IgMin RESEARCH
A BioMed & Engineering Journal
Focusing on Biology, Medicine and Engineering disciplines

ENGINEERING ISSN 2995-8067
Educational Technology | Artificial Intelligence

Article Information

Submitted: January 29, 2024
Approved: February 14, 2024
Published: February 15, 2024

How to cite this article: Al-Zahrani AM. From Traditionalism to Algorithms: Embracing Artificial Intelligence for Effective University Teaching and Learning. IgMin Res. Feb 15, 2024; 2(2): 102-112. IgMin ID: igmin151; DOI: 10.61927/igmin151; Available at: www.igminresearch.com/articles/pdf/igmin151.pdf

ORCID: https://orcid.org/0009-0007-9885-0730

Keywords: AI integration; University teachers; Students' learning; Higher education; Quantitative research methods

Research Article

From Traditionalism to Algorithms: Embracing Artificial Intelligence for Effective University Teaching and Learning

Abdulrahman M Al-Zahrani*

University of Jeddah, Jeddah, Saudi Arabia

***Correspondence:** Abdulrahman M Al-Zahrani, University of Jeddah, Jeddah, Saudi Arabia, Email: ammzahrani@uj.edu.sa

Abstract

The current study examines the impact of integrating artificial intelligence (AI) in higher education in Saudi Arabia, specifically focusing on the roles of university teachers and students' learning outcomes. It investigates the transformation of teaching practices, and the challenges faced by university teachers during AI integration, and identifies opportunities for collaboration and innovation. A quantitative research method using a survey questionnaire was employed to gather data and inform practical recommendations. The findings indicate that university teachers recognize the potential benefits of AI in education, but also highlight the need to address challenges for effective implementation. Participants perceive AI as a tool that enables more creative and engaging teaching methods, automates tasks, and brings about changes in teaching approaches. Difficulties in utilizing AI effectively and adapting to new teaching methods were identified. AI also offers opportunities for innovation, collaboration, and creating engaging learning environments. There were slight variations in perspectives based on gender and current role, with female university teachers and teaching assistants/professors perceiving higher impact and opportunities for collaboration and innovation. Participants with higher AI expertise perceived a greater impact of AI and fewer challenges. Those who aligned with the educational purposes of AI saw greater impact and opportunities for collaboration while acknowledging usage difficulties.

Introduction

The emergence of Artificial Intelligence (AI) has ushered in a transformative phase in higher education, necessitating an examination of its profound impact on the roles of university teachers and students [1-5]. As the educational landscape evolves from traditional paradigms to algorithmic frameworks, it becomes imperative to explore the implications of AI integration in university teaching, including the redefined roles of university teachers, the enhanced learning experiences of students, the challenges faced by educators in adopting AI, and the prospective opportunities for collaboration and innovation [2-5].

The utilization of AI technologies is revolutionizing the conventional role of university teachers by augmenting their capabilities and expanding their pedagogical scope [5,6]. By leveraging AI-powered tools and algorithms, educators can automate administrative tasks, streamline grading processes, and gain valuable insights into student performance [5,7-9]. This enables university teachers to redirect their attention from routine administrative duties towards personalized instruction, mentorship, and the provision of tailored support to students [5,8,10].

AI possesses immense potential to transform the learning experience for students [1,6,7,11,12]. Through adaptive learning platforms and intelligent tutoring systems, AI can generate personalized learning pathways that cater to individual students' needs, abilities, and learning styles [8,9,13,14]. AI-driven educational content and simulations can engender immersive and captivating learning environments, fostering critical thinking, problem-solving skills, and creativity. Moreover, AI-powered analytics enable university teachers to identify areas where students may encounter difficulties, thereby facilitating targeted interventions and personalized feedback [2,8,15,16].

However, the integration of AI in the classroom presents challenges that educators must address to ensure effective and engaging learning experiences for students [8,17-19]. These challenges encompass finding effective and engaging ways to utilize AI in educational contexts, mitigating potential negative impacts on student learning, and acquiring new skills and adapting to novel

teaching methodologies [20-25]. Overcoming these challenges necessitates thoughtful deliberation, professional development initiatives, and a proactive approach to maximizing the benefits of AI in education.

Looking ahead, the future promises exciting opportunities for collaborative endeavors and innovation as university teachers embrace AI [26-30]. AI can facilitate global collaboration among educators, enabling the exchange of resources, experiences, and best practices across geographical boundaries [26-30]. By harnessing AI-powered platforms and virtual reality, university teachers can create immersive collaborative learning experiences. Additionally, the fusion of AI and augmented reality can give rise to intelligent learning environments that dynamically adapt to student's needs and provide real-time feedback [26-30].

As we explore the impact of AI on university teachers' roles, students' learning, the challenges they face, and the futuristic opportunities that lie ahead, this study aims to provide insights and recommendations for university teachers to adapt and thrive in the age of AI. By embracing AI technologies, university teachers can reimagine their roles, create more personalized learning experiences, and prepare students for a future where AI is intertwined with various aspects of life. The journey 'from traditionalism to algorithms' represents an exciting transformation that empowers university teachers to collaborate, innovate, and shape the future of education in partnership with AI.

Literature review

The integration of AI technologies into higher education has transformed traditional teaching methods, leading to a shift from traditionalism to algorithms. This literature review examines the current state of research on embracing AI for effective university teaching, focusing on the impact of AI on university teachers' roles, students' learning experiences, the challenges faced by university teachers, and the futuristic opportunities for collaboration and innovation.

Impact of AI on university teachers' roles

The advent of AI technologies has profoundly transformed the roles of university teachers, enabling them to adopt more student-centered and personalized approaches [2,5]. AI offers opportunities for university teachers to alleviate administrative burdens and devote additional time to creative and engaging teaching methods. By leveraging AI-driven technologies such as automated grading systems and data analytics tools, university teachers can streamline time-consuming tasks, allowing them to prioritize instructional design, individualized instruction, and personalized feedback [8,10]. Through the utilization of AI-powered platforms, university teachers can analyze student data, identify learning gaps, and tailor instruction to meet individual needs, ultimately enhancing student engagement and achievement [8,10].

One prominent aspect of AI's impact on the teaching profession is the automation of various teacher tasks [3,6]. Research indicates that AI has the potential to automate tasks such as grading papers, creating lesson plans, and generating quizzes, thereby reducing university teachers' workload, and increasing efficiency [7,8,10]. By leveraging natural language processing and machine learning algorithms, AI systems can provide instantaneous feedback, identify common errors, and track student progress, enabling university teachers to allocate their time to more meaningful interactions with students [7,8,10].

The integration of AI in the classroom necessitates university teachers to adapt their teaching approaches and develop new skills. Scholars emphasize the significance of teacher professional development programs to enable educators to effectively utilize AI tools and technologies [3,16]. As AI-driven systems offer personalized and adaptive learning experiences, university teachers need to acquire the knowledge and skills to integrate these tools into their pedagogical practices, facilitate student interactions with AI, and effectively balance human and AI-driven instruction [10,15]. Professional development programs should place emphasis on AI literacy, critical thinking, and ethical considerations related to the use of AI in education.

The emergence of AI in education has led to the emergence of new roles for university teachers. Several studies propose that university teachers can assume the role of learning coaches, guiding students in navigating AI-driven learning environments, and fostering metacognitive skills [9,16]. Additionally, university teachers can adopt the role of learning experience designers, curating educational content and designing AI-enabled learning experiences that promote higher-order thinking skills and creativity [10,16]. The evolving teacher role necessitates the development of competencies related to AI integration, instructional design, and student mentoring [10,16].

The integration of AI in education provides university teachers with access to new tools and resources that enhance their instructional practices. AI-powered platforms equip university teachers with data analytics, adaptive learning technologies, and intelligent tutoring systems, facilitating personalized instruction and informed decision-making [2,7,8,15]. These tools enable university teachers to monitor student progress, identify areas for improvement, and tailor instruction accordingly. Furthermore, AI-driven virtual reality and augmented reality applications can create immersive learning experiences, expanding university teachers' instructional possibilities [2,15].

Impact of AI on students' learning experiences

The integration of AI into university teaching has significantly revolutionized the landscape of student learning experiences. This transformation encompasses a spectrum of dimensions within the learning process. One of the most promising applications of AI in education lies in its ability to offer tailored recommendations for resources and activities, customized to individual student requirements [11,12]. By harnessing diverse student data, including past performance, interests, and learning preferences, AI-powered platforms can pinpoint specific areas for improvement. For instance, a struggling student might receive recommendations for supplementary materials targeting their weak spots, while another student may be directed towards interactive activities that align with their learning style.

AI plays a pivotal role in monitoring students' progress and identifying areas necessitating additional support [6,7]. Through automated grading and feedback mechanisms, AI not only streamlines assessment processes but also offers real-time insights into students' comprehension levels. For instance, an AI-driven tutor can swiftly identify conceptual hurdles and provide tailored guidance or suggest additional resources to bolster understanding [7].

The potential of AI to personalize learning experiences is equally profound, fostering deeper comprehension, self-paced learning, and the realization of individual potential [3]. This personalized approach entails adapting learning experiences to suit each student's distinct needs, preferences, and learning modalities [2,8,15,16]. For instance, AI-driven platforms can empower students to choose topics of interest, set their learning pace, and engage in activities tailored to their preferences, thereby fostering a sense of ownership over the learning journey [11,12].

Furthermore, AI holds immense potential to enhance student engagement, making learning more interactive and captivating [4,31]. By leveraging gamification, simulations, and other interactive elements, AI-powered platforms can create immersive learning environments that resonate with students. For instance, virtual worlds crafted by AI can facilitate the active exploration of concepts and foster peer interaction, thereby cultivating a vibrant learning community [13,14].

Challenges facing university teachers with AI

While the advantages of integrating AI into university teaching are significant, several challenges require attention. One major challenge for university teachers lies in effectively and engagingly utilizing AI in their instructional practices [17-19]. While AI can be a powerful tool for learning, it can also overwhelm and confuse students. University teachers must find ways to leverage AI that are tailored to their students' needs while simultaneously fostering a sense of enjoyment and interest in the learning process [17-19].

Although AI has the potential to enhance student learning, it also carries the risk of negative consequences. One major concern is that students may become less engaged in learning if they become overly dependent on AI. Excessive reliance on AI might lead to a decline in students' intrinsic motivation to learn independently [18,24,25]. Another concern pertains to the potential impact of AI on students' creativity and critical thinking skills. While AI can generate creative content such as poems, stories, and essays, an overreliance on AI in generating such content may stifle students' originality and capacity for critical thinking [20-23]. Thus, university teachers must be cognizant of these potential negative effects on student learning. They can mitigate these risks by employing AI in a balanced manner that preserves and complements human interaction.

Another challenge faced by university teachers is the need to acquire new skills and adapt to evolving teaching methods. The dynamic nature of AI demands that teachers stay abreast of the latest developments, often exceeding the pace of traditional professional development offerings [18,24]. This necessitates acquiring new skills such as coding and data analysis. Integrating AI effectively requires understanding how it works, which often involves basic coding skills and the ability to analyze data [18,24]. This can be a steep learning curve for some university teachers, especially those less familiar with technology.

Likewise, university teachers need to be open to experimenting with novel teaching approaches [18,24]. Most importantly, embedding AI into existing curricula requires careful consideration and potential redesign. University teachers need to develop new skills in selecting and integrating AI tools, creating AI-powered learning activities, and assessing student learning in AI-driven environments [24]. Ultimately, university teachers who demonstrate adaptability in the face of change will be better equipped to harness the potential of AI, thereby improving student learning, and cultivating a more engaging and personalized learning environment [18,24].

Futuristic opportunities for collaboration and innovation with AI

The future of university teaching embraces a dynamic partnership between educators and AI technologies, fostering synergistic endeavors to redefine learning experiences. AI's capabilities extend far beyond conventional boundaries, offering the potential to revolutionize education through personalized learning pathways designed to meet the diverse needs, preferences, and learning modalities of individual students [28-30].

AI stands poised to reshape the landscape of interactive learning by empowering students to immerse themselves in hands-on activities that deepen their understanding and enjoyment of academic concepts [28-30]. From AI-driven virtual simulations that transport learners into immersive environments to gamified experiences that transform abstract theories into tangible experiences, the possibilities are limitless.

Additionally, AI holds promise in fostering collaborative networks among university educators, facilitating the exchange of insights, resources, and best practices. By leveraging AI-powered platforms, teachers can cultivate vibrant online communities where innovative ideas flourish, and educational materials are freely shared [26,27]. These virtual spaces serve as hubs of collaboration, enabling instructors to co-create lesson plans, refine teaching strategies, and provide mutual support in pursuit of pedagogical excellence.

As the educational landscape continues to evolve, embracing AI-driven collaboration not only streamlines administrative tasks but also cultivates a culture of continuous improvement among educators. By harnessing the collective wisdom of AI and human expertise, universities can unlock new frontiers of innovation, enhancing learning outcomes and enriching the academic journey for generations to come.

Research problem and gap

The increasing presence of AI in various educational settings has undoubtedly sparked considerable interest. However, within

the specific context of higher education, there persists a noticeable knowledge gap regarding effective AI integration in university teaching practices. While existing research explores broader applications of AI in education or delves into specific technological tools, limited studies directly address the unique challenges and opportunities faced by university teachers seeking to adopt AI-driven approaches. This dearth of research necessitates a more nuanced investigation that examines the integration of AI within the complex ecosystem of university classrooms and equips educators with practical guidance for navigating its potential.

Aim and scope

This research aims to bridge this crucial gap by investigating the multifaceted impact of AI on both university teachers and their students' learning. It specifically explores the impact of AI on the roles of university teachers, the impact of AI on students' learning experiences, the challenges that university teachers face with AI, and finally, the futuristic opportunities for university teachers to collaborate and innovate with AI.

By focusing on university contexts across diverse institutional types and academic disciplines, this research aims to offer relevant and actionable insights for university teachers navigating the transformative potential of AI. The employment of quantitative methods ensures robust and generalizable findings, while practical recommendations directly inform teaching practices and inspire further research efforts in the integration of AI within higher education.

Research questions

1. **The research's main questions are:** How do university teachers perceive the impact of AI on their role?
2. How do university teachers perceive the impact of AI on students' learning?
3. How do university teachers perceive the challenges associated with AI integration?
4. How do university teachers perceive the opportunities for collaboration and innovation with AI in the future?
5. What is the influence of demographics on university teachers' perspectives regarding AI?

Research methodology

A quantitative cross-sectional survey design is adopted for this study. This allows for the systematic examination of university teachers' perspectives regarding the impact of AI integration on various aspects of teaching and learning. The use of a survey questionnaire enables the collection of numeric data from a sample to identify patterns and relationships between variables.

Research design

The research design utilizes an online survey questionnaire as the primary data collection instrument. The questionnaire was developed specifically for the current study. An extensive literature review of existing research on AI in university teaching and learning was conducted. This informed the identification of key domains of interest to be included in the survey. The survey consists of two sections and utilizes a Likert scale for rating statements as follows:

Section 1: This section collects basic demographic information from the participants. It includes questions about gender, current role (teaching assistant, lecturer, professor), subjective AI expertise level (low, medium, high), AI usage for educational purposes (strongly disagree to strongly agree), and AI usage difficulties (strongly disagree to strongly agree).

Section 2: This section includes a series of statements related to the impact of AI on university teachers' roles, students' learning, challenges facing university teachers with AI, and futuristic opportunities for collaboration and innovation. The statements cover various aspects of AI's influence on teaching and learning, such as changes in university teachers' roles, personalization of student learning, challenges university teachers may face, and opportunities for collaboration and innovation.

Participation and ethical considerations

The participants in this study were university teachers from different disciplines and subject areas in Saudi Arabia. The participation of university teachers was obtained using a snowball sampling technique. The survey questionnaire was distributed to an initial group of participants, who were asked to provide responses based on their experiences and perceptions and further circulate the survey among their colleagues. The total number of participants obtained through this snowball sampling method was 242 university teachers.

Ethical participation is of utmost importance in this study. Participants were provided with informed consent forms detailing the purpose of the research, the voluntary nature of participation, and the confidentiality and anonymity of their responses. They were assured that their participation would not have any bearing on their employment or professional standing.

Data analysis

The collected data is analyzed using SPSS (v.22) to identify patterns, trends, and relationships among variables.

Validity and reliability

To ensure the validity of the survey questionnaire, a piloting phase was conducted involving three experts in the field. The experts reviewed the questionnaire for clarity, relevance, and appropriateness of the items in measuring the intended constructs. Their feedback and suggestions were incorporated into the final version of the questionnaire, enhancing its content validity (**Appendix 1**).

The reliability of the questionnaire was assessed through the calculation of Cronbach's alpha coefficient for internal consistency, resulting in an overall value of .93, indicating strong reliability. Reliability statistics were also calculated separately for each of the four sub-scales, with Cronbach's alpha values ranging from .78 to .91 as shown in Table 1. These high coefficient values further confirm the reliability of the questionnaire and its subscales.

ISSN 2995-8067 DOI: 10.61927/igmin151

Appendix 1	
Survey on Embracing AI for Effective University Teaching	
Section 1: Demographic information	
Gender	1. Male 2. Female
Current Role	1. Teaching Assistant 2. Lecturer 3. Professor
AI Expertise	1. Low 2. Medium 3. High
AI Usage for Educational Purposes	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree
AI Usage Difficulties	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree
Section 2: University teachers' Perspectives	
Please rate the following statements on a scale of 1 to 5, with 1 being "strongly disagree" and 5 being "strongly agree."	
A. The impact of AI on university teachers' role: How do you think AI will impact the role of university teachers in the classroom? 1. AI will change the way university teachers teach, requiring them to learn new skills and adapt to new teaching methods. 2. AI will create new roles for university teachers, such as coaches and designers of learning experiences. 3. AI will automate many of the tasks that university teachers currently perform such as grading papers and creating lesson plans. 4. AI will provide university teachers with new tools and resources to help them teach more effectively. AI will allow university teachers to focus on more creative and engaging teaching methods	
B. The impact of AI on students' learning: How do you think AI will impact student learning? 1. AI will personalize learning for each student, helping them improve their understanding, learn at their own pace, and reach their full potential. 2. AI will engage students in learning, making it more fun and interesting. 3. AI could track student progress and identify areas where they need additional help. AI could recommend resources and activities that are tailored to each student's individual needs	
C. Challenges facing university teachers with AI: What are some of the challenges that university teachers may face in the age of AI? 1. Learning new skills and adapting to new teaching methods. 2. Dealing with the potential negative impact of AI on student learning. 3. Finding ways to use AI in a way that is effective and engaging for students.	
D. Futuristic opportunities for university teachers to collaborate and innovate with AI: Will AI create new opportunities for university teachers to collaborate and innovate in the future? 1. AI could help university teachers collaborate with each other to share ideas and resources. 2. AI could help university teachers innovate in their teaching methods, creating new and more effective ways to teach students. 3. AI could help university teachers connect with students in new ways, creating a more personalized and engaging learning experience for all students.	

Table 1: Reliability Statistics.

Sub-scale	Cronbach's Alpha	No of Items
The Impact of AI on University Teachers' Role	.91	5
The Impact of AI on Students' Learning	.87	4
Challenges Facing University Teachers with AI	.78	3
Futuristic Opportunities for University Teachers to Collaborate and Innovate with AI	.86	3
Total	.93	15

Results

Demographics

As shown in Table 2, the demographic groups represent the distribution of participants based on their gender, current role, and subjective AI expertise. The percentages indicate the proportion of participants within each demographic group. The gender distribution shows that there were slightly more male participants (54.1%) than female participants (45.9%). In terms of the current role, the largest group was professors (48.8%), followed by teaching assistants (28.5%) and lecturers (22.7%). Regarding subjective AI expertise, the distribution was relatively balanced, with medium expertise being the most common (43.4%), followed by low expertise (32.6%) and high expertise (24.0%).

AI usage statistics

Table 3 shows that the mean score for using AI for educational purposes is 4.22, indicating a generally positive perception and acceptance of AI in the educational context. On the other hand, the mean score for usage difficulties is 2.97, indicating that participants reported some level of difficulty in using AI in the educational setting.

The impact of AI on university teachers' role

Based on Table 4, it can be noted that participants generally agreed with the statements related to the positive impact of AI on university teachers' roles, as the mean scores for all the items are above 4 on a 5-point scale. Table 3 suggests that participants perceive AI as having the potential to enable university teachers to focus on more creative and engaging teaching methods, automate certain tasks, bring about changes in teaching approaches, create

ISSN 2995-8067 DOI: 10.61927/igmin151

Table 2: Participants' Demographics (N = 242).

Demographics		Groups	N	%
1.Gender	1.	Male	131	54.1
	2.	Female	111	45.9
2. Current Role	1.	Teaching Assistant	69	28.5
	2.	Lecturer	55	22.7
	3.	Professor	118	48.8
3. Subjective AI expertise	1.	Low	79	32.6
	2.	Medium	105	43.4
	3.	High	58	24.0

Table 3: AI Usage Statistics (N = 242).

AI Usage	M	SD
1.Using AI for Educational Purposes	4.22	1.01
2. Usage difficulties	2.97	1.19

Table 4: The Impact of AI on University teachers' Role (N = 242).

Item	M	SD
1.AI will allow university teachers to focus on more creative and engaging teaching methods.	4.45	.69
2.AI will automate many of the tasks that university teachers currently perform such as grading papers and creating lesson plans.	4.40	.77
3.AI will change the way university teachers teach, requiring them to learn new skills and adapt to new teaching methods.	4.36	.84
4.AI will create new roles for university teachers, such as coaches and designers of learning experiences.	4.30	.86
5.AI will provide university teachers with new tools and resources to help them teach more effectively.	4.21	.92
Total	4.34	.70

new roles for university teachers, and provide them with new tools and resources to enhance their effectiveness in teaching.

The impact of AI on students' learning

As presented in Table 4 participants generally agreed with the statements related to the impact of AI on students' learning, as the mean scores for all the items are above 5. These findings suggest that participants perceive AI as having the potential to recommend personalized resources and activities for students, track their progress, personalize their learning experiences, and engage them in a more enjoyable and interesting way (Table 5).

Challenges facing university teachers with AI

Table 6 shows that the mean scores for all the items are above 4, indicating that participants recognized these challenges to a significant extent. The findings suggest that university teachers may face difficulties in finding effective and engaging ways to utilize AI for student learning, addressing any potential negative impacts it may have, and acquiring the necessary skills to adapt to new teaching methods associated with AI integration.

Futuristic opportunities for university teachers to collaborate and innovate with AI

Based on Table 7, it can be observed that participants expressed positive views regarding the potential opportunities for collaboration and innovation with AI. The mean scores for all the items are above 4. The findings suggest that AI has the potential to facilitate university teachers in innovating their teaching methods, establishing better connections with students, and

Table 5: The Impact of AI on Students' Learning (N = 242).

Item	M	SD
1. AI could recommend resources and activities that are tailored to each student's individual needs.	4.22	.81
2. AI could track student progress and identify areas where they need additional help.	4.14	.82
3. AI will personalize learning for each student, helping them improve their understanding, learn at their own pace, and reach their full potential.	4.14	.91
4. AI will engage students in learning, making it more fun and interesting.	4.05	.87
Total	4.14	.72

Table 6: Challenges Facing University Teachers with AI (N = 242).

Item	M	SD
1. Finding ways to use AI in a way that is effective and engaging for students.	4.39	.76
2. Dealing with the potential negative impact of AI on student learning.	4.32	.78
3. Learning new skills and adapting to new teaching methods.	4.30	.91
Total	4.34	.68

Table 7: Futuristic Opportunities for University Teachers to Collaborate and Innovate with AI (N = 242).

Item	M	SD
1. AI could help university teachers innovate in their teaching methods, creating new and more effective ways to teach students.	4.45	.75
2. AI could help university teachers connect with students in new ways, creating more personalized and engaging learning experiences.	4.40	.76
3. AI could help university teachers collaborate with each other to share ideas and resources.	4.37	.75
Total	4.41	.66

fostering collaboration among educators. These opportunities can contribute to creating a more engaging, personalized, and effective learning environment for students. Overall, these results highlight the promising role of AI in supporting and enhancing university teachers' abilities to collaborate, innovate, and provide meaningful learning experiences for students.

The impact of demographics on participants' perspectives

Table 8 shows the results of a multivariate analysis of variance (MANOVA) test, which was conducted to test for the effects of five independent variables (gender, current role, AI expertise, educational purposes, and usage difficulties) on a dependent variable (university teachers' role, students' learning, challenges facing university teachers with AI, and futuristic opportunities for university teachers to collaborate and innovate with AI).

The multivariate tests yielded significant results for the independent variables. Gender demonstrated a highly significant effect (Wilks' Lambda = 0.74, $F = 7.77$, $p < 0.001$, $\eta p^2 = 0.26$), indicating a substantial impact. Current Role also had a significant effect (Wilks' Lambda = 0.76, $F = 3.32$, $p = 0.001$, $\eta p^2 = 0.13$), although the effect size was moderate. Subjective AI expertise showed a significant effect (Wilks' Lambda = 0.83, $F = 2.22$, $p = 0.028$, $\eta p^2 = 0.09$), albeit with a smaller effect size. The use of AI for educational purposes exhibited a highly significant effect (Wilks' Lambda = 0.41, $F = 5.81$, $p < 0.001$, $\eta p^2 = 0.20$), indicating a substantial impact. Lastly, usage difficulties had a significant effect (Wilks' Lambda = 0.68, $F = 2.29$, $p = 0.004$, $\eta p^2 = 0.09$), although the effect size was smaller. These findings provide empirical evidence of the relationships between these variables and the dependent variables.

ISSN 2995-8067 DOI: 10.61927/igmin151

Table 8: Multivariate Tests.

Effect		Value	F	Hypothesis df	Error df	Sig.	ηp²
1. Gender	Wilks' Lambda	.74	7.77	4.00	89.00	.000	.26
2. Current Role		.76	3.32	8.00	178.00	.001	.13
3. Subjective AI expertise		.83	2.22	8.00	178.00	.028	.09
4. Use of AI for Educational Purposes		.41	5.81	16.00	272.54	.000	.20
5. Usage Difficulties		.68	2.29	16.00	272.54	.004	.09

Table 9 presents the results of tests of between-subjects effects, which analyze the impact of different factors on the dependent variables. Gender had a significant effect on the impact of AI on university teachers' role (*F* = 10.001, *p* = 0.002, ηp² = 0.098), and the impact of AI on students' learning (*F* = 7.742, *p* = 0.007, ηp² = 0.078). When considering the current role, it showed a significant effect on challenges facing university teachers with AI (*F* = 4.072, *p* = 0.020, ηp² = 0.081) and futuristic opportunities for university teachers to collaborate and innovate with AI (*F* = 3.495, *p* = 0.034, ηp² = 0.071). Subjective AI expertise also yielded significant effects. It impacted the impact of AI on university teachers' role (*F* = 5.454, *p* = 0.006, ηp² = 0.106), challenges facing university teachers with AI (*F* = 3.600, p = 0.031, ηp² = 0.073), and futuristic opportunities for university teachers to collaborate and innovate with AI (*F* = 3.398, *p* = 0.038, ηp² = 0.069). The use of AI for educational purposes had significant effects on various dependent variables. It influenced the impact of AI on university teachers' role (*F* = 6.072, *p* < 0.001, ηp² = 0.209), the impact of AI on students' learning (*F* = 6.425, *p* < 0.001, ηp² = 0.218), challenges facing university teachers with AI (*F* = 3.377, *p* = 0.013, ηp² = 0.128), and futuristic opportunities for university teachers to collaborate and innovate with AI (*F* = 5.342, *p* = 0.001, ηp² = 0.188). Lastly, AI usage difficulties had significant effects on challenges facing university teachers with AI (*F* = 3.318, *p* = 0.014, ηp² = 0.126) and futuristic opportunities for university teachers to collaborate and innovate with AI (*F* = 4.862, *p* = 0.001, ηp² = 0.175).

Gender: As shown in Table 10, for the impact of AI on university teachers' role, females (M = 4.37) rated it slightly higher than males (M = 4.27). Similarly, females (M = 4.22) perceived a slightly higher impact of AI on students' learning compared to males (M = 4.06).

Current role: Table 9 shows that in terms of challenges facing university teachers with AI, teaching assistants reported the highest mean (4.36), followed by professors (M = 4.33) and lecturers (M = 4.27). For futuristic opportunities for collaboration and innovation with AI, professors had the highest mean (4.44), followed by teaching assistants (M = 4.33) and lecturers (M = 4.31).

Subjective AI expertise: For the impact of AI on university teachers' role, the mean scores range from 4.17 for low expertise to 4.63 for high expertise as demonstrated in Table 9. This indicates an increasing trend in means as subjective AI expertise level increases. Similarly, for challenges facing university teachers with AI, the mean scores range from 4.30 for low expertise to 4.42 for high expertise. Again, there is a general trend of increasing means with higher levels of subjective AI expertise. In terms of futuristic opportunities for collaboration and innovation with AI, the mean scores range from 4.30 for low expertise to 4.53 for high expertise. This demonstrates a similar pattern of increasing means with higher levels of subjective AI expertise.

Table 9: Tests of Between-Subjects Effects.

Source	Dependent Variable	Type III Sum of Squares	df	M Square	F	Sig.	ηp²
Gender	The impact of AI on university teachers' role	1.621	1	1.621	10.001	.002	.098
	The impact of AI on students' learning	1.710	1	1.710	7.742	.007	.078
Current role	Challenges facing university teachers with AI	1.396	2	0.698	4.072	.020	.081
	Futuristic opportunities	0.695	2	0.347	3.495	.034	.071
AI expertise	The impact of AI on university teachers' role	1.767	2	0.884	5.454	.006	.106
	Challenges Facing University Teachers with AI	1.234	2	0.617	3.600	.031	.073
	Futuristic opportunities	0.676	2	0.338	3.398	.038	.069
AI for educational purposes	The impact of AI on university teachers' role	3.936	4	0.984	6.072	.000	.209
	The impact of AI on students' learning	5.678	4	1.419	6.425	.000	.218
	Challenges facing university teachers with AI	2.316	4	0.579	3.377	.013	.128
	Futuristic opportunities	2.125	4	0.531	5.342	.001	.188
Usage difficulties	Challenges facing university teachers with AI	2.275	4	0.569	3.318	.014	.126
	Futuristic opportunities	1.934	4	0.483	4.862	.001	.175

Educational purposes: The findings in Table 9 indicate that as the agreement with the educational purposes increases, the mean scores tend to increase across the dependent variables. This suggests that individuals who strongly agree or agree with the educational purposes tend to perceive a greater impact of AI on university teachers' roles, students' learning, and perceived challenges related to AI implementation, and perceive more futuristic opportunities for collaboration and innovation with AI.

Usage difficulties: The findings in Table 9 show that as the level of usage difficulties increases, the mean scores tend to increase for both challenges facing university teachers with AI and futuristic opportunities for collaboration and innovation with AI. This suggests that individuals who agree or strongly agree with the usage difficulties tend to perceive more challenges in the implementation of AI in teaching but perceive more futuristic opportunities for collaboration and innovation with AI.

Discussion

The objective of the current study is to examine how the integration of AI affects the roles of university teachers and students' learning. It also aims to explore the challenges faced by university teachers when integrating AI and identifies potential opportunities for collaboration and innovation. The research investigates the transformation of teaching practices through AI, its impact on student outcomes, and the difficulties encountered by university teachers, and suggests avenues for collaboration and innovation. The study specifically focuses on university-level teaching environments, utilizes a quantitative research method, and offers practical recommendations to guide teaching practices and encourage future research in the integration of AI.

ISSN 2995-8067 DOI: 10.61927/igmin151

Table 10: Difference Between Groups.

Dependent Variable		Group	M	Std. Error
The impact of AI on university teachers' role	Gender	Male	4.27	.04
		Female	4.37	.04
The impact of AI on students' learning		Male	4.06	.04
		Female	4.22	.05
Challenges facing university teachers with AI	Current Role	Teaching Assistant	4.36	.05
		Lecturer	4.27	.06
		Professor	4.33	.04
Futuristic opportunities for university teachers to collaborate and innovate with AI		Teaching Assistant	4.33	.04
		Lecturer	4.31	.05
		Professor	4.44	.03
The impact of AI on university teachers' role	Subjective AI expertise	Low	4.17	.05
		Medium	4.23	.04
		High	4.63	.06
Challenges facing university teachers with AI		Low	4.30	.05
		Medium	4.30	.04
		High	4.42	.06
Futuristic opportunities for university teachers to collaborate and innovate with AI		Low	4.30	.04
		Medium	4.36	.03
		High	4.53	.05
The impact of AI on university teachers' role	Educational Purposes	Strongly Disagree	3.33	.14
		Disagree	3.72	.18
		Neutral	3.96	.80
		Agree	4.17	.05
		Strongly Agree	4.60	.04
The impact of AI on students' learning		Strongly Disagree	3.54	.16
		Disagree	3.30	.21
		Neutral	3.88	.11
		Agree	3.89	.06
		Strongly Agree	4.45	.05
Challenges facing university teachers with AI		Strongly Disagree	3.67	.14
		Disagree	3.87	.19
		Neutral	3.93	.10
		Agree	4.31	.05
		Strongly Agree	4.50	.04
Futuristic opportunities for university teachers to collaborate and innovate with AI		Strongly Disagree	3.44	.11
		Disagree	3.87	.14
		Neutral	4.19	.08
		Agree	4.30	.04
		Strongly Agree	4.59	.03
Challenges facing university teachers with AI	Usage Difficulties	Strongly Disagree	4.73	.10
		Disagree	4.25	.06
		Neutral	4.18	.05
		Agree	4.28	.06
		Strongly Agree	4.58	.08
Futuristic opportunities for university teachers to collaborate and innovate with AI		Strongly Disagree	4.64	.07
		Disagree	4.35	.04
		Neutral	4.22	.04
		Agree	4.45	.05
		Strongly Agree	4.50	.06

University teachers perceive AI as a tool that can enable them to focus on more creative and engaging teaching methods, automate certain tasks, and bring about changes in teaching approaches. This highlights the potential for AI to enhance university teachers' effectiveness and improve the overall teaching experience. The existing literature supports these findings. AI technologies, such as automated grading systems and data analytics tools, can streamline time-consuming tasks and reduce university teachers' workload [8,10]. This allows university teachers to devote additional time to creative and engaging teaching methods, prioritizing instructional design, individualized instruction, and personalized feedback. Also, the literature emphasizes that AI-powered platforms enable university teachers to analyze student data, identify learning gaps, and tailor instruction to meet individual needs, ultimately enhancing student engagement and achievement [8,10]. Moreover, the literature suggests that AI has the potential to automate tasks such as grading papers, creating lesson plans, and generating quizzes, reducing university teachers' workload, and increasing efficiency [7,8,10]. Further, the literature highlights that the integration of AI in education has led to the emergence of new roles for university teachers, such as learning coaches and learning designers [10,16]. Lastly, the literature indicates that AI-powered platforms provide university teachers with access to data analytics, adaptive learning technologies, intelligent tutoring systems, and immersive learning experiences [2,7,15].

The findings indicate that AI has the potential to personalize learning experiences, recommend personalized resources and activities, track student progress, and engage students in a more enjoyable and interesting way. Existing literature strongly supports these findings. For instance, the literature states that AI can analyze student data, such as past performance, interests, and learning styles, to provide personalized recommendations for resources and activities [11,12]. Also, the literature suggests that AI can monitor student progress, offer real-time feedback, and identify areas of difficulty [7,8]. Further, the research line emphasizes that AI has the potential to personalize the learning experience for each student, taking into account their unique needs, interests, and learning styles [2,8,15,16]. Moreover, the literature highlights that AI can foster student engagement in learning by using gamification, simulations, and other interactive activities [4,31]. These approaches make learning more enjoyable and captivating, increasing student engagement and motivation.

The results emphasize the importance of providing support, training, and resources to university teachers to effectively navigate the challenges associated with the implementation of AI in higher education. University teachers may face difficulties in finding effective ways to utilize AI for student learning, addressing potential negative impacts, and acquiring the necessary skills to adapt to new teaching methods. Based on these findings, addressing the challenges associated with AI implementation and equipping university teachers with the required skills and knowledge, higher education institutions can ensure the successful integration of AI in teaching and enhance student learning outcomes [17-19]. It is crucial for university teachers to find ways to leverage AI that are tailored to their student's needs while fostering enjoyment and interest in the learning process. This requires university teachers

to develop strategies that strike a balance between utilizing AI and maintaining meaningful human interaction. Also, excessive reliance on AI may lead to decreased student engagement and intrinsic motivation to learn independently [24,25]. Additionally, overreliance on AI-generated content may inhibit students' creativity and critical thinking skills [20-23]. Therefore, University teachers must be aware of these risks and find ways to mitigate them to ensure a balanced and holistic learning experience for students. Lastly, research emphasizes the need for university teachers to acquire new skills and adapt to evolving teaching methods in the context of AI integration [18,24]. This includes developing skills in coding and data analysis, as well as being open to experimenting with new teaching approaches. University teachers who demonstrate adaptability and keep up with the latest developments in AI will be better equipped to harness its potential and provide an engaging and personalized learning environment.

As the results show, AI offers opportunities for university teachers to innovate their teaching methods, establish better connections with students, and foster collaboration among educators. The findings highlight the promising role of AI in supporting and enhancing university teachers' abilities to collaborate, innovate, and provide meaningful learning experiences for students [28-30]. Moreover, the literature suggests that AI can foster collaboration among university teachers by providing platforms for idea exchange and resource sharing [26,27]. Online communities and AI-powered virtual classrooms allow educators to share innovative ideas, educational materials, and instructional resources, thereby enhancing their teaching methodologies [26,27]. This collaborative environment not only saves time for university teachers but also contributes to improving the overall quality of teaching. Finally, the literature emphasizes that embracing AI technologies in university teaching can lead to innovation and improvement in teaching methods [26,27]. AI-powered tools and platforms enable university teachers to explore new approaches, experiment with innovative teaching methods, and stay updated with the latest trends in education. This fosters a culture of continuous improvement and enhances university teachers' abilities to provide meaningful learning experiences for students.

Regarding the impact of demographics, the results indicate that there are slight variations in perspectives on the impact of AI based on gender and current role among university teachers. Specifically, female university teachers tend to rate the impact of AI on university teachers' roles and students' learning slightly higher than male university teachers. This suggests that female university teachers may have a more positive perception of the potential benefits and opportunities associated with AI in education. Furthermore, teaching assistants and professors perceive a higher impact of AI on their roles and see more opportunities for collaboration and innovation compared to lecturers. This finding suggests that individuals in different teaching roles may have different levels of awareness or engagement with AI technologies. Teaching assistants and professors may be more involved in research or have more exposure to innovative teaching methods, which could explain their higher perception of the impact of AI and the opportunities it presents.

Further, the results suggest that participants who have higher subjective AI expertise tend to perceive a greater impact of AI in education. This means that individuals who consider themselves to be more knowledgeable or skilled in the field of AI are more likely to recognize and appreciate the potential benefits and implications of AI in educational settings. They have a deeper understanding of how AI can impact teaching and learning processes, which influences their perception of its impact. Additionally, participants with higher subjective AI expertise tend to perceive fewer challenges associated with AI integration and more opportunities for collaboration and innovation. This could be because individuals who possess greater AI expertise are better equipped to navigate the complexities and potential pitfalls of AI implementation. They may have a better understanding of how to address challenges or mitigate negative impacts, which leads to a more positive perception overall. Moreover, individuals with higher AI expertise are likely to be more aware of the innovative possibilities and collaborative opportunities that AI can offer in educational contexts, which influences their perception of these opportunities.

The results also indicate that participants who strongly agree or agree with the educational purposes of AI tend to perceive a greater impact of AI and more opportunities for collaboration and innovation. This suggests that individuals who understand and appreciate the potential benefits of AI in education are more likely to recognize its positive impact on teaching and learning. They perceive AI as a valuable tool that can enhance educational outcomes and create new opportunities for collaboration and innovation among educators. Their positive attitude towards AI aligns with their belief in its educational value, leading to a more favorable perception of its impact. On the other hand, participants who agree or strongly agree with usage difficulties perceive more challenges associated with AI integration. This suggests that individuals who acknowledge the difficulties and complexities of implementing AI in educational settings are more aware of the potential challenges that may arise. However, despite perceiving these challenges, they also perceive more opportunities for collaboration and innovation. This could be because they understand that addressing these difficulties can lead to innovative solutions and foster collaboration among educators as they work together to overcome the challenges associated with AI usage.

To sum up, the findings indicate a positive acceptance of AI in education and highlight its potential to enhance teaching and learning. However, challenges such as skill acquisition, addressing negative impacts, and effective utilization need to be addressed. Providing support, training, and resources to university teachers, along with considering individual demographics and expertise levels, can contribute to successful AI integration in higher education.

Conclusion and implications

The overall positive acceptance of AI in education suggests that there is recognition among educators of its potential benefits. However, challenges related to the implementation and utilization of AI need to be addressed for effective integration in educational

settings. AI has the potential to enhance university teachers' effectiveness by enabling them to focus on creative and engaging teaching methods, automating tasks, and bringing about changes in teaching approaches. Also, AI has the potential to personalize learning experiences, recommend personalized resources, track student progress, and engage students in a more enjoyable and interesting way, thus contributing to enhanced learning outcomes and experiences. Adequate support, training, and resources should be provided to university teachers to help them navigate the challenges associated with AI implementation, including finding effective ways to utilize AI for student learning, addressing potential negative impacts, and acquiring necessary skills. AI offers opportunities for university teachers to innovate their teaching methods, establish better connections with students, and foster collaboration among educators, thereby creating a more engaging and effective learning environment.

Variations in perspectives based on gender and current role suggest that targeted interventions and support should be considered for different demographics to ensure inclusive and equitable AI integration. Further, educators with higher subjective AI expertise tend to perceive a greater impact of AI, fewer challenges, and more opportunities for collaboration and innovation. This highlights the importance of developing educators' AI skills and knowledge to fully leverage the potential of AI in education. Addressing usage difficulties and aligning AI implementation with educational goals are crucial for addressing challenges and maximizing opportunities for collaboration and innovation.

Implications for policy and practice stemming from these findings include several key recommendations. Firstly, policymakers in higher education should prioritize providing support, training, and resources for university teachers to enhance their understanding and use of AI in education. Secondly, professional development programs should focus on building educators' AI skills and knowledge to effectively integrate AI into university teaching practices. Thirdly, collaborative platforms and networks should be established to facilitate knowledge sharing and collaboration among educators, promoting innovative approaches to AI integration. Furthermore, policymakers and educational leaders should promote diversity and inclusivity in AI implementation by addressing variations in perspectives based on gender and university teachers' current roles. Lastly, partnerships between policymakers, educators, researchers, and industry stakeholders should be fostered to promote innovation, share expertise, and ensure the alignment of AI technologies with universities' educational goals.

Research limitations and future research directions

There are some limitations associated with the current research. Firstly, the limited sample size and demographics may not fully represent the broader population of educators. Secondly, the study relies on self-reported measures, which are subject to potential biases and inaccuracies. Finally, the study assesses subjective AI expertise, which may not align with actual proficiency in working with AI technologies.

Accordingly, several future research directions emerged. Firstly, combining qualitative and quantitative methods could provide a deeper understanding of educators' experiences with AI in education. Qualitative research can offer insights into the nuanced perceptions, challenges, and opportunities associated with AI implementation. Secondly, conducting experimental or quasi-experimental studies to evaluate the effectiveness of specific AI interventions on student learning outcomes, teacher practices, and educational outcomes could offer evidence-based recommendations for implementing AI in educational settings. Thirdly, investigating the ethical implications of AI in education, such as privacy concerns, algorithmic bias, and equity issues, is crucial. Future research should explore ways to mitigate these challenges and ensure responsible AI use in educational contexts. Lastly, exploring students' perceptions and experiences with AI in education is essential to understanding how students interact with AI tools, their preferences, and the impact of AI on their motivation, engagement, and learning outcomes.

References

1. Al-Zahrani AM. The impact of generative AI tools on researchers and research: Implications for academia in higher education. Innovations in Education and Teaching International. 2023; 1-15. https://doi.org/10.1080/14703297.2023.2271445
2. Dilmurod R, Fazliddin A. Prospects for the introduction of artificial intelligence technologies in higher education. Academicia: an international multidisciplinary research journal. 2021; 11(2): 929-934. https://doi.org/10.5958/2249-7137.2021.00468.7
3. Luan H, Geczy P, Lai H, Gobert J, Yang SJH, Ogata H, Baltes J, Guerra R, Li P, Tsai CC. Challenges and Future Directions of Big Data and Artificial Intelligence in Education. Front Psychol. 2020 Oct 19;11:580820. doi: 10.3389/fpsyg.2020.580820. PMID: 33192896; PMCID: PMC7604529.
4. Popenici SAD, Kerr S. Exploring the impact of artificial intelligence on teaching and learning in higher education. Res Pract Technol Enhanc Learn. 2017;12(1):22. doi: 10.1186/s41039-017-0062-8. Epub 2017 Nov 23. PMID: 30595727; PMCID: PMC6294271.
5. Tomar P, Verma S. Impact and Role of AI Technologies in Teaching, Learning, and Research in Higher Education. In S Verma & P Tomar (Eds.), Impact of AI Technologies on Teaching, Learning, and Research in Higher Education. IGI Global. 2021; 190-203. https://doi.org/10.4018/978-1-7998-4763-2.ch012
6. Wang C. The Value Orientation of University teachers' Role in Artificial Intelligence Teaching Environment Based on Information Technology 2021 4th International Conference on Information Systems and Computer Aided Education, Dalian, China. 2021. https://doi.org/10.1145/3482632.3483059
7. Asthana P, Hazela B. Applications of Machine Learning in Improving Learning Environment. In S Tanwar, S Tyagi, & N Kumar (Eds.), Multimedia Big Data Computing for IoT Applications: Concepts, Paradigms and Solutions. Springer Singapore. 2020; 417-433. https://doi.org/10.1007/978-981-13-8759-3_16
8. Celik I, Dindar M, Muukkonen H, Järvelä S. The Promises and Challenges of Artificial Intelligence for University teachers: a Systematic Review of Research. TechTrends. 2022; 66(4): 616-630. https://doi.org/10.1007/s11528-022-00715-y
9. Shen L, Su A. The Changing Roles of University teachers with AI. In M. Habib (Ed.), Revolutionizing Education in the Age of AI and Machine Learning. 2020; 1-25. IGI Global. https://doi.org/10.4018/978-1-5225-7793-5.ch001
10. Liu J, Wang S. The change of university teachers' role in teaching under the environment of "Artificial Intelligence +". 2020 International Conference on Artificial Intelligence and Education (ICAIE). 2020. Doi: 10.1109/ICAIE50891.2020.00030
11. Gu R, Xi Z, Lin B, Ji Y. Teacher-guided Autonomous Learning Enabled by Artificial Intelligence Empowered Remote Experiment Platform. 2022 IEEE

Global Engineering Education Conference (EDUCON). 2022. https://doi.org/10.1109/EDUCON52537.2022.9766531

12. Yu D, Ding M, Li W, Wang L, Liang B. Designing an Artificial Intelligence Platform to Assist Undergraduate in Art and Design to Develop a Personal Learning Plans. In A. Marcus & W. Wang (Eds.), Design, User Experience, and Usability. Application Domains Springer International Publishing. 2019; 528-538. https://doi.org/10.1007/978-3-030-23538-3_41
13. Chaiyarak S, Nilsook P, Wannapiroon P. An empirical study of intelligent virtual universal learning platforms. 2021 Research, Invention, and Innovation Congress: Innovation Electricals and Electronics (RI2C). 2021; https://doi.org/10.1109/RI2C51727.2021.9559785
14. Khurana A, Lohani BP, Bibhu V. AI Frame-Worked Virtual World Application - The Ramification of Virtual World on Real World. 2019 International Conference on Automation, Computational and Technology Management (ICACTM). 2019.
15. Bisen IE, Arslan EA, Yildirim K, Yildirim Y. Artificial Intelligence and Machine Learning in Higher Education. In Z. Gulzar & A. A. Leema (Eds.), Machine Learning Approaches for Improvising Modern Learning Systems. 2021; 1-17. IGI Global. https://doi.org/10.4018/978-1-7998-5009-0.ch001
16. Lameras P, Arnab S. Power to the University teachers: An Exploratory Review on Artificial Intelligence in Education. Information. 2022; 13(1): 14. https://www.mdpi.com/2078-2489/13/1/14
17. Carnegie Mellon University (CMU) (2021). Learning is more effective when active. ScienceDaily. 2023. www.sciencedaily.com/releases/2021/09/210930140710.htm
18. Seo K, Tang J, Roll I, Fels S, Yoon D. The impact of artificial intelligence on learner-instructor interaction in online learning. Int J Educ Technol High Educ. 2021;18(1):54. doi: 10.1186/s41239-021-00292-9. Epub 2021 Oct 26. PMID: 34778540; PMCID: PMC8545464.
19. UCL. (2023) Engaging with AI in your education and assessment. Students. https://www.ucl.ac.uk/students/exams-and-assessments/assessment-success-guide/engaging-ai-your-education-and-assessment
20. Anantrasirichai N, Bull D. Artificial intelligence in the creative industries: a review. Artificial Intelligence Review. 2021; 55(1): 589–656. https://doi.org/10.1007/s10462-021-10039-7
21. Halina M. Insightful artificial intelligence. Mind & Language. 2021; 36(2): 315–329. https://doi.org/10.1111/mila.12321
22. Li S, Ren X, Schweizer K, Brinthaupt TM, Wang T. Executive functions as predictors of critical thinking: Behavioral and neural evidence. Learning and Instruction. 2021; 71: 101376. https://doi.org/10.1016/j.learninstruc.2020.101376
23. Suh M, Youngblom E, Terry M, Cai CJ. AI as Social Glue: Uncovering the Roles of Deep Generative AI during Social Music Composition. 2021; https://doi.org/10.1145/3411764.3445219
24. UNESCO (2023). Artificial intelligence in education. https://www.unesco.org/en/digital-education/artificial-intelligence
25. World Economic Forum (WEF) (2021). Should universities be worried about the increasing capabilities of AI? https://www.weforum.org/agenda/2021/11/artificial-intelligence-writing-universities-plagiarism/
26. Bradbeer C. "Innovative" Teacher Collaboration in (Elementary) Innovative Learning Environments (ILEs): Products and Potential. In M. A. Peters & R. Heraud (Eds.), Encyclopedia of Educational Innovation. Springer Singapore. 2020. https://doi.org/10.1007/978-981-13-2262-4_193-1
27. Kitchen J, Berry M, Russell T. The Power of Collaboration. Studying Teacher Education. 2019; 15(2): 93-97. https://doi.org/10.1080/17425964.2019.1628560
28. Mollick ER, Mollick L. New Modes of Learning Enabled by AI Chatbots: Three Methods and Assignments. Social Science Research Network. 2022. https://doi.org/10.2139/ssrn.4300783
29. Stanford/Teaching Commons (STC) (2023). Technology-enhanced, Policy, Artificial Intelligence (AI): AI Tools in Teaching and Learning. https://teachingcommons.stanford.edu/news/ai-tools-teaching-and-learning
30. UCLA Center for the Advancement of Teaching. (2023.). Guidance for the Use of Generative AI. https://teaching.ucla.edu/resources/ai_guidance/
31. Huang J, Saleh S, Liu Y. A Review on Artificial Intelligence in Education. Academic Journal of Interdisciplinary Studies. 2021; 10(3): 206. https://doi.org/10.36941/ajis-2021-0077

How to cite this article: Al-Zahrani AM. From Traditionalism to Algorithms: Embracing Artificial Intelligence for Effective University Teaching and Learning. IgMin Res. Feb 15, 2024; 2(2): 102-112. IgMin ID: igmin151; DOI: 10.61927/igmin151; Available at: www.igminresearch.com/articles/pdf/igmin151.pdf

Publisher note: Thank you for providing this insightful research study—it's a valuable asset that will empower us in our future undertakings.

INSTRUCTIONS FOR AUTHORS

IgMin Research - A BioMed & Engineering Open Access Journal is a prestigious multidisciplinary journal committed to the advancement of research and knowledge in the expansive domains of Biology, Medicine, and Engineering. With a strong emphasis on scholarly excellence, our journal serves as a platform for scientists, researchers, and scholars to disseminate their groundbreaking findings and contribute to the ever-evolving landscape of Biology, Medicine and Engineering disciplines.

For book and educational material reviews, send them to IgMin Research, at support@igminresearch.us. The Copyright Clearance Centre's Rights link program manages article permission requests via the journal's website (https://www.igminresearch.com). Inquiries about Rights link can be directed to info@igminresearch.us or by calling +1 (860) 967-3839.

https://www.igminresearch.com/pages/publish-now/author-guidelines

APC

In addressing Article Processing Charges (APCs), IgMin Research: recognizes their significance in facilitating open access and global collaboration. The APC structure is designed for affordability and transparency, reflecting the commitment to breaking financial barriers and making scientific research accessible to all.

At IgMin Research - A BioMed & Engineering Open Access Journal, fosters cross-disciplinary communication and collaboration, aiming to address global challenges. Authors gain increased exposure and readership, connecting with researchers from various disciplines. The commitment to open access ensures global availability of published research. Join IgMin Research - A BioMed & Engineering Open Access Journal at the forefront of scientific progress.

https://www.igminresearch.com/pages/publish-now/apc

WHY WITH US

IgMin Research | A BioMed & Engineering Open Access Journal employs a rigorous peer-review process, ensuring the publication of high-quality research spanning STEM disciplines. The journal offers a global platform for researchers to share groundbreaking findings, promoting scientific advancement.

JOURNAL INFORMATION

Journal Full Title: IgMin Research-A BioMed & Engineering Open Access Journal
Journal NLM Abbreviation: IgMin Res
Journal Website Link: https://www.igminresearch.com
Topics Summation: 150
Subject Areas: Biology, Engineering, Medicine and General Science
Organized by: IgMin Publications Inc.

Regularity: Monthly
Review Type: Double Blind
Publication Time: 14 Days
GoogleScholar: https://www.igminresearch.com/gs
Plagiarism software: iThenticate
Language: English
Collecting capability: Worldwide

Online Manuscript Submission: https://www.igminresearch.com/submission or can be mailed to submission@igminresearch.us