



College of education students' perceptions on the impact of artificial intelligence on the practice of teaching in Kuwait University

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Abstract

Objectives: This study aims to explore the perceptions of students at the College of Education, Kuwait University, regarding the impact of Artificial Intelligence (AI) on teaching practices seeking to provide a forward-looking vision of the role of emerging technologies in shaping the future of higher education. **Method:** A descriptive approach was employed in this study. Utilizing a questionnaire adapted from the Students' Perceptions of AI in Education Scale, 422 students from the College of Education participated to express their perceptions of AI's impact on teaching practices. **Results:** The study's findings revealed a moderate level of perceptions regarding the impact of AI on teaching practices among the students. These perceptions focused particularly on practices related to personalized learning, assessment and grading, and Intelligent Tutoring Systems (ITS). Furthermore, inferential statistics showed no statistically significant differences in perceptions based on student characteristics such as gender, age, and academic year. In contrast, significant differences were found related to the level of computer literacy and the intensity of technology use in learning, suggesting that technical awareness is the primary driver in shaping these perceptions. **Conclusion:** The study recommends conducting further research to investigate the impact of AI on teaching practices in other faculties at Kuwait University and regulating the use of AI applications in teaching to ensure the quality of academic outcomes.

Keywords: Artificial Intelligence (AI), perceptions, teaching practices, college of education, Kuwait

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تصورات طلبة كلية التربية حول تأثير الذكاء الاصطناعي على ممارسة التدريس في جامعة الكويت

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ملخص

الأهداف: هدفت الدراسة إلى استكشاف تصورات طلاب كلية التربية بجامعة الكويت حول تأثير الذكاء الاصطناعي على ممارسات التدريس؛ وذلك سعياً إلى تقديم رؤية استشرافية لدور التقنيات الناشئة في تشكيل مستقبل التعليم العالي. **المنهج:** اتبعت الدراسة المنهج الوصفي باستخدام استبانة مُقتبسة من مقياس تصورات الطلاب للذكاء الاصطناعي في التعليم، وشارك في الدراسة 422 طالباً بكلية التربية لعرض تصوراتهم حول تأثير الذكاء الاصطناعي على ممارسات التدريس. **النتائج:** كشفت النتائج عن مستوى متوسط من التصورات حول تأثير الذكاء الاصطناعي على ممارسات التدريس بين الطلاب، مع بروز واضح للممارسات المتعلقة بـ "التعلم الشخصي وأنظمة التدريس الذكية، وآليات التقييم الرقمي، وأظهرت الإحصاءات الاستدلالية عدم وجود فروق ذات دلالة إحصائية تُعزى لمتغيرات (الجنس، العمر، السنة الدراسية)، في حين برزت فروق جوهريّة ذات دلالة إحصائية ترتبط بمستوى الثقافة الحاسوبية وكثافة استخدام التكنولوجيا في التعلم؛ مما يشير إلى أن الوعي التقني هو المحرك الأساسي لتشكيل تلك التصورات. **الخاتمة:** أوصت الدراسة بإجراء المزيد من الدراسات لتعرف أثر الذكاء الاصطناعي على ممارسة التدريس في باقي كليات جامعة الكويت وتقنين استخدام تطبيقاته في الممارسات التدريسية بما يضمن جودة المخرجات الأكاديمية.

الكلمات المفتاحية: الذكاء الاصطناعي، التصورات، ممارسات التدريس، كلية التربية، الكويت.

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Introduction

In 1956, Professor John McCarthy introduced the term "Artificial Intelligence". Based on McCarthy's definition (2006), Artificial Intelligence (AI) involved "expressing knowledge in a computer in logical language and reasoning by logical inference, including non-monotonic inference" and "studying and imitating human neurophysiology". The concept behind AI is that it has the ability to utilize language, create abstract ideas, build concepts, and address issues on behalf of humans (Djokic et al., 2024). AI has quickly become a major force for change that has transformed industries, economies, and societies around the world, and education is no different (Shen et al., 2021). The incorporation of AI technology in education has the ability to transform customary teaching practices by offering personalized instruction, adaptable learning experiences, data-informed decision-making, and timely feedback thereby, enhancing students' academic performance, among other benefits (Cheng et al., 2023; Iqbal et al., 2024).

The standard of learning in higher education pertains to the approaches and teachings offered to students. Therefore, it is important for the education system to uphold effective teaching strategies to help students reach their future ambitions through their academic pursuits (Chen et al., 2020). The integration of AI and smart technologies in the education sector has been driven by rapid technological advancements and the need for innovative classes that support both in-person and remote activities (Dimitriadou & Lanitis, 2023). Modern educational practices can incorporate AI tools in various aspects such as classroom management, instructional tools, and automated assessment technologies, to improve the efficiency of the learning environment (Dimitriadou & Lanitis, 2023).

AI has the potential to impact the educational sector, specifically in the area of "content and teaching", by allowing personalized customization (Chassignol et al., 2018). Acknowledging the diversity of students, it is crucial to have a deeper insight into their individual learning needs in order to tailor educational materials accordingly (Bhutoria, 2022). Unlike the conventional approach, personalized learning is when teaching is tailored to meet the specific needs and skills of each student (Magomadov, 2020). Kokku et al. (2018) created an AI-driven personalized learning platform that enhanced conventional classroom instruction, increased student engagement and ultimately improving learning results. Their system was incorporated into the classroom as an intelligent tutoring system to offer customized feedback to students. Digital game-based learning, Augmented Reality (AR), and Virtual Reality (VR) simulations are also useful tools for educational activities (Holmes & Tuomi, 2022). Furthermore, AI systems provide efficient assistance for online education and instruction, such as customizing learning for students, automating teachers' daily tasks, and enabling adaptive evaluations (Seo et al., 2021). Moreover, AI's primary focus is on creating software to improve instruction. AI plays a crucial role in developing instructional systems by customizing teaching, improving student learning, addressing student emotions, providing data for new educational theories, and teaching cognitive, intrapersonal, dialogue, interpersonal, and inquiry skills needed in the 21st century (Ng et al., 2023; Woolf, 2015).

The future of higher education closely depends on advancements in new technologies and the computing capabilities of emerging intelligent machines (Pedro et al., 2019). Advancements in AI within this area present new opportunities and obstacles for higher education teaching and learning, potentially reshaping the governance and internal structure of higher education institutions

(Chen et al., 2020). Technology in higher education is meant to improve human cognition and enhance the learning experience, rather than being limited to delivering, controlling, and assessing content. As AI solutions become more prevalent, educational institutions must be vigilant to ensure that tech-lords do not monopolize control over the hidden algorithms that govern them (Eager & Brunton, 2023; Shen et al., 2021). There are several exciting prospects in education and AI, such as simulating learning environments and teachers, intelligent tutoring systems, gathering intelligent content, automating simple tasks, and more. Using AI can help address educational obstacles by assisting in the enhancement of knowledge and skills to tailor learning experiences and provide personalized feedback. This includes aiding in repetition, exercises, and monitoring students' progress (Muhie & Woldie, 2020).

University teaching practices are a significant focus for educational researchers as they impact students' interest, participation, comprehension, and academic success (Álvarez-Álvarez & Falcon, et al., 2023). A significant change in university teaching is currently taking place, as traditional teaching practices are being challenged and gradually replaced by active strategies, professional simulations, and interactive approaches with AI technologies, among other practices (Chen et al., 2020; Huang et al., 2021). Kuwait University followed the trend by incorporating AI technology to enhance educational outcomes. The integration of AI is in line with Kuwait's government objective for digital revolution in the country (Al-Slehat et al., 2023). Understanding students' preferences and perspectives on using AI technology for teaching practices is important, as it affects students' emotional engagement and performance, since one of the most common types of adaptive technologies is assessing students' performance (Maghsudi et al., 2021).

When integrating AI into higher education, particularly in teaching, it is crucial to consider the perspectives of students in addition to researchers and policymakers. Promoting inclusivity, addressing possible biases, and involving learners in the design and integration of AI in education are important. Hence, the objective of this study is to clarify the perspectives of students at Kuwait University's College of Education regarding the influence of AI on teaching practices.

Today, many priorities for enhancing teaching and learning need to be further developed to become more effective and comprehensive. Educators are looking for new technology-based approaches, such as AI, to address these priorities that are safe, effective, and widely applicable. The integration of AI technology into the education sector can redefine traditional teaching and learning practices through personalized instruction, adaptive learning experiences, and data-driven decision-making (Iqbal et al., 2024). Teachers are integrating AI tools into their daily routines; for example, voice assistants at home, apps that can correct grammar, complete sentences, and produce essays, as well as automated travel planning on their mobile devices (Cardona et al., 2023). The application of AI in education is transforming multiple aspects of the education system, including teaching methods, assessment techniques, and administrative procedures, in addition to effectively contributing to the development of science education (Almasri, 2024). Tools like ChatGPT could provide opportunities for teachers to leverage AI to build supportive learning environments, despite concerns about plagiarism detection (Eager & Brunton, 2023). Nowadays, various educational institutions are recognizing the importance of integrating modern technology into their daily teaching practices. This is due to the advanced ability of artificial intelligence to think and learn, understand students' emotions, and make complex decisions, as well as visual perception, speech recognition, language

translation, and more (Muhie & Woldie, 2020). The use of AI is mainly focused on creating programs to improve teaching, by developing the educational system to help design education, improve students' learning experience, address their emotions, provide the data needed to create innovative educational theories, and fostering 21st century skills (i.e., cognitive abilities, personal skills, dialogue systems, and inquiry-based learning) (Shen et al., 2021). According to Tomar and Verma (2021), advances in AI present new opportunities and challenges for teaching and learning in higher education. Therefore, it is important to investigate students' perspectives in higher education towards the use of AI in teaching practices. In this regard, various studies have reported students' perceptions on this topic.

Djokic et al. (2024) focused on the implementation of the Student Conceptions of AI in Education Scale (SCAIES) instrument on a sample of Serbian students (Cheng et al., 2023). The results indicated that elements such as intelligent tutoring systems, student grading and assessment, retention and dropout rates, sentiment analysis in education, recommendation systems, classroom monitoring, visual analysis, personalized learning, and student performance prediction significantly and positively shaped the perception of AI use in education from the students' perspective. However, the most significant impact can be linked to the limitations of traditional education, namely, sentiment analysis, personalized learning, and performance prediction. At the same time, it was found that the lower contribution of certain factors may be linked to aspects related to privacy issues surrounding the use of AI and the field of supervision, specifically classroom monitoring and visual assessment, as well as student grading and assessment.

Lee et al. (2024) examined how Korean college students perceived AI-based writing tools, which included machine learning tools

such as "Google Translate" and "Naver Papago", as well as generative AI tools such as "Grammarly". The results indicated that these AI-based writing tools have the potential to enhance English learners' writing skills. In medical education, Busch et al. (2023) examined current medical student attitudes regarding AI in medical training and the profession worldwide, emphasizing students' positive views about integrating AI into healthcare practice while also highlighting the need to include AI education in medical curricula.

College teaching practices influence student interest, engagement, and academic performance. Álvarez-Álvarez and Falcon et al. (2023) presented a study that used AI to examine students' preferences for college teaching practices, finding that students preferred practices that focused on clarity, interaction, and relationships.

Baidoo-Anu et al. (2024) explored the views of Ghanaian higher education students regarding the use of ChatGPT. The research findings revealed that most students understand and acknowledge the potential of ChatGPT to assist their learning. However, many students indicated that they used ChatGPT primarily for purposes outside of academia, citing issues such as violations of academic policies, overreliance on technology, concerns about authenticity in their work, and potential security threats. Furthermore, they primarily used ChatGPT for assignments rather than class or group projects. Additionally, students reported that they had not received any training on how to use ChatGPT in a safe and effective manner.

Overall, previous studies showed a direct impact of AI technologies on the educational process in universities and in various specializations. These studies documented university students' opinions about the role played by AI in the educational process, including teaching practices.

Problem Statement

The significance of implementing AI in the educational field was particularly highlighted because of the COVID-19 crisis, which led to a transition from traditional in-person teaching to online learning (Bouktif & Manzoor, 2021; Djokic et al., 2024; Maqbool, 2021; Mijwil et al., 2022; Pantelimon et al., 2021; Sarnato et al., 2024). Furthermore, numerous research studies have concentrated on utilizing AI technologies for educational purposes, as demonstrated by recent systematic reviews (Almasri, 2024; Iqbal et al., 2024; Ng et al., 2023). Nevertheless, only a small number of studies have looked into how students view the role of AI in educational practices and the classroom environment (Cheng et al., 2023; Djokic et al., 2024; Hooda et al., 2022). Other studies have explored how students view the use of AI technology in different educational areas, like AI applications for writing academic essays (Malik et al., 2023), medicine practice (Busch et al., 2023; Park et al., 2021), and the use of ChatGPT (Baidoo-Anu et al., 2024; Smolansky et al., 2023).

The way students view AI in teaching can influence their willingness to use AI in their learning and their openness to AI being used by university faculty, staff, and administration. Assessing students' beliefs about AI in education is a crucial part of grasping the possible influence of AI on the educational experience. Educators can create support strategies for students using AI in education by grasping students' ideas about AI, leading to ethical use and positive learning outcomes. Nevertheless, the implementation of AI technologies in educational settings needs to strike a balance between leveraging the advantages of AI in enhancing teaching and student outcomes, while also considering teachers' responsibilities and decision-making processes (Petersen & Batchelor, 2019). Therefore, it is important for AI technologies to be integrated into the educational settings to combine algorithm outputs with a human teacher's assessments.

In Kuwait, a committee was established to integrate AI technology into the computer curriculum, acknowledging its alignment with current technological advancements. The notable influence of AI on various educational sectors in Kuwait's schools is well known, emphasizing the value of incorporating it into learning to support the government's commitment to developing technologically skilled youth. This step is part of the global digital transformation in the Kuwaiti education system, emphasizing that AI represents the peak of scientific achievements, technological progress, and industrial development. Due to the lack of adequate research on university students' opinions about AI integration in education in Kuwait, this study seeks to fill this gap by exploring the perspectives of students enrolled in the College of Education at Kuwait University on how AI influences teaching practices.

The specific research goals include:

- 1 - Measuring students' attitudes toward the impact of AI on teaching practices at the College of Education of Kuwait University, where five dimensions of conceptions of AI in teaching practices were considered as follows: (AI1) intelligent tutoring systems, (AI2) students' grading and evaluation, (AI3) classroom monitoring and visual analysis, (AI4) personalized learning, and (AI5) student performance prediction.
- 2 - Exploring the differences between the mean responses of the study sample members regarding the impact of AI on teaching practices, attributed to sample demographic features.

The study is guided by the following research questions:

Q1. What is the level of students' perceptions of the impact of AI on the practice of teaching at the College of Education of Kuwait University?

Q2. Do students' perceptions of the impact of AI on teaching practice vary by participants' demographic characteristics?

Significance of Study

The integration of Artificial Intelligence (AI) into higher education is no longer a choice but a global necessity. Studying how AI technology can be implemented in universities must prioritize students' perceptions, as they are the primary stakeholders affected by shifting teaching paradigms. This study provides a significant scientific contribution by offering quantitative field data that deepens the empirical understanding of students' perceptions within a unique Middle Eastern academic context (Kuwait University), filling a geographical gap in global AI education literature. Hence, this research contributes to the current knowledge on AI utilization in university settings by assessing students' perceptions on teaching practices, feedback, and performance evaluation. Unlike general descriptive studies, this research bridges the gap between theoretical conceptualizations and practical pedagogical applications by exploring how variables such as computer literacy and technology usage patterns shape these perceptions. This offers both theoretical frameworks and practical insights for educational policymakers to comprehend the factors influencing AI incorporation. Furthermore, the research offers insights into how AI affects curriculum design and delivery strategies, enabling educators to effectively implement AI to enhance personalized learning and academic outcomes. Importantly, this study serves as a foundational benchmark for future experimental and longitudinal global research. By exploring how AI equips pre-service teachers at the College of Education, the findings provide a strategic roadmap for teacher training programs to adapt to rapid technological advancements, ensuring that the next generation of educators is not merely users of technology, but innovators within AI-enhanced learning environments.

Study Purpose

This research quantitatively investigates the perceptions of students in (College of Education at Kuwait University) on the impact of artificial intelligence on teaching practices.

Methodology

Design

This research relied on the descriptive approach, as it focuses on studying reality and aims to depict it accurately, allowing for quantitative expression through the analysis and interpretation of results.

Sample

The population of the study included students from the College of Education at Kuwait University CEKU. The study sample was selected using the simple random sampling method, and it consisted of 422 individuals, equivalent to 4.8 % of the total study population (N= 8777) in CEKU (Kuwait-University, 2024). Table 1 shows the characteristics of the sample according to the study variables (age, gender, current academic year, computer literacy level, and use of computer technology in learning).

Table 1

Characteristics of the Study Sample (N = 422)

Variable	Category	Frequency	Percentage
Age (in years)	18 – 20	167	39.6
	21 – 23	158	37.4
	More than 23	97	23.0
Gender	Male	124	29.4
	Female	298	70.6

Cont. Table 1*Characteristics of the Study Sample (N = 422)*

Variable	Category	Frequency	Percentage
Current academic year	First	71	16.8
	Second	86	20.4
	Third	133	31.5
	Fourth	120	28.4
	Graduate	12	2.8
Computer literacy level	Competent	94	22.3
	Literate	214	50.7
	Proficient	114	27.0
Use of computer technology in learning	Never	27	6.4
	Sometimes	242	57.3
	Always	153	36.3
Total		422	100.0

Data Collection

The study adapted the survey instrument from Cheng et al. (2023), where only five dimensions of their scale "Students' Conceptions of AI in Education Scale (SCAIES)" will be considered as these five dimensions are directly related to teaching practices, which are as follows: (AI1) intelligent tutoring systems, (AI2) students' grading and evaluation, (AI3) classroom monitoring and visual analysis, (AI4) personalized learning, and (AI5) student performance prediction. Each dimension consists of three statements. The SCAIES employed a five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5) with a Neither Agree nor Disagree (3) option. The criteria for classifying the mean levels are as follows: from 1 to 1.80: very low, from 1.81 to 2.60: low, from 2.61 to 3.40: medium,

from 3.41 to 4.20: high, and from 4.21 to 5.00: very high. The demographic section of the survey includes multiple-choice questions regarding the participant's gender, age, academic year, level of experience with AI in education, and overall attitude toward the use of AI in education.

Data Analysis

The data were statistically processed using the IBM SPSS statistics software as follows:

- 1 - Descriptive Statistics: means and standard deviations.
- 2 - Inferential Statistics: MANOVA.

Validity and Reliability of the Study Tool

Face Validity

The questionnaire was presented to a group of university professors at the College of Education. Based on the comments provided by the reviewers, some items were excluded, and the wording of others was modified.

Construct Validity

The researcher applied the tool to a survey sample of 40 students from the CEKU, where the correlation coefficients were calculated between each statement and the total score of the dimension to which it belongs. The results of the correlation coefficients indicated a strong positive correlation between the scores of each statement and the dimension to which it belongs, at the 0.01 of significance level, as shown in Table 2. It can be seen that all questionnaire dimensions have a statistically significant positive correlation with the overall score. The statistical significance of the Pearson correlation coefficient ranged from 0.782 to 0.896. This also applies to the di-

mensions, which means that all dimensions contribute to measuring the impact of AI in teaching.

Table 2

Correlation Coefficients of Dimensions with the Total Score of the Questionnaire (N = 40)

	Dimension	Total Score	AI1	AI2	AI3	AI4
AI1	Intelligent tutoring system	.836**				
AI2	Students' grading and evaluation	.889**	.727**			
AI3	Classroom monitoring and visual analysis	.896**	.630**	.776**		
AI4	Personalized learning	.886**	.640**	.754**	.813**	
AI5	Student performance prediction	.782**	.553**	.556**	.639**	.609**

Note: ** Correlation is significant at 0.01 level

Reliability

In order to verify the reliability of the tool, the reliability coefficient was extracted using the Cronbach's alpha method for the entire questionnaire. The overall reliability coefficient was 0.954, which indicates a high internal consistency of the questionnaire.

Results

Findings related to students' perceptions of the impact of AI on teaching practice.

Table 3
Means, Standard Deviations, and Rating Scales for the Items and Dimensions of the Impact of AI on Teaching Practice (N = 422)

	Dimension	Statement	M	SD	Rating
AI1	Intelligent tutoring system	AI1_1: Provide timely feedback on my learning.	3.23	1.30	medium
		AI1_2: Assign learning tasks based on my learning status.	3.06	1.22	medium
		AI1_3: Provide real-time diagnosis of my learning status.	2.96	1.25	medium
	Total		3.08	1.13	medium
AI2	Students' grading and evaluation	AI2_1: Make the evaluation more accurate.	3.33	1.34	medium
		AI2_2: Provide more useful feedback than a human evaluator.	3.25	1.31	medium
		AI2_3: Make fewer mistakes than a human evaluator.	3.07	1.27	medium
	Total		3.22	1.08	medium
AI3	Classroom monitoring and visual analysis	AI3_1: Record student attendance better than a human teacher.	3.19	1.48	medium
		AI3_2: Provide a useful assessment of a student's engagement in a learning situation.	3.12	1.28	medium
		AI3_3: Assess student engagement better than a human teacher in a learning situation.	2.90	1.34	medium
	Total		3.07	1.18	medium

Cont. Table 3

Means, Standard Deviations, and Rating Scales for the Items and Dimensions of the Impact of AI on Teaching Practice (N = 422)

	Dimension	Statement	M	SD	Rating
AI4	Personalized learning	AI4_1: Give me timely, personalized feedback on my learning performance.	3.26	1.25	medium
		AI4_2: Using my past learning performance to help me learn in the future.	3.25	1.30	medium
		AI4_3: Improve the amount of time I spend paying attention to the learning situation.	3.19	1.30	medium
	Total		3.23	1.13	medium
AI5	Student performance prediction	AI5_1: Reliably predict future learning outcomes.	3.11	1.28	medium
		AI5_2: Accurately predict my future educational performance.	3.02	1.31	medium
		AI5_3: Judge my future educational performance better than a human teacher.	2.96	1.33	medium
	Total		3.03	1.13	medium
Total scale			3.13	0.95	medium

Table 3 shows the students' perceptions of the impact of AI on teaching practice. The results indicate that the study sample's responses to the dimensions of the impact of AI on teaching practice were generally moderate; the overall mean was 3.13 with a standard deviation of 0.95. In descending order and in light of the mean values,

we note the following ranking of the five dimensions of the scale:

- The fourth dimension (Personalized learning) ranked first with a mean of 3.23 and a moderate rating. The means for all statements of this dimension ranged from 3.19–3.26, with a moderate rating. The highest ranks were for statement AI4_1, indicating a great agreement among the sample members that the most prominent impact of AI on personalized learning is providing them with timely personal feedback about their educational performance, while the lowest mean was for statement AI4-3, indicating that the study sample agrees, to a lesser extent, with the rest of the statements of the dimension, stating "Improving the amount of time they spend paying attention to the learning situation", with a mean of 3.19.
- The second dimension (Student grading and evaluation) ranked second with a mean of 3.22 and a moderate rating, slightly different from the previous dimension, with a moderate rating. The means for all statements of this dimension ranged from 3.07 to 3.33, with a medium rating. The highest rank between statements was for AI2_1, indicating a high level of agreement among the sample members that the most prominent areas of impact of AI on student evaluation and assessment are making the assessment more accurate, while the lowest mean was for statement AI2_3, showing that the study sample agrees, to a lesser extent than the rest of the statements of the dimension, on the statement "Making fewer mistakes than the human evaluator", with a mean of 3.07.
- The first dimension (Intelligent tutoring system) ranked third with a mean of 3.08 and a moderate rating. The means for all statements of this dimension ranged from 2.96 to 3.23, with a moderate rating. The highest rank was for statement AI1_1, in-

dicating a high level of agreement among the sample members that the most prominent areas of impact of AI on the Intelligent Tutoring System are providing timely feedback about student's education, while the lowest mean was for statement AI1_3, showing that the study sample agrees, to a lesser extent than the rest of the dimension statements, on the statement "Providing a real-time diagnosis of student educational status", with a mean of 2.96.

- The third dimension (Classroom monitoring and visual analysis) ranked fourth with a mean of 3.07 and a moderate rating. The means for all statements of this dimension ranged between 2.90 and 3.11. The means of all statements fell within a moderate ratings and showed that the highest rank was for statement AI3_1. This indicates a high level of agreement among the sample members that the most prominent area of impact of AI on classroom monitoring and visual analysis is "Recording student attendance better than the human teacher", while the lowest mean was for statement AI3_3, indicating that the study sample agreed, to a lesser extent than the rest of the statements of the dimension, on the statement "Assess student engagement better than the human teacher in the learning situation", with a mean of 2.90.
- The fifth dimension (Student performance prediction) ranked fifth and last with a mean of 3.03 and a moderate rating. The means for all statements in this dimension ranged from 2.96 to 3.19, also indicating a moderate level. The highest rank was for statement AI5_1. This indicates a high level of agreement among the sample members that the most prominent impact of AI on predicting student performance is reliably predicting future learning outcomes, while the lowest mean was for state-

ment AI5_3, indicating that the study sample agreed to a lesser extent than the rest of the statements of the dimension, on the statement "Judging student's future educational performance better than a human teacher", with a mean of 2.96.

Findings related to study sample's estimates of the impact AI on teaching practice according to demographic variables

Table 4

Levene's Test Results for the Homogeneity of Variances

Dimension	Levene Statistic	df1	df2	Sig.
AI1	0.806	2	419	0.447
AI2	0.825	2	419	0.439
AI3	1.063	2	419	0.346
AI4	0.873	2	419	0.418
AI5	0.465	2	419	0.628
Total	0.367	2	419	0.693

Table 5

MANOVA Statistics to Detect Differences between the Means in the Sample Responses according to the Demographic Variables (N = 422)

Variable	Dimension	SS	df	MS	F	Sig.
Age	AI1	2.77	2	1.38	1.14	0.322
	AI2	4.99	2	2.49	2.33	0.099
	AI3	4.82	2	2.41	1.83	0.162
	AI4	2.12	2	1.06	0.87	0.422
	AI5	4.76	2	2.38	2.03	0.133
	Total	3.66	2	1.83	2.22	0.110

Cont. Table 5

MANOVA Statistics to Detect Differences between the Means in the Sample Responses according to the Demographic Variables (N = 422)

Variable	Dimension	SS	df	MS	F	Sig.
Gender	AI1	0.49	1	0.49	0.40	0.527
	AI2	1.69	1	1.69	1.58	0.210
	AI3	0.35	1	0.35	0.26	0.608
	AI4	1.42	1	1.42	1.16	0.282
	AI5	1.79	1	1.79	1.52	0.219
	Total	1.05	1	1.05	1.27	0.261
Current academic year	AI1	6.85	4	1.71	1.41	0.231
	AI2	9.71	4	2.43	2.26	0.062
	AI3	10.06	4	2.51	1.91	0.108
	AI4	2.34	4	0.59	0.48	0.752
	AI5	19.18	4	4.79	4.08	0.003
	Total	7.20	4	1.80	2.18	0.070
Computer literacy level	AI1	7.12	2	3.56	2.92	0.055
	AI2	12.61	2	6.30	5.88	0.003*
	AI3	12.58	2	6.29	4.78	0.009*
	AI4	9.31	2	4.65	3.80	0.023*
	AI5	16.57	2	8.28	7.05	0.001*
	Total	11.33	2	5.67	6.87	0.001*
Use of computer technology in learning	AI1	11.44	2	5.72	4.70	0.010*
	AI2	7.82	2	3.91	3.65	0.027*
	AI3	5.13	2	2.57	1.95	0.144
	AI4	8.18	2	4.09	3.34	0.036*
	AI5	2.75	2	1.37	1.17	0.312
	Total	6.38	2	3.19	3.86	0.022*

Cont. Table 5

MANOVA Statistics to Detect Differences between the Means in the Sample Responses according to the Demographic Variables (N = 422)

Variable	Dimension	SS	df	MS	F	Sig.
Total scale	AI1	4551.78	422			
	AI2	4857.89	422			
	AI3	4563.44	422			
	AI4	4939.33	422			
	AI5	4411.22	422			
	Total	4504.00	422			

Note: Significance at 0.05 level

As a first step of the analysis, the assumption of homogeneity of variance was tested using levene's test (table4). Then, Multivariate Analysis of Variance (MANOVA) was used to detect differences between the means of the sample responses according to the demographic variables, as shown in Table 5. The results in Table 4 indicate that the significance for the five dimensions and the total score is greater than 0.05, which means that the variances are not significantly different from each other (i.e., the homogeneity assumption of the variance is satisfied). In addition, the results in Table 5 indicate that there are no statistically significant differences in the study dimensions depending on the variables of age, gender, and academic year. Regarding the variable of "Computer literacy level", there were statistically significant differences at the 0.05 level in the dimensions and the total score, except for the first dimension (Intelligent tutoring system). To identify the variable categories whose means are statistically different, the Least Significant Difference (LSD) post-hoc test was applied, as shown in Table 6.

Table 6

Dimension Differences Using LSD according to the Variable of Computer Literacy Level

Dimension	Category	M	Category	M	D	Sig.
AI2	Competent	3.28	Literate	3.02	.26	0.040*
	Proficient	3.54	Literate	3.02	.53	0.000*
AI3	Proficient	3.39	Literate	2.88	.52	0.000*
AI4	Proficient	3.53	Competent	3.21	.31	0.043*
	Proficient	3.53	Literate	3.08	.45	0.001*
AI5	Proficient	3.39	Competent	3.05	.34	0.024*
	Proficient	3.39	Literate	2.83	.56	0.000*
Total	Proficient	3.44	Competent	3.15	.29	0.023*
	Proficient	3.44	Literate	2.95	.50	0.000*

Note: Significance at 0.05 level

The significance of the differences for the dimensions AI2, AI3, AI4, and AI5 and the total score were in favor of the "Proficient" level versus "Literate" level, as well as in favor of "Competent" versus "Literate" in the second dimension (Students' grading and evaluation). This indicates that those with higher computer proficiency were more likely to support the impact of AI on teaching practices.

Table 7

Dimension Differences Using LSD according to the Variable of Using Computer Technology in Learning

Dimension	Category	M	Answer	M	D	Sig.
AI1	Always	3.35	Never	2.65	.69	0.003*
	Always	3.35	Sometimes	2.96	.38	0.001*

Cont. Table 7

Dimension Differences Using LSD according to the Variable of Using Computer Technology in Learning

Dimension	Category	<i>M</i>	Answer	<i>M</i>	<i>D</i>	<i>Sig.</i>
AI2	Always	3.47	Never	2.88	.59	0.006*
	Always	3.47	Sometimes	3.10	.38	0.000*
AI4	Always	3.49	Never	3.02	.46	0.046*
	Always	3.49	Sometimes	3.09	.39	0.001*
Total	Always	3.37	Never	2.88	.49	0.011*
	Always	3.37	Sometimes	3.00	.36	0.000*

Note: Significance at 0.05 level

Regarding the variable of "Using computer technology in learning", there were statistically significant differences at the 0.05 level in the dimensions of AI1, AI2, and AI4. The total score was in favor of those who answered "always" versus "sometimes and never", as shown in Table 7. This indicates that students who regularly use computer technology in learning were more likely to support the impact of AI on teaching practices.

Discussion

Assessing students' perceptions of AI in education are a crucial step in understanding its potential impact on teaching practices. As AI becomes increasingly used in higher education classrooms, it is essential to understand how students perceive and interact with AI. This knowledge will guide the integration of AI solutions into higher education settings. By understanding students' views of AI in education, educators can develop strategies to help students use AI responsibly and ethically, while achieving beneficial learning outcomes (Almasri, 2024; Álvarez-Álvarez & Falcon et al., 2023; Cheng et al., 2023). In

this context, the present study aimed to explore the perceptions of CE-KU's students about the impact of AI on teaching practices in Kuwait University. Five dimensions of conceptions of AI teaching practice were considered, namely, intelligent tutoring system, student grading and evaluation, classroom monitoring and visual analysis, personalized learning, and student performance prediction. In addition, the statistically significant differences between the means of responses of the study sample regarding AI impact on teaching practices, attributed to participants' demographic characteristics, were investigated.

The study sample is characterized by a percentage of 39.6% in age range of 18–20 years, and male-to-female distribution (29.4% to 70.6%), which reflects the characteristics of students population of young ages and predominance of females at the CEKU. About half (50.7 %) of the students had basic computer literacy skills. However, only 36.3 % of them always use computer technology in their learning, a rate that is not expected nowadays. 31.5 % of respondents were in their third academic year, while only 2.8 % of them were in the graduate year.

In general, study findings revealed that the students perceived the impact of AI on teaching practices at a moderate level. By focusing on the three most important factors (dimensions) in students' perceptions of AI impact on the teaching practices at university, it can be noted that the most important dimension participating in AI impact on the teaching process is "Personalized learning" dimension, in which the students appreciate the fact that AI give them timely, personalized feedback on their learning performance. In addition, they agreed that AI is useful for future learning based on their past learning performance, thus saving time in paying attention to learning situation process. Student learning performance factors that should be evaluated include not only grades and results, but also the challenges

students face in their learning. AI technology plays a vital role in creating and managing flipped learning models that promote adaptive and personalized learning. Song et al. (2021) demonstrated that key components of flipped learning include data-driven decision-making, adaptable content, and reflection. Data derived from learning analytics in flipped learning models can provide insights into the amount of time students devote to mastering concepts to improve their performance on assignments (Sein-Echaluze et al., 2021). Therefore, AI technologies can be implemented to provide rapid, tailored feedback to enhance students' learning outcomes (Kokku et al., 2018). One potential way to achieve systematic change in teaching practices is to use feedback-based interventions using AI (Falcon et al., 2023). This enables students to provide feedback on their preferred teaching methods, which can be immediately assessed by artificial intelligence, allowing teachers to adapt to their students' preferences (Álvarez-Álvarez & Falcon et al., 2023).

On the other hand, the two dimensions that contribute the least to students' perceptions of the impact of AI on teaching practices are related to grading and evaluating student performance and intelligent tutoring system. Student assessment and grading involve the use of AI to support teachers in assigning grades and assessing student learning and performance (Cheng et al., 2023). Intelligent tutoring systems represent an early use of AI in educational settings that aim to provide personalized learning experiences for students and instructional support (e.g., hints) at appropriate times and places (Djokic et al., 2024). In the area of student assessment and grading, students agree that AI primarily makes assessments more accurate, providing more useful feedback than human assessors, with fewer mistakes. AI-powered assessment systems can reduce the time and cost associated with grading a larger numbers of assignments (Nassoura, 2022).

Graded assignments provide valuable information for machine learning algorithms to understand the assessment methods used by human assessors. Therefore, AI systems combined with machine learning algorithms can accurately assess assignments according to criteria set by human instructors (Cheng et al., 2023). However, when there are significant differences among assessors for the same assignment in the training data, machine learning models may produce biased grades (Alur et al., 2013). Therefore, human assessors may be more fair than an AI-powered assessment system in cases of assessment inconsistencies in training data (Cheng et al., 2023).

Regarding the area of intelligent tutoring system in teaching practices, students emphasized the key role of AI in providing immediate feedback on their learning, as well as its ability to assign learning tasks based on their learning status and provide immediate diagnosis. Intelligent tutoring systems are typically designed using knowledge-based approaches. They implement learning activities by posing questions and distributing learning tasks. A learning task typically includes a problem description, questions, answers, and a summary of accurate answers. Intelligent tutoring systems can use AI algorithms to generate learning tasks and deliver them to students according to their learning level (Graesser et al., 2018). However, intelligent tutoring systems may sometimes fail to deliver valuable learning activities, unlike human teachers, who tend to be more interactive and effective (Cheng et al., 2023).

To enhance the interpretive depth of the statistical findings, the effect size was calculated using Partial Eta Squared (η^2) for the variables that showed significant differences in the MANOVA (Table 5). For the "Computer Literacy Level," the effect size for the total scale was ($\eta^2=0.032$), and for the "use of computer technology in learning," it was ($\eta^2=0.018$). According to Cohen's (1988) criteria, These

values indicate small effect sizes. This suggests that while technological proficiency and usage intensity significantly influence students' perceptions, they explain a relatively small proportion of the variance in these perceptions, reinforcing the practical importance of technical empowerment in the pedagogical integration of AI.

The inclusion of effect size measures provides a more robust explanation of the findings beyond *p*-values alone. The observed effect sizes for computer-related variables underscore that students' readiness to engage with AI-driven teaching practices is substantially rooted in their prior technological competence. This provides empirical weight to the argument that pedagogical shifts toward AI must be preceded by comprehensive digital literacy initiatives, as the "practical impact" of these variables on student perception is statistically and educationally evident.

The results did not show any statistically significant differences between gender, age, and academic year groups, indicating that all these groups are aware of the impact of AI on teaching practices, while there are statistically significant differences between "computer literacy level" and "use of computer technology in learning". This indicates the importance of encouraging students and urging them to become more proficient in computer skills in general and in education in particular. In this context, Chou et al. (2022) found that the student-computer interaction experience has a significant impact on the effectiveness of learning through AI-based technology applications.

Overall, the findings are consistent with other studies regarding the significant impact of AI technology on teaching practices at universities (Álvarez-Álvarez & Falcon et al., 2023). The results also highlight the need to expand and improve AI education so that students and teachers can confidently and responsibly use it in class-

rooms. This is in line with the framework adopted by UNESCO (Pedro et al., 2019), which includes learning with AI (using its tools in the classroom), awareness of its use, and preparation for it, which increases student performance and improves their academic outcomes.

Conclusion

This study explored the perceptions of CEKU students regarding the impact of AI on teaching practices at Kuwait University. Five dimensions of conceptions of AI teaching practice were taken into account, namely, intelligent tutoring system, students' grading and evaluation, classroom monitoring and visual analysis, personalized learning, and student performance prediction. The findings revealed that the students exhibited a moderate level in the impact of AI on teaching practice, with a focus on the significant role of AI in teaching practices that are related to personalized learning, grading and evaluation, and intelligent tutoring system. In addition, there were no statistically significant differences between student categories of gender, age, and academic year, while there were statistically significant differences related to computer literacy level and computer technology use in learning among students, indicating that students, with computer proficiency and who regularly use computer technology in learning, are more likely to support the impact of AI on teaching practices. The results of this study provide guidance for designing future interventions aimed at changing university teaching practices. Such changes may enhance CEKU students' interest, engagement, and performance. There are some limitations to this research. First, the sample was limited to students enrolled at CEKU. The perceptions of students from different colleges may differ from the conclusions drawn from the current study. Second, the quantitative approach may limit the understanding of students' perceptions of AI. Future re-

search should include a broader range of colleges and students from different regions of the country. The study recommends the urgent development of professional development programs for educators. These programs should focus on pedagogical AI readiness, ensuring that teachers are not only users of AI, but also capable of guiding students toward ethical and effective AI interactions. Additionally, teacher preparation curricula should be updated to include AI-based instructional design to bridge the gap between technical literacy and classroom application.

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