

Research Article

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Redefining Teaching Faculty Roles at King Khalid University in the Fifth Industrial Revolution: An Artificial Intelligence Perspective

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Abstract

Background/purpose. This study examines the transformative and innovative roles of the teaching faculty at King Khalid University (KKU) in the context of the Fifth Industrial Revolution, with particular focus on the integration of artificial intelligence (AI) in higher education.

Materials/methods. The study utilized a survey research design, gathering data from a purposive sample of 60 teaching faculty members. A structured questionnaire was administered, addressing five critical domains: didactic content, instructional techniques, learning technologies, student acquisition, and assessment processes.

Results. Findings indicate that the teaching faculty at KKU exhibit moderate levels of innovation across instructional content, educational methods, technology integration, and student engagement. By contrast, innovation within the evaluation process was notably lower. Considerable variations were observed according to academic rank, years of experience, and the number of published papers. Remarkably, faculty members with higher academic ranks, at least a decade of experience, and over ten published studies demonstrated more frequent adoption of AI-related educational practices than their less experienced counterparts.

Conclusion. This study underscores the need to improve AI integration in teaching, learning, and assessment by providing actionable recommendations to enhance faculty competencies in AI applications, thus addressing the increasing demand for efficient education.

1. Introduction

The current era is marked by a broad spectrum of challenges across diverse fields, with the educational sector particularly affected by the rapid development of artificial intelligence (AI) technologies (Luan et al., 2020). The revolution in information technology (IT) and the expansion of software design have profoundly transformed pedagogical approaches and learning paradigms (Chiesa, 2020; Golubev & Testov, 2015). Recent advancements in AI across various sectors have not only redefined industry standards but have also brought substantial changes to academia by improving teaching and learning processes and fostering innovation in educational methodologies. In this context, the Fifth Industrial Revolution (5IR) represents a pivotal turning point in technological evolution, emphasizing human-machine collaboration and re-centering human agency in the development and application of technological tools (Atanasoski & Vora, 2019). This shift underscores the urgent need to redefine roles within higher education institutions to align with the evolving technological landscape.

As IT becomes an integral component of higher education, it has been closely linked to improvements in institutional quality and design. Cantú-Ortiz et al. (2020) emphasized that universities are increasingly benefiting from innovations in computing and software systems, particularly through transformative technologies such as AI. As a multidisciplinary field that encompasses computer science, mathematics, philosophy, biology, and engineering (Mohaghegh, 2024), AI is designed to simulate human intelligence in complex problem-solving and decision-making scenarios. Liu et al. (2025) and Albahiri and Alhaj (2024) affirmed that AI-driven systems are capable of applying adaptive strategies to address multifaceted academic challenges. The integration of AI within academia has yielded numerous advantages, including enhanced faculty performance and streamlined administrative functions (Nadimpalli, 2017). AI has further improved educational dynamics by enabling adaptive, individualized learning opportunities and facilitating seamless virtual communication, thereby enriching the academic experience.

Several scholars have highlighted the educational benefits of AI. Popenici and Kerr (2017) asserted that the availability of personalized, on-demand instruction—irrespective of time or location—substantially enhances student learning outcomes. Abu Zaia (2018) concurred, noting that AI assists teaching faculty in addressing diverse learner needs, efficiently presenting material, and tailoring interventions based on student performance. Moreover, Aithal et al. (2024) advocated for instructional frameworks that integrate AI, promoting a shift toward knowledge-based, technology-enhanced learning environments. The university faculty today are expected to fulfill increasingly interdisciplinary roles, including teaching, conducting research, contributing to community engagement, and participating in institutional administration (Altbach, 2014; Doğan & Arslan, 2024). Abu Zaia (2018) further expanded on these evolving roles, emphasizing the need for faculty members to possess advanced skills in information sourcing, lifelong learning, and future-oriented cognitive competencies such as reasoning, memory, and critical thinking. In response, Dzogovic et al. (2024) recommended expanding AI applications across educational fields and promoting the integration of humanities with applied sciences for nuanced and impactful outcomes.

The emergence of the 5IR marks a paradigm shift from automation and digitization to a more human-centered integration of technologies, where AI, empathy, ethics, and creativity coexist. Within this evolving framework, educators are no longer mere facilitators of knowledge but are expected to assume roles as innovators, collaborators, and ethical leaders. At King Khalid University (KKU), this technological and pedagogical transformation is reshaping the role of teaching faculty, with AI serving as a model for innovative practice and institutional development. In this context, the present study seeks to explore the innovative roles that faculty members at KKU perceive for themselves in light of the technological advancements of the 5IR, with particular attention to AI integration.

Despite the increasing attention to AI in educational settings, empirical studies have revealed varying levels of AI adoption in higher education institutions. Luo (2018) highlighted institutional trends that stress the importance of AI integration to enhance organizational efficiency. However, Al-Muqayti (2021) found that AI utilization among the faculty in Jordanian universities was moderate, a finding echoed by Al-Yazji (2019) in the Saudi context. Al-Subhi (2020) reported even lower levels of AI application at Najran University, prompting Al-Hukami (2023) to call for the development of practical frameworks and standards to support effective AI adoption in Saudi higher education. Drawing on the researcher's professional experience in postgraduate education and the observed transformative potential of AI in academic settings, this study aims to investigate how the faculty at KKU perceive their evolving roles within the broader context of the 5IR.

Accordingly, the primary research question guiding this study is "What innovative roles do faculty members at KKU perceive for themselves in light of the technological innovations of the 5IR, particularly in AI?"

To address this overarching question, the study explores the following sub-questions:

1. What role do the teaching faculty at KKU perceive themselves playing in educational content in the AI era?
2. What role do the teaching faculty at KKU perceive themselves playing in teaching strategies and methods in the AI era?
3. What role do the teaching faculty at KKU perceive themselves playing in utilizing educational technologies in the AI era?
4. What role do the teaching faculty at KKU perceive themselves playing in engaging learners in the AI era?
5. What role do the teaching faculty at KKU perceive themselves playing in assessment processes in the AI era?

2. Literature Review

2.1. 5IR and Human Centric AI

5IR marks a shift away from the automation-focused agenda of the Fourth Industrial Revolution (4IR) toward a paradigm that places human creativity and ethical values at the center of technological progress. 4IR emphasized digitization, automation, and efficiency, while 5IR is defined by empathy, ethics, inclusivity, and sustainability. Xu, David, and Kim (2018) argue that this new paradigm repositions humans at the core of innovation, fostering technology that complements rather than replaces human potential. According to Schwab and Zahidi (2020), 5IR promotes human-centered innovation in which AI serves not only as a tool for optimization but as a co-creative partner advancing human well-being and societal flourishing.

In higher education, this reorientation demands that faculty roles evolve beyond technological proficiency to include the cultivation of ethical reasoning, socioemotional learning, and personalized instruction. As AI systems become increasingly prevalent in instructional delivery and student assessment, educators are increasingly called upon to foreground human capacities, such as empathy, mentorship, and moral judgment, that machines cannot replicate. Thus, the faculty are now envisioned as facilitators of human AI collaboration, aligning pedagogical practices with the broader objectives of 5IR.

2.2. Evolving Roles of University Faculty Members

In Saudi Arabia, the 5IR has precipitated essential role expansions for the university faculty. The faculty are expected to guide students toward innovation through integrating contemporary

technologies, especially AI, which are aligned with the goals of Saudi Vision 2030 (Adesiji, 2024; Albahiri et al., 2023). To remain relevant and effective, the faculty must engage in continuous professional development to keep pace with the rapid developments in digital tools and teaching methodologies.

Moreover, institutional success is increasingly tied to the qualifications and competencies of the teaching faculty (Asiyai, 2022; Zhao et al., 2024). Beyond instruction and research, the faculty are being called upon to engage in community service and environmental advocacy (Berkey et al., 2023). They serve as bridges to local communities, participate in student counseling and awareness programs, and promote sustainable and inclusive development through conscientious AI adoption. Hamed (2023) summarized the importance of university professors as multifaceted contributors: educators, researchers, mentors, and leaders steering innovation and intellectual growth. As AI becomes progressively integrated, the faculty must also acquire new competencies in technological facilitation and digital innovation to fulfill these expanded expectations.

2.3. AI

2.3.1. AI Concept

AI is broadly defined as the scientific pursuit of systems capable of simulating human cognitive processes, including reasoning, learning, and problem solving (Kumar et al., 2025). Haenlein et al. (2019) described AI as systems that can interpret data, learn from it, and adapt behavior to achieve targeted outcomes. Institutions such as the OECD and AI in Medicine (AIM) (2018) characterized AI as technology that takes on tasks traditionally requiring human intelligence, such as decision-making. Similarly, Abu Al Nasr (2020) framed AI as an interdisciplinary field that develops software and machines to perform human-like tasks, improving life quality and operational efficiency. Al Ghamdi (2024) added that AI systems can autonomously conduct complex work, ranging from data analysis to interactive communication, transforming sectors such as education, healthcare, and industry.

2.3.2. Objectives of AI

Within universities, AI aims to enhance educational quality by personalizing student learning experiences and assisting the faculty in accurately analyzing academic performance. It also supports scientific research and streamlines administrative operations, thereby fostering an innovative and efficient academic environment. According to Abu Al Nasr (2020), AI's broader objective is to replicate human intelligence by understanding and emulating cognitive processes, which require large data storage capacity, fast processing, and sophisticated information management systems. Al Asi (2021) emphasizes the development of algorithms, robots, and systems that emulate human cognitive and perceptual behavior. Al Hussein and Gomaa (2024) identified crucial goals, including facilitating logical inference and decision making, enhancing human-computer interaction, enabling effective speech and image recognition, and supporting parallel processing to mirror human multitasking.

2.3.3. Importance of AI

AI is one of the most transformative innovations of our era, driving efficiency and innovation across sectors. AI enhances decision-making by rapidly analyzing large datasets to reveal patterns that might elude human analysis. It automates repetitive tasks, allowing human agents to focus on creative and strategic work. In healthcare, AI aids diagnostics, personalized treatments, and drug development. In education, AI offers personalized learning, automates grading, tracks student progression, and provides insights for improvement. In industrial and economic contexts, AI optimizes processes, reduces waste, improves productivity, and fosters innovation in new product and service development. However, as Seba'a et al. (2018) and Mahmoud (2020) noted, these

benefits come with ethical concerns (i.e., privacy, bias, accountability) that demand careful regulation and responsible deployment of AI.

2.3.4. Developing the Skills of the Teaching Faculty in the Age of AI

As AI technologies proliferate in education, the faculty must invest in developing technical and non-technical skills. Mousa and Bilal (2019) argued that the faculty need a deep understanding of AI capabilities, allowing them to critically evaluate educational AI systems and integrate them thoughtfully into their teaching practice. The faculty also need to sharpen their research and data literacy skills to analyze AI-generated data for assessing student learning, informing instructional decisions, and guiding students in interpreting feedback. Furthermore, collaboration and management skills are essential because the faculty will increasingly work alongside AI systems and digital teaching assistants. Therefore, continuous professional development is critical not only to keep pace with technological change but also to strengthen faculty roles as mentors, leaders, and agents of change.

2.4. Previous Studies

Previous studies on the evolving roles of the university faculty within the context of AI and the 4IR and 5IR offer critical insights into the challenges and opportunities educators face as they navigate rapidly changing educational landscapes. For instance, Baker et al. (2019) explored how AI technologies, particularly intelligent tutoring systems (ITSs), support instructors by offering real-time feedback to students. Notably, the latter enables personalized learning. This capability allows the faculty to shift their focus from routine instructional tasks to fostering higher-order cognitive skills such as critical thinking. A central finding of the study was that faculty roles are transitioning from traditional knowledge transmitters to facilitators of learning, as AI increasingly automates assessments, grading, and rudimentary tutoring functions. In this evolving framework, educators are reimagined as mentors and coaches rather than lecturers.

Similarly, Woolf (2010) conducted a foundational study on ITSs, demonstrating how AI-driven systems can tailor instructional content, feedback, and pacing based on individual learner performance. This adaptability renders AI particularly effective in addressing diverse learner needs, including variations in learning speed, style, and comprehension. Woolf emphasized that the individualized nature of AI-enhanced education improves overall instructional efficiency and learning outcomes. Mhlana (2022) further contributed to the discourse by advocating for a human-centered AI approach. His study emphasized the importance of the Human-in-the-Loop (HITL) model, which ensures that AI systems are designed to serve human well-being and maintain ethical accountability. Mhlana also stressed the need for policies that promote AI awareness and responsible autonomy, particularly in educational and corporate settings.

Redecker (2017) emphasized that AI integration necessitates a shift in the educator's identity from knowledge dispenser to learning facilitator. This transition requires the development of strong digital pedagogical competencies to effectively leverage AI tools for personalized learning. Luckin et al. (2016) also highlighted the potential of AI to support adaptive learning environments and real-time feedback mechanisms. Their work underscored the need for faculty involvement in the co-design of AI tools to ensure pedagogical alignment and relevance. The OECD (2021) stressed the necessity for the faculty to acquire AI literacy and data fluency to remain effective in a tech-driven academic environment. However, the report also identified substantial professional development gaps, especially in low- and middle-income countries, where resources and training opportunities may be limited.

Zawacki-Richter et al. (2019) reinforced this concern, revealing that many faculty members feel underprepared to integrate AI into curriculum delivery and assessment. They called for structured

training programs and interdisciplinary collaboration to bridge this skills gap. Finally, Selwyn (2019) cautioned that whereas AI and automation can enhance instructional delivery, the irreplaceable role of the educator lies in fostering empathy, creativity, and ethical reasoning—capacities that machines cannot replicate. Collectively, these studies affirm that while AI offers substantial potential for improving educational processes, the evolving role of the faculty must be supported through targeted training, ethical guidance, and a reaffirmation of the human elements in teaching and learning.

3. Methodology

3.1. Research Design

This study employed a case study design with a quantitative descriptive approach. The case study method was selected owing to the research focus on a single institution (i.e., KKU) and the purposive nature of the sampling. Although numerical data were collected using a structured questionnaire, the specificity of the institutional context limits the generalizability of the findings, making the case study framework appropriate for an in-depth exploration. As Al-Assaf (2003) stated, “descriptive research involves the careful and systematic collection, organization, and analysis of existing data or records that relate to the research problem” (p. 206). This approach facilitates a detailed and objective understanding of the phenomena under investigation, ensuring that the data align closely with our research objectives.

3.2. Research Population and Sample

The research population comprised all faculty members at KKU. A purposive sampling technique was used to select participants based on their relevance to the research objectives. Specifically, faculty members in higher education with experience or interest in AI integration were targeted. Although purposive sampling limits external validity, it is suitable for case study research where contextual depth is prioritized over statistical generalizability (Sekaran & Bougie, 2010). The final sample included 60 teaching faculty members. Table 1 presents their demographic distribution.

Table 1. Demographic Distribution of the Research Sample

Percentage (%)	Frequency	Variable	
33.3	20	Assistant Professor	Academic Rank
26.7	16	Associate Professor	
40.0	24	Professor	
100	60	Total	
16.7	10	Less than 5 years	Years of Experience
26.7	16	5–10 years	
56.7	34	More than 10 years	
100	60	Total	
50.0	30	Less than five publications	Published Papers
20.0	12	5–10 publications	
30.0	18	More than 10 publications	
100	60	Total	

3.3. Research Instrumentation

The primary instrument employed for data collection in this study was a structured questionnaire, carefully designed on the basis of an extensive review of relevant literature and prior research on the role of the university faculty in the age of AI. The final version of the questionnaire comprised five thematic sections, each exploring different aspects of faculty roles in this evolving educational landscape. The sections are as follows: Faculty Role in Educational Content (7 items), Faculty Role in Teaching Strategies and Methods (7 items), Faculty Role in Educational Technologies (7 items), Faculty Role in Student Engagement (7 items), and Faculty Role in Assessment Processes (8 items).

Altogether, the questionnaire contained 36 items, each aimed at capturing faculty perspectives on their responsibilities and practices in relation to AI integration. The response format used a five-point Likert scale, with the following options: 5 = Strongly Agree, 4 = Agree, 3 = Sometimes, 2 = Disagree, 1 = Strongly Disagree.

The questionnaire was developed to ensure clarity, relevance, and comprehensiveness. Each section was designed to align with key themes identified in the literature, addressing the opportunities and challenges posed by AI in higher education. By leveraging a structured and systematic approach, the instrument aimed to generate reliable data that reflects faculty attitudes and experiences with AI across various aspects of their roles.

Equation (3-1): Response Estimation Method

1. Category Length = Range / Number of Categories

Calculating the Range:

- Range = (Smallest Alternative–Largest Alternative)/ Number of Responses

In the case of a five-point Likert scale, where the responses range from 1 (Strongly Disagree) to 5 (Strongly Agree), the range is calculated as follows:

$$\text{Range} = (5 - 1)/5 = 0.80 \quad \text{Range} = \frac{(5 - 1)}{5} = 0.80 \quad \text{Range} = 5(5 - 1) = 0.80.$$

Thus, the category length for this Likert scale is 0.80, indicating that the interval between each scale point is 0.80 units. The judgment criterion is determined according to Table 2 below.

Table 2. Rating Scale for Questionnaire Scores

Arithmetic Mean	Rating Degree
Greater than 4.20–5	Very High
Greater than 3.40–4.20	High
Greater than 2.60–3.40	Medium
Greater than 1.80–2.60	Low
Greater than 1–1.80	Very Low

The researchers calculated the validity and reliability coefficients to ensure the questionnaire's suitability for use in the current study.

3.4. Validity and Reliability of the Questionnaire

3.4.1. Validity

Two validation strategies were applied:

- Expert Review (Content Validity): A panel of academic experts (N = 10) reviewed the initial questionnaire for clarity, relevance, and alignment with research objectives. Items with $\geq 80\%$ agreement were retained.
- Internal Consistency Validity: Pearson correlation coefficients were calculated between each item and the total score of its corresponding dimension. All coefficients were statistically significant at the 0.01 level, indicating strong internal validity (see Table 3).

Table 3. Correlation Coefficients Between the Statement and Dimension Scores on the Questionnaire

Correlation with Dimension	Item	Correlation with Dimension	Item	Dimension
0.72**	5	0.83**	1	Faculty Role in Educational Content
0.83**	6	0.84**	2	
0.73**	7	0.87**	3	
-	-	0.78**	4	
0.84**	5	0.76**	1	Faculty Role in Teaching Strategies and Methods
0.85**	6	0.92**	2	
0.81**	7	0.91**	3	
-	-	0.88**	4	
0.72**	5	0.80**	1	Faculty Role in Educational Technologies
0.69**	6	0.75**	2	
0.71**	7	0.76**	3	
-	-	0.78**	4	
0.84**	4	0.75**	1	Faculty Role in Student Engagement
0.86**	5	0.71**	2	
0.86**	6	0.85**	3	
0.86**	5	0.87**	1	
0.87**	6	0.81**	2	Faculty Role in Assessment Processes
0.84**	7	0.82**	3	
0.76**	8	0.85**	4	

Note: Correlation is significant at the 0.01 level (2-tailed).

The correlation coefficients between the individual questionnaire items and their respective dimension scores range from moderate to very strong (0.69 to 0.92), all statistically significant at the 0.01 level. This finding indicates a high level of internal consistency within each dimension, suggesting that the items reliably measure the intended constructs related to faculty roles in educational content, teaching strategies, educational technologies, student engagement, and assessment processes. The consistently strong correlations across all dimensions provide confidence in the questionnaire's validity and support its use as a reliable tool for assessing faculty roles in these educational areas.

3.4.2. Reliability of the Instrument

The reliability of the questionnaire was rigorously evaluated using two established methods, namely, Cronbach's alpha and the split-half method with the Spearman-Brown coefficient.

Cronbach's alpha values ranged from 0.86 to 0.93 across all dimensions, indicating excellent internal consistency and confirming that the items within each dimension reliably measure their

respective constructs. These values surpass the commonly accepted threshold of 0.70, demonstrating strong coherence among items.

The split-half reliability coefficients, ranging from 0.71 to 0.94, provide additional evidence of the instrument's stability. The highest reliability was found in the "Faculty Role in Teaching Strategies and Methods" dimension (0.94). By contrast, the "Faculty Role in Educational Technologies" dimension recorded the lowest value (0.71), which remains within an acceptable range.

Together, these results affirm the robustness and consistency of the questionnaire, supporting its use as a reliable tool for assessing faculty roles in various educational dimensions.

Table 4. Cronbach's Alpha Coefficients for the Questionnaire

Cronbach's Alpha Coefficient	Number of Items	Dimensions
0.91	7	Faculty Role in Educational Content
0.93	7	Faculty Role in Teaching Strategies and Methods
0.86	7	Faculty Role in Educational Technologies
0.88	6	Faculty Role in Student Engagement
0.93	8	Faculty Role in Assessment Processes

The results presented in Table 3-4 demonstrate that the questionnaire exhibits excellent internal consistency across all dimensions, with Cronbach's alpha coefficients ranging from 0.86 to 0.93. These high values indicate strong inter-item correlations, confirming that the items within each dimension consistently measure the intended constructs.

- Split-Half Method (Spearman-Brown Coefficient): The split-half method was employed to further verify the reliability. The questionnaire was divided into two equal halves, and the correlation between the two sets of scores was assessed. The Spearman-Brown prophecy formula was applied to adjust the resulting reliability coefficient accordingly.

Table 5. Split-Half Reliability Coefficients (Spearman-Brown) for the Questionnaire

Split-Half Reliability Coefficient	Number of Items	Dimensions
0.87	8	Faculty Role in Educational Content
0.94	8	Faculty Role in Teaching Strategies and Methods
0.71	10	Faculty Role in Educational Technologies
0.73	8	Faculty Role in Student Engagement
0.72	6	Faculty Role in Assessment Processes

Using the split-half method, we divided the instrument into two equal halves to further confirm the questionnaire's reliability. The Spearman-Brown prophecy formula was then used to adjust the reliability coefficients, as summarized in Table 5. The split-half reliability coefficients range from 0.71 to 0.94, indicating acceptable to excellent stability and consistency. The highest reliability was observed in the Teaching Strategies and Methods dimension (0.94). By contrast, the Educational Technologies dimension had the lowest coefficient (0.71), which remains within an acceptable reliability threshold.

3.4.3. Conclusion on Reliability

Overall, the consistently high Cronbach's alpha and split-half reliability coefficients confirm that the questionnaire is a reliable and robust measurement tool. These results demonstrate excellent internal consistency and stability across all dimensions, supporting the instrument's suitability for investigating the evolving roles of the university faculty in the context of AI and the 5IR. Consequently,

the questionnaire is well-equipped to effectively address the study's research questions and objectives.

4. Results

4.1. Results Addressing the First Research Question

Research Question 1: What role do the teaching faculty at KKU perceive themselves playing in educational content in the AI era?

To address this question, the researcher calculated the means and standard deviations of faculty members' responses regarding their role in incorporating AI into their educational content. Table 6 below summarizes the results.

Table 6. Means and Standard Deviations of Faculty Responses on the Role of AI in Educational Content

Level	Standard Deviation	Mean	Statement	No.
Moderate	1.017	3.000	Utilizing AI applications during lesson planning	1
Moderate	1.020	2.833	Employing AI tools when defining procedural lesson objectives	2
Moderate	1.048	3.267	Summarizing educational content	3
Moderate	0.988	2.700	Identifying AI-based learning resources	4
Moderate	1.114	3.000	Presenting concepts more comprehensively and broadly	5
Moderate	0.922	2.667	Updating content to align with AI applications	6
Low	0.860	2.533	Developing alternative plans to address challenges associated with AI	7
Moderate	0.797	2.533	Faculty role in AI-driven educational content	

The highest-rated aspect within this dimension was "Summarizing educational content" (mean = 3.267), indicating that the faculty are comfortable utilizing AI tools for content synthesis. This finding could be attributed to the availability of AI-powered summarization tools, such as natural language processing applications that facilitate efficient content management. Conversely, the lowest-rated aspect was "Developing alternative plans to address challenges associated with AI" (mean = 2.533), suggesting that faculty members are less prepared to tackle the potential obstacles related to AI integration in educational materials. This finding aligns with prior research emphasizing the need for faculty training in managing AI-related challenges.

These findings reflect that although the faculty members recognize the importance of AI tools in enhancing educational content, their practical application remains limited. The moderate engagement suggests an awareness of AI's potential but also highlights gaps in training, resources, and institutional support. This outcome is consistent with Maqaiti's (2021) study, which reported a moderate level of AI utilization among the university faculty in Jordan. Similarly, Abu Al Nasr (2020) emphasized that one of the primary emerging roles of the faculty in the 4IR is in teaching and content development. However, these results contrast with Al-Subhi's (2020) study at Najran University, where AI application in teaching was very low, pointing to regional and institutional variations in AI adoption.

The results indicate that the overall perception of faculty members at KKU regarding their role in integrating AI into educational content is at a moderate level, with an overall mean score of 2.857. This finding suggests that despite some level of engagement with AI in content development, it remains nascent and requires further advancement to fully harness the potential of AI in educational settings.

4.2. Results Addressing the Second Research Question

Research Question 2: What role do the teaching faculty at KKU perceive themselves playing in teaching strategies and methods in the AI era?

To address this question, the researcher computed the means and standard deviations of faculty members' responses regarding their role in integrating AI into teaching strategies and instructional methods. Table 7 below presents the results.

Table 7. Means and Standard Deviations of Faculty Responses on the Role of AI in Teaching Strategies and Methods

Level	Standard Deviation	Mean	Statement	No.
Moderate	0.960	2.900	Utilizing AI applications during the presentation of educational content	1
Moderate	1.055	2.700	Applying AI-based techniques for lesson preparation	2
Moderate	1.053	2.833	Considering individual differences among students when implementing AI applications	3
Low	0.900	2.467	Organizing student interactions during AI-based teaching	4
Moderate	1.073	2.767	Training students for self-learning through AI applications	5
Low	1.037	2.600	Designing interactive educational activities	6
Moderate	1.050	3.000	Implementing active learning strategies	7
Moderate	0.858	2.752	Faculty role in AI-driven teaching strategies and methods	

The results reveal that faculty members at KKU hold a moderate perception of their role in integrating AI into teaching strategies and instructional practices, with an overall mean score of 2.752. Although practical implementation remains limited and underdeveloped, this finding indicates a growing recognition of AI's potential in education.

The highest-rated area was "Implementing active learning strategies" (mean = 3.000), suggesting that the faculty are relatively comfortable using AI to enhance student engagement while promoting participatory learning. This finding aligns with modern educational paradigms that prioritize student-centered approaches and leverage adaptive AI-powered learning tools to support active learning environments. Conversely, the lowest-rated area was "Organizing student interactions during AI-based teaching" (mean = 2.467), highlighting challenges in managing interpersonal dynamics when AI technologies are involved. This finding reflects broader concerns in the literature regarding the complexities of balancing human interaction with AI-driven instruction in technology-enhanced learning settings.

Overall, moderate engagement with AI suggests that the faculty are in the early stages of incorporating such technologies into their pedagogy. To support effective integration, the following areas require attention:

1. Targeted Faculty Training

Comprehensive professional development programs should be established to empower educators with the knowledge and skills required to effectively integrate AI tools into diverse instructional settings. Training should emphasize technical proficiency and pedagogical application to foster confident, informed use of AI in the classroom.

2. Collaborative Faculty Engagement

Structured collaborations among faculty members should be encouraged through peer learning communities, workshops, and cross-disciplinary initiatives. Sharing best practices and experiences can enhance collective problem-solving and support the effective implementation of AI-enhanced teaching strategies.

3. Curricular Redesign for AI Integration

A strategic revision of academic curricula should be undertaken to embed AI meaningfully within the teaching and learning frameworks. This alignment ensures that instructional practices keep pace with technological advancements and prepares students for success in an AI-driven educational landscape.

4.3. Results Addressing the Third Research Question

Research Question 3: What role do the teaching faculty at KKU perceive themselves playing in educational technologies in the AI era?

To explore faculty members' perceptions of their role in integrating AI into educational technologies, the researcher computed the mean scores and standard deviations of their responses. Table 8 below presents these results, which offer insights into the extent and consistency of faculty engagement with AI in educational settings.

Table 8. Means and Standard Deviations of Faculty Responses on the Role of AI in Educational Technologies

Level	Standard Deviation	Mean	Statement	No.
Moderate	1.083	3.000	Utilizing AI software for continuous learning	1
Low	1.037	2.600	Employing AI tools to help students acquire proper research skills	2
Moderate	1.224	2.867	Using AI tools to search for course-specific information	3
Low	0.900	2.533	Leveraging AI tools to obtain university-related data	4
Moderate	1.124	2.667	Using AI software for publishing scientific research	5
Low	1.042	2.467	Utilizing AI tools in virtual conferences	6
Low	0.974	2.500	Presenting course materials using AI tools (e.g., chatbots, CLASs Point)	7
Moderate	0.786	2.662	Faculty role in AI-driven educational technologies	

The findings reveal that faculty members at KKU perceive their role in integrating AI into educational technologies as moderate, with an overall mean score of 2.662. Thus, despite the emerging awareness of AI's potential in education, its practical application remains in the early stages of development.

The highest-rated item, "Utilizing AI software for continuous learning" (mean = 3.000), reflects a moderate level of engagement. This finding suggests that faculty members are increasingly adopting AI tools to support their own professional development, aligning with contemporary trends in lifelong learning and self-directed growth. Conversely, the lowest-rated items, "Utilizing AI tools in virtual conferences" (mean = 2.467) and "Presenting course materials using AI tools" (mean = 2.500), suggest the limited adoption of AI in interactive teaching and digital presentation formats. These findings may reflect several underlying challenges, including technical limitations, lack of institutional support, and insufficient training in the effective use of AI technologies.

The overall moderate level of engagement implies that faculty members remain in the initial phase of AI integration within their teaching and research activities. The following potential factors may account for this phenomenon:

1. Technical Proficiency

Some faculty members may lack the technical skills necessary to effectively utilize AI tools in educational settings. This scenario highlights the need for specialized training programs that focus on practical and pedagogical applications of AI in higher education.

2. Institutional Constraints

Limited access to AI technologies, inadequate digital infrastructure, and a lack of administrative support may hinder faculty adoption. To address these barriers, universities must invest in AI resources and provide structured institutional support to facilitate the integration process.

3. Perceived Disciplinary Relevance

Faculty members in certain disciplines may not perceive AI tools as relevant to their subject matter or teaching strategies. Therefore, demonstrating the cross-disciplinary benefits of AI and providing contextualized examples of its effectiveness in enhancing teaching and learning outcomes are essential.

In summary, the findings point to a growing but cautious engagement with AI among faculty members. Advancing the integration of AI in educational technologies will require a multifaceted approach that includes capacity building, institutional investment, and awareness-raising initiatives tailored to diverse academic contexts.

4.4. Results Addressing the Fourth Research Question

Research Question 4: What role do the teaching faculty at KKU perceive themselves playing in engaging learners in the AI era?

To answer this question, the researcher computed the means and standard deviations of faculty members' responses regarding their role in utilizing AI to support and engage learners. Table 9 below presents the findings.

Table 9. Means and Standard Deviations of Faculty Responses on the Role of AI in Supporting Learners

Level	Standard Deviation	Mean	Statement	No.
Moderate	1.015	2.733	I communicate with learners using AI tools.	1
Low	1.073	2.567	I guide students to use AI tools for completing assignments and tasks.	2
Moderate	1.055	2.700	I provide creative solutions to student challenges through AI applications.	3
Moderate	1.147	3.167	I promote lifelong learning among students.	4
Moderate	1.104	3.233	I analyze student behaviors and learning patterns.	5
Moderate	1.305	3.233	I provide psychological support and academic guidance.	6
Moderate	0.879	2.939	Faculty role in AI-driven support for learners	

The findings indicate that faculty members at KKU perceive their role in utilizing AI to support and engage learners as moderate, with an overall mean score of 2.939. This finding suggests an emerging awareness and interest in leveraging AI to enhance student learning experiences, although substantial opportunities for deeper integration and optimization remain.

The highest-rated items, “I analyze student behaviors and learning patterns” (mean = 3.233) and “I provide psychological support and academic guidance” (mean = 3.233), demonstrate where the faculty are most actively incorporating AI into their instructional practices. These responses highlight a growing recognition of AI’s potential in delivering personalized support. By analyzing student learning data and behavioral trends, the teaching faculty can tailor instruction and guidance to better meet individual student needs (Holmes et al., 2019). Conversely, the lowest-rated item was “I guide students to use AI tools for completing assignments and tasks” (mean = 2.567). This finding suggests that although the faculty may use AI tools in their own teaching, they are less likely to encourage students to adopt AI for independent or self-directed learning. This finding points to a missed opportunity in empowering students to utilize AI technologies as part of their academic development (Luckin et al., 2016).

The following factors may explain the current level of faculty engagement with AI in student support:

1. Limited Familiarity with Student-Centered AI Tools

The faculty may lack sufficient awareness of AI applications specifically designed for student use. This scenario highlights the importance of professional development centered on AI tools that foster personalized learning and engagement (Zawacki-Richter et al., 2019).

2. Preference for Traditional Support Methods

Many faculty members may still rely heavily on conventional approaches, such as in-person academic advising and classroom interaction, rather than exploring AI-driven solutions such as adaptive learning platforms or ITSs.

3. Concerns Regarding Overreliance on Technology

Some educators may be cautious regarding encouraging heavy student dependence on AI, fearing it could impede the development of critical thinking or problem-solving skills. Addressing

these concerns involves demonstrating how AI can complement active learning rather than replace it (Holmes et al., 2019).

Overall, the teaching faculty at KKU exhibits a moderate level of engagement with AI to support student learning. Despite the clear awareness of AI's potential, high emphasis on professional training, cultural shifts in pedagogy, and strategic integration of student-friendly AI tools are needed to fully realize the benefits of AI in enhancing learner outcomes.

4.5. Results Addressing the Fifth Research Question

Research Question 5: What role do teaching faculty members at KKU perceive themselves playing in assessment processes in the AI era?

To address this question, the researcher calculated the means and standard deviations of faculty members' responses regarding their role in integrating AI into the assessment process. Table 10 below summarizes the findings.

Table 10. Means and Standard Deviations of Faculty Responses on the Role of AI in the Assessment Process

Level	Standard Deviation	Mean	Statement	No.
Moderate	1.155	2.667	I use AI to design formative assessment questions for each instructional unit.	1
Low	1.074	2.533	I apply e-portfolios through AI applications.	2
Moderate	0.935	2.767	I provide feedback to students using AI applications.	3
Low	1.033	2.367	I design all assessments based on scientific standards through AI.	4
Low	1.042	2.467	I employ diagnostic assessment methods using AI tools.	5
Low	0.928	2.367	I implement formative assessment strategies through AI applications.	6
Low	0.858	2.567	I apply summative assessment methods through AI tools.	7
Low	0.935	2.233	I use AI tools to analyze assessment results.	8
Low	0.821	2.496	Faculty role in AI-driven assessment processes	

The findings indicate that faculty members at KKU perceive their engagement with AI in assessment processes as relatively limited, with an overall mean score of 2.496. This low level of perceived involvement suggests that AI tools have not yet been widely adopted or integrated into the assessment processes of the university, underscoring the need for strategic efforts to enhance the role of AI in modernizing evaluation methods.

The highest-rated practices are "I provide feedback to students using AI applications" (mean = 2.767) and "I use AI to design formative assessment questions for each instructional unit" (mean = 2.667). These results suggest that some faculty members are beginning to experiment with AI in formative assessment contexts, particularly in providing automated feedback and generating assessment items. Although these practices represent initial steps toward AI integration, they remain limited in scope and scale (Holmes et al., 2019). Conversely, the lowest-rated practices are "I use AI

tools to analyze assessment results" (mean = 2.233) and "I design all assessments based on scientific standards through AI" (mean = 2.367). These lower mean scores reflect a significant gap in the use of AI for more advanced and systematic tasks, such as data analysis and test construction, which are essential components of effective, data-informed assessment processes in contemporary education.

The following factors contribute to limited AI use by the teaching faculty:

1. Institutional Constraints and Limited Flexibility

Traditional educational structures and rigid curriculum frameworks may restrict faculty autonomy and innovation in adopting AI for assessment. Institutional policies often lag behind technological advancements, creating a barrier to integration (Zawacki-Richter et al., 2019).

2. Lack of Training and Awareness

Many faculty members may be unaware of the capabilities and availability of AI-based assessment tools. The absence of targeted professional development initiatives contributes to the underutilization of these technologies (Popenici & Kerr, 2017).

3. Concerns Regarding Validity and Reliability

Skepticism often arises regarding the accuracy, fairness, and validity of AI-assisted assessments. Concerns regarding algorithmic transparency and trustworthiness can lead to reluctance in adopting AI, especially for high-stakes evaluations (Holmes et al., 2019).

4. Technical and Ethical Challenges

The use of AI in assessment raises important questions related to data privacy, algorithmic bias, and the ethics of automated grading. These challenges can deter the faculty from fully embracing AI-driven assessment systems (Luckin et al., 2016).

5. Discussion

The findings from this study reveal that faculty members at KKU hold a moderate perception of their roles in integrating AI into higher education. Across domains such as educational content, teaching strategies, educational technologies, learner support, and assessment, the average engagement level remained moderate. Notably, the highest engagement was seen in student support, whereas the lowest was in assessment processes. These results suggest that although faculty members acknowledge AI's potential, their practical application remains limited and exploratory in nature (Zawacki-Richter et al., 2019).

In the domain of educational content, the faculty reported confidence in using AI for content summarization and lesson planning, indicating early-stage adoption. However, less engagement occurred with complex tasks such as adapting content to address AI-related challenges. This finding reflects similar findings by Maqaiti (2021), who observed moderate AI integration in Jordanian universities. The results also contrast with studies such as that of Al-Subhi (2020), which found significantly lower engagement at Najran University. This finding underlines the institutional variability in AI readiness and application across the region.

Regarding teaching strategies, the faculty demonstrated moderate usage of AI, particularly in supporting active learning approaches. However, difficulties were reported in managing AI-supported student interactions, pointing to a need for pedagogical training. This finding aligns with Luckin et al. (2016), who emphasized the complexity of balancing AI with human-centered teaching methods. The faculty requires not only technical skills but also instructional design knowledge to effectively integrate AI into learner-centered environments.

In the area of learner support, the faculty demonstrated relatively higher engagement, particularly in utilizing AI for analyzing learning patterns and providing academic guidance. However, they were less likely to guide students in using AI tools for assignments or independent learning. This finding indicates a missed opportunity to promote student digital literacy and autonomy. Similar concerns were raised by Holmes et al. (2019), who cautioned that without proper guidance, students may underutilize the educational potential of AI or misuse it.

Finally, faculty engagement in AI-driven assessment was the lowest among all domains. Although some use AI for feedback and formative assessment, few apply it in data analysis or high-stakes evaluation. Concerns over validity, ethical implications, and a lack of institutional frameworks likely contribute to this hesitancy (Popenici & Kerr, 2017). Overall, the findings underscore the pressing need for comprehensive professional development, robust infrastructure, and supportive policies to promote confident and responsible AI integration in higher education.

6. Conclusion

This study examined the perceptions of teaching faculty at KKU regarding their roles in integrating AI across five educational domains. Addressing Research Question 1 on educational content, this study confirmed the faculty's moderate engagement, showing comfort with AI-supported content summarization but limited involvement in adapting materials to AI-related challenges, consistent with Maqaiti's (2021) findings. For Research Question 2 on teaching strategies and methods, the faculty moderately incorporated AI, especially in promoting active learning, although they faced difficulties in managing AI-mediated student interactions, underscoring the need for pedagogical training as noted by Luckin et al. (2016). Regarding Research Question 3 on educational technologies, participants demonstrated an emerging use of AI tools for continuous learning, but less adoption in virtual conferencing and digital presentations, reflecting the barriers highlighted by Zawacki-Richter et al. (2019). In Research Question 4, faculty engagement in learner support was relatively higher, particularly in analyzing student behaviors and providing academic and psychological guidance; however, the faculty were less inclined to encourage student use of AI tools for assignments, which Holmes et al. (2019) identify as a missed opportunity to foster digital literacy. Finally, Research Question 5 revealed the lowest faculty engagement in AI-driven assessment processes, with challenges rooted in technical proficiency, ethical concerns, and institutional limitations, as discussed by Popenici and Kerr (2017). These results collectively emphasize a moderate yet cautious acceptance of AI among faculty members, highlighting critical areas such as assessment and curriculum redesign that require targeted professional development, institutional support, and clear policies to foster effective AI integration. This study acknowledges its limitations, including a small purposive sample of 60 faculty members from a single institution, which restricts the generalizability of the findings. Future research should consider larger, more diverse samples to better understand faculty roles in integrating AI across various educational contexts.

6.1. Recommendation

The study recommends the following:

1. Enhance Course Content Development

The faculty must be supported in incorporating AI tools for lesson planning, content summarization, and addressing AI-related educational challenges.

2. Strengthen Teaching Practices

The adoption of AI-enhanced teaching strategies must be encouraged, including interactive and student-centered approaches.

3. Advance Use of Educational Technologies

The integration of AI tools must be promoted in research, virtual collaboration, and continuous professional development.

4. Improve Student Engagement through AI

Faculty use of AI should be expanded to support students, monitor behavior, and foster lifelong learning.

5. Integrate AI into Assessment

Training must be provided on AI applications for creating assessments, delivering feedback, and performing diagnostic evaluations.

Based on this research findings and the challenges of AI adoption, future research should focus on these key areas to enhance effective integration in academia:

1. Faculty AI Training Programs:

Training must be developed and evaluated to equip faculty members with practical skills in utilizing AI tools, such as integrating AI-driven grading or adaptive learning platforms into their courses.

2. Faculty Perceptions of AI in Research:

The faculty's perception of AI applications, such as data analysis automation and literature review tools, including their ethical concerns and trust in AI-generated results, must be explored.

3. Institutional AI Adoption from Leadership Views:

An investigation must be carried out on how academic leaders incorporate AI to enhance institutional competitiveness, such as through AI-powered student recruitment or administrative efficiency.

4. Student Perspectives on Faculty Use of AI:

A study should be conducted on students' attitudes toward faculty use of AI to promote creativity and engagement, such as AI-assisted project feedback or personalized learning paths, and their concerns regarding fairness and transparency.

5. Policy and Ethical Frameworks:

Policies addressing issues such as data privacy, bias mitigation, and accountability must be examined and developed to guide responsible AI use in higher education.

Declarations

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