualification, the majority of participants hold a bachelor's degree as their highest qualification, alongside a considerable proportion holding postgraduate degrees. This pattern is consistent with the employment structure of school education systems. However, the literature suggests that higher academic qualifications may contribute to expanding teachers' capacity for critical engagement with technology, although this effect remains contingent upon the availability of a supportive environment and clear enabling structures (Tondeur et al., 2017; OECD, 2023).

In terms of academic specialization, the data reveal wide representation across multiple disciplines, with a noticeable predominance of humanities-related specializations. The significance of this finding lies in its implications for understanding engagement with artificial intelligence through the epistemological nature of each discipline. Humanities disciplines often emphasize originality, meaning-making, and interpretation—issues that intersect directly with the challenges posed by generative artificial intelligence in relation to reliability, originality, citation practices, and knowledge production (Williamson & Eynon, 2020; Zhai, 2024).

Regarding pedagogical qualification, the results indicate that a substantial proportion of teachers do not possess specialized pedagogical training. Educational literature suggests that insufficient pedagogical preparation may lead to an instrumental use of technology rather than its integration within purposeful instructional design that aligns objectives, assessment, and learning impact (Koehler et al., 2014; UNESCO, 2023).

With respect to school type, the majority of participants were drawn from public schools, with representation from private schools, military culture schools, and UNRWA schools. This variable is critical for interpreting the findings, as AI integration is closely linked to schools' capacity to provide technological infrastructure, usage policies, and administrative support—factors that vary considerably across educational sectors (OECD, 2023; UNESCO, 2023).

Overall, while the characteristics of the sample strengthen the descriptive and interpretive validity of the findings, they also caution against automatically attributing demographic diversity to differences in outcomes. AI-related practice may be shaped more by structural and systemic factors than by individual characteristics, a conclusion further supported by the statistical differences reported later (Zawacki-Richter et al., 2019).

2 .Teachers' Patterns of Artificial Intelligence Use

The findings indicate that teachers' use of AI tools tends to be concentrated in preparatory and planning tasks (such as lesson preparation and the design of supporting materials), while their use in evaluative tasks—such as grading, generating detailed feedback, and analyzing

assessment results—remains relatively limited. This pattern can be interpreted through a dual educational lens.

From a functional perspective, it highlights the value of AI in reducing preparation workload and accelerating resource production, consistent with literature suggesting that technological adoption often begins with low-risk tasks (Holmes et al., 2019; WISE & USC, 2025). From a professional–ethical perspective, the cautious use of AI in assessment reflects sensitivity toward issues of fairness, accountability, bias, and output accuracy, rather than a lack of technical competence (Eubanks, 2018; Akgün & Greenhow, 2021).

The results also reveal a gap between personal and institutional use, indicating that individual skill or positive attitudes toward AI do not necessarily translate into structured classroom practice unless supported by clear policies, adequate infrastructure, administrative support, and targeted professional training (OECD, 2023; UNESCO, 2023).

3 .Teachers' Attitudes Toward Artificial Intelligence in Education

The findings reflect an attitude that may be described as conditional positive acceptance, whereby teachers acknowledge the usefulness of AI as a tool for supporting and improving practice while clearly rejecting the notion of replacing the teacher. This balance signals professional maturity, as it combines openness to innovation with a commitment to preserving the human and value-laden essence of education, which extends beyond technical efficiency (Biesta, 2015; Biesta, 2020; WISE & USC, 2025).

The results also indicate concerns related to the impact of AI on thinking skills, motivation, and academic integrity. The literature interprets such concerns as a logical response to the expansion of generative AI, where issues of originality and overreliance become more pronounced in the absence of clear pedagogical frameworks (Williamson & Eynon, 2020; Zhai, 2024).

4 .Ethical, Pedagogical, and Institutional Challenges

The study confirms that barriers to AI integration are not purely technical but fundamentally institutional and structural in nature. Weak technological infrastructure, limited administrative support, and gaps in skills and knowledge emerge as key constraints preventing the translation of positive attitudes into practice. This aligns with international reports emphasizing that successful AI integration requires supportive infrastructure, clear governance, and well-defined guidance frameworks (OECD, 2023; UNESCO, 2023).

Ethical challenges—such as privacy, information accuracy, and academic integrity—appear not as rejection factors but as regulatory constraints that shape conditions for use. Digital ethics literature emphasizes that these issues remain under global debate and require alignment between ethical principles, legal frameworks, and professional practice (Floridi et al., 2018; Zawacki-Richter et al., 2019).

5 .Statistical Differences Across Variables

Multivariate analysis of variance (MANOVA) revealed no statistically significant differences ($\alpha \leq 0.05$) in teachers' perceptions of AI use, their attitudes toward it, or the challenges associated with it attributable to gender, years of experience, academic qualification, or academic specialization. This finding carries important critical implications, suggesting that determinants of AI use and attitudes are not primarily individual but rather systemic and shared, including infrastructure, school policies, administrative support, and training opportunities. Consequently, interpretations of AI integration should focus on institutional

enabling conditions rather than demographic group differences (OECD, 2023; UNESCO, 2023).

6 .Correlational Relationship Between Use and Attitudes

The findings demonstrate a statistically significant positive correlation between actual AI use and teachers' attitudes toward its integration. This result indicates that attitudes are not merely theoretical positions but evolve alongside practical experience. However, positive attitudes alone are insufficient to overcome structural barriers that may limit the transition from functional to transformative integration.

In summary, the study reveals a pattern of conditional acceptance of AI among teachers, characterized by its use in preparatory and supportive tasks, caution in evaluative functions, and institutional constraints that limit progression toward transformative integration. Accordingly, the study contributes a contextual insight to the literature, emphasizing that AI integration is not a purely technical decision but an educational choice shaped by values, policies, and institutional readiness (Zawacki-Richter et al., 2019; UNESCO, 2023; OECD, 2023).

Second: Discussion of the Findings in Light of Educational Technology Adoption Models

1 .Technological–Pedagogical–Content Knowledge (TPACK) Model

The TPACK framework emphasizes that effective technology integration occurs through the intersection of content knowledge, pedagogical knowledge, and technological knowledge. In light of the study findings, AI use appears more prevalent in contexts where teachers retain direct pedagogical control (planning, preparation, and enrichment material design), while it declines in assessment contexts that demand high pedagogical and ethical sensitivity and contextual judgment that cannot be reduced to technical outputs. Thus, the challenge lies not in rejecting technology but in the incomplete integration of the three knowledge domains in certain areas of practice, underscoring the need for targeted professional development that links AI use to instructional and assessment design rather than superficial tool use (Koehler et al., 2014).

2 .Substitution–Augmentation–Modification–Redefinition (SAMR) Model

The SAMR model categorizes technology integration into four progressive levels. When interpreting the study findings through this lens, AI use largely resides at the substitution and augmentation levels, where AI is employed to accelerate and enhance preparatory tasks without substantial movement toward modification or redefinition that fundamentally transforms learning. This pattern is attributed to ethical caution in assessment and to weak institutional enabling environments that limit safe experimentation. Advancing practice toward modification and redefinition therefore requires institutional support, developmental planning, and clear policies that define boundaries and responsibilities for AI use (OECD, 2023; UNESCO, 2023).

3 .Technology Acceptance Model (TAM)

The Technology Acceptance Model posits perceived usefulness and ease of use as primary determinants of acceptance. While the findings demonstrate general acceptance of AI as a supportive tool, this acceptance does not consistently translate into deep pedagogical use, particularly in assessment contexts. This reveals the limitations of TAM in explaining educational AI adoption, as factors such as teachers' professional identity, ethical

considerations, and the absence of regulatory frameworks and institutional support play a decisive role in shaping actual practice (Biesta, 2015; UNESCO, 2023; WISE & USC, 2025).
Overall, the study indicates that AI integration operates within a middle ground—practical acceptance in preparation and support, caution in assessment, and institutional barriers that homogenize experiences across groups and constrain transformative adoption. Accordingly, advancing practice requires clear usage policies, improved infrastructure, sustained administrative support, and ethically grounded pedagogical training that ensures accountable and safe AI integration.

Recommendations

Axis I: Policy Development and Methodological Approaches

1. Reframing the Philosophy of Artificial Intelligence Integration within a Clear Educational Value Framework

The study recommends reconstructing the approach to integrating artificial intelligence in education by positioning it as a component that supports the educational curriculum rather than as an independent or value-neutral technological tool. Such integration should be aligned with the national educational philosophy and development goals, particularly the cultivation of critical thinking, responsibility, and digital citizenship, in accordance with the principles of Education for Sustainable Development (ESD).

2. Aligning Developed Curricula with Pedagogically-Oriented AI Applications

The study recommends reviewing school curricula, particularly within the humanities and language disciplines, to ensure the inclusion of applied learning spaces that enable the use of AI tools in planning, analysis, and knowledge construction. This alignment should preserve the ethical and linguistic core of the curriculum without subjecting it to the logic of automation.

Axis II: Teacher Capacity Building and Sustainable Professional Preparation

3. Designing Specialized Competency-Based Professional Development Programs

The findings highlight the need for in-depth professional development programs that prioritize building a critical pedagogical understanding of artificial intelligence rather than focusing solely on instrumental skills. These programs should address responsible educational use, the limitations of technology, and the requirements of academic integrity, while accounting for disciplinary and educational-stage differences.

4. Integrating Artificial Intelligence into Pre-Service Teacher Education Programs

The study recommends introducing mandatory coursework within colleges of education that addresses the pedagogical applications of AI, its ethical dimensions, and its role in supporting active learning and formative assessment. Such initiatives would help bridge the knowledge gap identified between academic preparation and classroom practice requirements.

Axis III: Institutional Environment and Supporting Infrastructure

5. Enhancing Schools' Technological Readiness, Particularly within the Public Sector

The study indicates that inadequate infrastructure constitutes a major barrier to the effective use of artificial intelligence. Accordingly, it recommends systematic investment in stable internet networks, secure educational platforms, and licensed digital tools that respect privacy considerations and support the Arabic language.

6. Providing Specialized Administrative Support and Instructional Supervision

The findings suggest that successful AI integration requires an active role from school leadership and instructional supervisors through allocating time, reducing administrative

burdens, encouraging structured experimentation, and supporting teachers as they implement innovative classroom practices.

Axis IV: Ethical Frameworks and Educational Governance

7. Establishing Clear Ethical and Regulatory Frameworks for AI Use in Education

The study recommends developing explicit regulatory policies governing the use of artificial intelligence in education to ensure data privacy protection, uphold academic integrity, mitigate plagiarism, and clearly define the responsibilities of both teachers and students.

8. Promoting Ethical Awareness among Teachers and Students

The study underscores the importance of embedding artificial intelligence within values-based education, framing it as a conscious learning tool that supports rather than substitutes thinking, while fostering digital responsibility instead of weakening independent cognitive effort.

Axis V: Classroom Practices and Educational Assessment

9. Encouraging Pedagogical Uses of Artificial Intelligence in Planning and Active Learning

The study recommends strengthening the use of AI in designing differentiated instructional activities, supporting project-based learning, and enriching classroom dialogue, while maintaining assessment tasks and pedagogical judgment within the teacher's professional responsibility.

10. Redefining the Role of Artificial Intelligence in Assessment as a Supportive Tool

The study advises against delegating summative assessment or educational judgment to AI systems. However, AI may be effectively utilized in formative assessment, pattern analysis, and the provision of preliminary feedback that supports learning.

Axis VI: Educational Research and Future Development

11. Supporting Longitudinal Applied Studies on the Impact of Artificial Intelligence on Learning

The study recommends encouraging applied research examining the effects of artificial intelligence on higher-order thinking skills, learning motivation, and educational values across diverse educational contexts, with particular emphasis on the Arab region.

12. Building Strategic Partnerships with the Technology Sector

The study highlights the importance of developing structured partnerships with educational technology developers to produce AI tools that respect cultural specificity, support the Arabic language, and address school needs rather than relying solely on market-driven or ready-made solutions.

Conclusion

The findings of this study consistently demonstrate that artificial intelligence is no longer a transient phenomenon or an emerging technological trend within education; rather, it has become a structural component increasingly embedded in contemporary instructional practices. Nevertheless, the trajectory of its integration is neither linear nor automatic but is shaped by a complex interaction among teachers' readiness, the level of institutional support, and the clarity of ethical and regulatory frameworks governing its use.

The results indicate that teachers perceive artificial intelligence as a supportive tool that enhances instructional quality and efficiency rather than as a substitute for the teacher's human role. This perception reflects an advanced level of professional awareness regarding the boundaries and functions of technology. Teachers exhibited a clear capacity to distinguish between tasks that may be delegated to intelligent systems and those inherently tied to

pedagogical judgment, classroom expertise, and human interaction that cannot be automated.

Furthermore, the primary barrier to effective AI utilization appears not to stem from teachers' resistance to change but from the educational system's capacity to provide an enabling environment characterized by adequate technological infrastructure, sustained professional development, and clear policy frameworks that regulate usage while defining responsibilities and limitations. In the absence of such institutional coherence, the benefits of technological potential remain fragmented and insufficient to generate sustainable educational transformation.

Accordingly, the study asserts that successful AI integration in education cannot be achieved merely through the introduction of technological tools. Rather, it requires the cultivation of a conscious digital educational culture that reinforces responsible use, safeguards professional ethics, and redefines the relationship between teachers and technology on the basis of complementarity rather than replacement. The central challenge remains ensuring that the human being—both teacher and learner—continues to occupy the core of the educational process, with technology serving to enhance rather than diminish the human dimension of learning.

This conclusion aligns with recent international scholarship emphasizing that genuine readiness for AI-supported education emerges from the convergence of professional competencies, institutional support, and ethical governance. Ultimately, the future of education will be determined not by the sophistication of algorithms but by educational systems' capacity to direct these technologies through a conscious human framework that balances innovation, equity, and learning quality.

Future Research Directions

In light of the study's findings and the complexity of the relationship between teachers and artificial intelligence in instructional practice, there is a clear need to expand scholarly inquiry in this field and move beyond preliminary descriptive studies toward deeper and more diversified approaches capable of generating mature and actionable educational knowledge.

Priority research trajectories include conducting comparative studies across multiple Arab educational systems to identify convergences and divergences in teachers' attitudes and practices related to AI integration. Such work may contribute to the development of a shared Arab guiding model grounded in cultural and ethical particularities rather than uncritical reliance on imported frameworks.

There is also a pressing need to expand experimental and quasi-experimental research examining the actual impact of AI-supported instruction on student achievement and higher-order thinking skills in comparison with traditional and other digital instructional models while carefully controlling contextual variables.

Longitudinal studies represent another critical avenue, enabling the observation of gradual shifts in students' motivation, autonomy, and critical and creative thinking beyond the limitations of short-term measurement.

Additionally, in-depth qualitative research is essential for exploring teachers' lived classroom experiences, ethical concerns, and professional tensions arising from the intersection of technological innovation and the preservation of education's human identity.

Future scholarship should also investigate the relationship between teachers' digital competencies and their actual AI use to determine the minimum professional competencies required for critical and purposeful integration.

Equally important is examining how institutional context and leadership patterns facilitate or hinder AI adoption, particularly through administrative support, instructional supervision, and school culture—dimensions often overlooked in technologically oriented research.

Further inquiry into the ethical and pedagogical implications of AI is strongly recommended, especially regarding academic integrity, plagiarism, knowledge ownership, and the consequences of excessive reliance on intelligent tools for students' learning habits.

Research should also address differences across educational stages, particularly between primary and secondary education, in terms of the appropriateness, boundaries, and pedagogical expectations surrounding AI use.

Finally, evaluating the effectiveness of specialized AI-focused professional development programs is crucial—not merely in terms of participant satisfaction or theoretical knowledge, but in their capacity to produce sustained changes in instructional practice.

Collectively, these directions highlight the need to develop Arab educational frameworks that regulate AI use while balancing technological advancement with the preservation of education's human essence, thereby guiding both research and practice toward an intelligent, equitable, and human-centered educational future.

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