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To cite this article:

Alenezi, W. (2024). Potentiality and apprehensions of artificial intelligence in education: Perspectives of education staff. *International Journal of Education in Mathematics, Science, and Technology (IJEMST), 12*(4), 942-956. https://doi.org/10.46328/ijemst.4177

International Journal of Education in Mathematics, Science and Technology

2024, Vol. 12, No. 4, 942-956 https://doi.org/10.46328/ijemst.4177

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Article Info

Article History

Received:
02 January 2024
Accepted:
03 June 2024

Keywords

AI education
Kuwait
Apprehensions
Challenges
potential

Abstract

The present study aimed to assess the potentiality and apprehensions of artificial intelligence (AI) in education. It also investigated the challenges of AI integration into education from the teachers' perspectives. A cross-sectional study design was adopted. Through random sampling, a total of 63 members of faculty were recruited from Kuwait University. An online questionnaire was administered to the study participants. The data was analyzed through SPSS version 26, using descriptive statistics, t-tests, and ANOVA. The results showed that there was a remarkably high consensus about the potentiality of AI for education. The teachers' readiness to adopt AI was low. Data analysis, machine learning, and natural language processing were the most important aspects of linking education and AI. The participants highlighted that for the empowerment of students, AI system use cases, evaluation of the intelligence of AI systems, and identification of the technical limitations of AI systems were crucial. Greater were challenges and difficulties in using AI such as the lack of availability of suitable educational materials, unavailability of required expertise in the field, and the complexity of the subject. However, no statistical difference attributed to gender, academic degree, and academic department in terms of facing challenges was found.

Introduction

Artificial intelligence (AI) systems have been adopted extensively by educational institutions, to replace or enhance the duties of teachers (Zhai et al., 2021). However, limited quantitative research has been conducted to assess the viewpoints of administrators and college teachers on the usage of artificial intelligence (AI) in secondary and higher education. "Teachers' insights on the usage of AI, have only been investigated by a few scholars in the wake of not enough exposure of AI prospects in the education and learning (Kim and Kim, 2022, p. 142). Kim and Kim (2021) surveyed to explore teacher's perceptions of AI-enabled educational tools as a scientific writing aid. Kim and Kim (2021) reported that most teachers perceived AI as a source of scaffolding (i.e. when the students are taught how to solve a problem, and then the teacher steps back to allow the students to solve problems independently). However, the teachers were very concerned about the replacement of their roles by AI in terms of feedback and quality of decisions through such systems. In a review of the literature, Lameras

and Arnab (2022, p.14) expressed optimistic views about the positive roles of teachers in planning, facilitating, and visualizing AI-enabled learning.

In a study, it was asserted that due to contemporary changes occurring, reforms in medical education were needed where increasing the knowledge and skills of medical students about using technology, in particular the usage of AI, was inevitable (Buabbas et al., 2019). Buabbas et al. (2019) examined the perceptions of the students regarding the usage of AI in their knowledge acquisition journey of medical studies. This cross-sectional study found that AI was a promising tool for increasing learning in the medical discipline and the majority of the students had knowledge about the fundamentals of AI usage but identified that this awareness regarding AI usage needed to expand. Also, the students did not favor the apprehensions about the role of AI in replacing doctors but rather as a catalyst to increase the quality of healthcare (Buabbas et al., 2019).

Ooi et al. (2023) have apprehended that the reliance on AI is not spared from the challenges until the expertise and knowledge about its optimal use are not spread. Another study by Tang (2023) expounded the vitality of AI by driving the analysis through the lens of needs theory in learning English for specific purposes. The researcher highlighted that now it is high time to modify the curriculum, appropriate for learning through AI, in particular for learning through AI for English for specific purposes. The academicians have to select carefully the tools, that best match the learning outcome, objectives, and long-term goals so that the students do not refer to other tools to avert the likelihood of ineffective and disruptive use of AI in such an imperative field of education. Adoption of the full coverage assessment will be required as the current assessment methods have been losing their relevance in the current era due to the easily available and large-scale penetration of AI amid an era where the data and generative technology have not been regularized yet.

Additionally, for the support of teachers, renewed teachers' development programs are crucial for familiarizing them with expanding scientific learning through AI. Based on the studies above, it can be asserted that the majority of the studies have covered the perceptions of the students about the usage of AI in different areas of interest. Investigating the apprehensions along with the potentiality of the educational usage of AI has not been examined in the context of the Arab region. To fill this gap, the present study aims to assess the potentiality and apprehensions of AI in education from the perspectives of education staff at Kuwait University. The findings of the study will add to the relevant literature about the vitality and apprehensions of AI integration into learning as well as providing knowledge about the concrete challenges from the experts' views. Such findings will help the stakeholders, educationists, researchers, programmers, students, and policy-makers in their educational realignment.

Literature Review

AI has become pervasive it is readily available for use via smartphones and related devices so that the general population can use AI. Technology has incentivized the availability of cloud storage, edge computing, open and restricted data sources, and agile networks on such smartphones and devices. This accessibility has eased access to educational resources by providing assistance and flexibility of modification in the way of disseminating or

imparting knowledge conveniently and with greater outreach maximizing the number of beneficiaries (Alam, 2021). Due to this technological advancement, some of the professions will be replaced completely whereas some will have to transform massively It would unveil another novel usage of technology as well as increase the need to boost human potential more than ever before as most of the investment and reforms have been given to accelerated economic and political achievements but least on human development (Ullah et al., 2014). AI is now popular in the domains of legal affairs, financial issues, public health, advertisement, and manufacturing (see Figure 1).

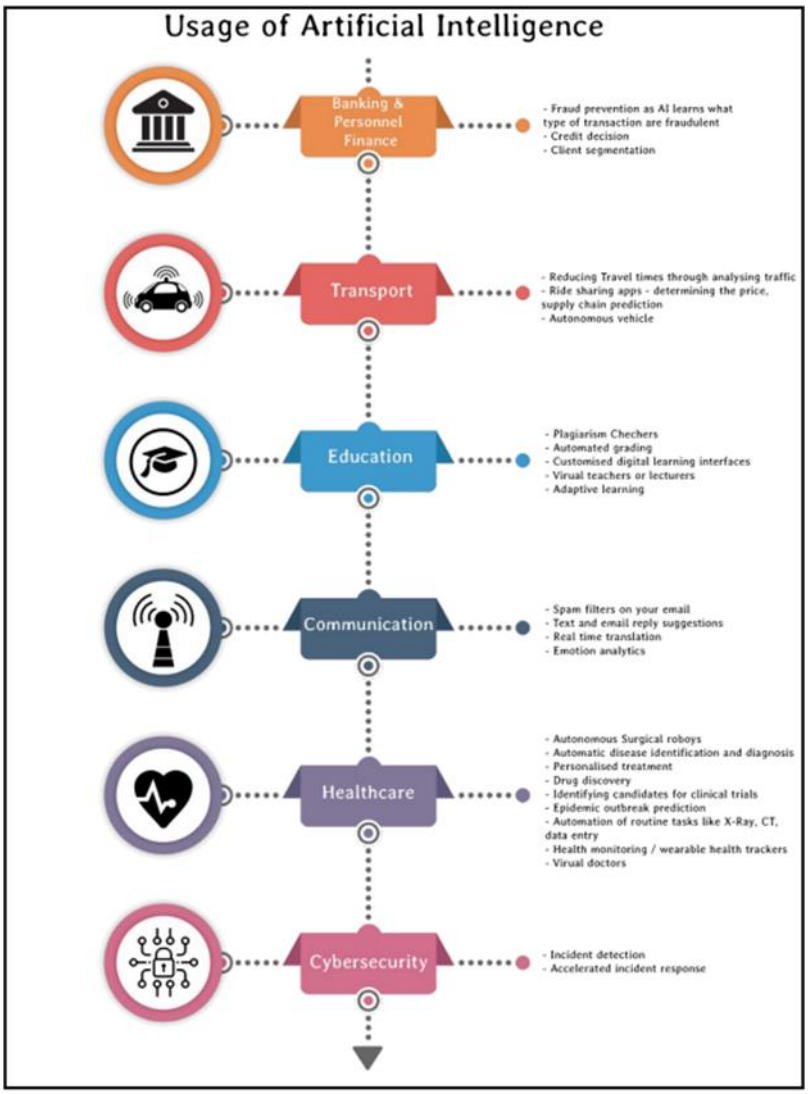

Figure 1. Uses of AI

Source: OneRageTime (2018)

AI is programmed to be used in different domains through developing a programming language that is amalgamated with human intelligence and computational métier for outperforming humans based on the algorithm and the data, it has been trained. Thus, likewise humans, it has developed its characteristics of computer vision, speech recognition, and natural language processing attributes to get and provide multidimensional commands,

inputs, and output (see Figure 2) (Rouhiainen, 2018).

Figure 2. Attributes of AI
Source: Rouhiainen (2018)

As demonstrated in Figure 1, AI in education has enhanced e-learning while introducing more real-life features and possible platforms of learning while automating most of the manual functions (Ischebeck, 2017). E-learning is characterized as the optimization of data online in the process of learning that is accessible. This style of learning is not devoid of teacher or instructor but not teacher-centric, Rather, it can be both non-current and synchronous and there is no limit to the class size and student count which are usually the factors considered in the case of conventional learning and classrooms (Horton, 2018). Keeping the significance of improved learning through AI, a plethora of research has documented the significance of e-learning (Goyal, 2012; Arkorful and Abaidoo 2015; Baleni, 2015; Alnaqbi and Yassin 2021) while concluding that;

- it is an easily adaptable tool;
- it begets the students' autonomy to select the time and location of their study;
- it keeps the records of learning data for self-paced learning;
- it improves the viability and applicability of knowledge and information;
- it has encouraged dialogues and discussions through forming relationships among the groups, learning communities, and peers;
- it eliminates the barriers to participation such as cost, time, and communication.

More importantly, the challenges of AI in education have also been studied as students may find it less interesting to participate in distance learning and feel isolated. The lack of modified pedagogy amid AI usage can decrease the students' appeal and interest to ensure their full participation because of contemplation. The need of traditional explanation, communication, and clarification is still needed. The assessment methods are prone to cheating and the lack of effective control and monitoring persists in e-learning systems. AI-based e-learning is not all-encompassing as for the specialized fields, hands-on skills, and experience are yet required which cannot be achieved through e-learning (Goyal, 2012; Arkorful and Abaidoo 2015; Baleni, 2015; Alnaqbi and Yassin 2021). Alnaqbi and Yassin (2021) encapsulated the challenges of AI adoption in e-learning and stated that it will create a devoid of teacher-student interactions as it is an imperative of education. Also, the students find it difficult to take sessions through online mediums due to passive learning (Alnaqbi and Yassin, 2021). Wollowski et al. (2016)

conducted a survey to evaluate teachers' knowledge and understanding of important AI concepts (e.g., search, knowledge representation, reasoning, and machine learning). While, instructors' perceptions were not investigated about the possibilities of AI in higher education, nor evaluate the teacher's apprehensions. Linder and Romeike (2019) conducted a questionnaire survey to evaluate science teachers' knowledge of AI, which competencies and types of knowledge in the field of AI they would consider to be most important, and the challenges of teaching with AI. The teachers placed a higher value on students acquiring technical know-how and socio-cultural dynamics of AI and no focus has been given to exploring pragmatic use of AI. From the standpoints of teachers, there is a dearth of the aligned pedagogy and practicality of AI in the domain of education. In spite of all these stated limitations, teachers perceived AI as promising in imparting scientific education.

AlAfnan et al. (2023) examined the significance of ChatGPT in education and found that its performance was better than any of the search engines due to providing correct feedback and answers to the questions but in limited spheres which can be taken as one of its limitations. Moreover, the unethical and disruptive role of it can lead to human unlearning and unintelligence. Shaqra et al. (2022) investigated the role of AI in improving leadership skills for academic leaders. This study was conducted in Jordan and took the perspectives of faculty members through a 32-item questionnaire, divided into three sections administrative intellectual skills, decision-making, and technical skills. A total of 265 members of faculty were recruited. The results showed that there was a moderate impact of AI on the leadership skills of academic leaders whereas, the impact of AI varied significantly between the males and the females. However, no statistical difference was found based on public and private universities (Shaqra et al., 2022). Alnaqbi and Yassin (2021) investigated the usage of AI in the military education. The study was conducted in the United Arab Emirates (UAE). The study assessed the strategies, challenges, and adoption of AI in military colleges and recruited the students and teachers of Joint Command and Staff College (JCSC). 50 teachers and 157 students were recruited. According to the results, the dearth of human relations between teacher and student was the biggest challenge of using AI in e-learning. The findings also identified that the current educational system of UAE is not aligned with this transition which needs a massive upgrade to integrate AI usage while avoiding detraction.

Methodology

Study Design

The study adopted a cross-sectional study design to examine the apprehensions and potentiality of AI usage education from the perspective of educators. The cross-sectional study is an observational study, appropriate to collect data at one time about a specific phenomenon or area of study (Olsen and St George 2004).

Study Sampling

A random sampling technique was adopted to recruit 63 members of academic staff and administrators in the Faculty of Education, Kuwait University. The optimum sample size drawn from this population is based on the need to obtain accurate and precise quantitative data based on a statistically acceptable margin of error and confidence level. The online calculator Raosoft was used which recommended a sample size of 61 participants

with a 5% margin of error and 95% confidence. The online cross-sectional survey, therefore required a sample size of at least 68 participants to obtain the quantitative data needed to address the research questions. Thus, the sample size of the study was 63.

Data Collection

For data collection, the researcher designed and administered an online questionnaire. The participants were instructed to return the completed instruments to the researcher within three weeks of receipt. It comprised three sections; Attitudes for Artificial Intelligence (ATAI) scale developed and validated by Sindermann et al. (2021); Teachers' Perspectives on the Artificial Intelligence Questionnaire (adapted from Lindner et al., 2019); Scenarios of AI Education and AI-related Applications Questionnaire (adapted from Chen et al., 2020) (Appendix A).

The ATAI scale comprised five items on a 6-point Likert scale. Sindermann et al. (2021) collected cross-sectional data from Germany (N = 461), China (N = 413), and the UK (N = 84) and used factor analysis to divide the ATAI scale into two reliably measured dimensions. The factor solution indicated that the ATAI scale comprises two negatively correlated factors: (1) Acceptance of AI (items 1, 3, and 5) and (2) Fear of AI (items 2, and 4). These two dimensions measured the staff's general attitudes towards AI (to address RQ1).

The participants will complete all items in the instrument, Teachers' Perspectives on Artificial Intelligence Questionnaire (adapted from Lindner et al., 2019). The responses were given to the items in each of the five dimensions with a 6-point Likert scale format. Scenarios of AI Education and AI-related Applications Questionnaire (adapted from Chen et al., 2020) measured two dimensions, specifically the staff's beliefs about the major scenarios in AI education and the key AI-related applications.

Data Analysis

All the items incorporated in the three instruments listed in Tables 1, 2, and 3 were developed and published by other researchers. Consequently, because they are not new instruments, there is no need to validate the dimensions of each instrument using factor analysis. The analysis of the survey data was conducted using IBM SPSS version 26. All the dimensions were operationalized by averaging their constituent 6-point item scores. The averaging of multiple item scores was operationalized on 6-point Likert (Carifio and Perla, 2008; Wu and Leung, 2017). The descriptive statistics, T-test, and one-way analysis of variance (ANOVA) were computed to examine the extent to which the potentiality and apprehension of AI usage exist based on the perspectives of faculty members.

Results

Table 1 shows the demographic details of the participants. gender, academic degree, and academic department. The results showed that the males and females were almost equal in the sample size of the study where the majority of the participants were professors (n=26), working in the Curriculum and Instruction Department (n=45). While only 7 participants were from the Administration Department.

Table 1. Demographic Details

Variables	Description	Frequency	Percentage
Gender	Male	31	49.2
	Female	32	50.8
Total		63	100
Academic Degree	Associate Professor	23	36.5
	Assistant Professor	14	22.2
	Professor	26	41.3
Total		63	100
Academic Department	Curriculum and Instruction	45	71.4
	Foundations of Education	11	17.5
	Administration	7	11.1
Total		63	100

Table 2 represents the attitudes of faculty members towards AI. The results showed that the perceptions of the College of Education faculty members at Kuwait University towards AI came with medium acceptance degrees and an overall mean of 3.37. This indicates their medium acceptance of using AI in education. It is noted that there is a remarkably high consensus that AI will benefit humanity, as it received the highest mean among the axis items of 4.03. This was followed by their confidence in AI with a mean of 3.78. The analysis also showed that the lowest means were for items 1 and 3, which stated "I fear AI, AI will destroy humanity" with means of 2.98 and 3.05, respectively.

Table 2. Attitudes of Faculty Members towards AI

Items	Mean	Std. Deviation
1. I fear AI.	2.98	2.14
2. I trust AI.	3.78	2.11
3. AI will destroy humankind.	3.05	2.14
4. AI will benefit humankind.	4.03	1.98
5. AI will cause many job losses.	3.08	1.94
Total	3.37	1.25

The results indicated that the majority of the research sample (58.7%) did not have any prior teaching experience with AI. In contrast, 15.9% had used AI in teaching as part of non-curricular activities, while 12.7% had used AI in a regular classroom or a special lecture (see Table 3). About linking educational aspects to AI as a whole was 4.21. This suggests that the overall mean for the dimension of linking education to AI was moderate.

It is worth noting that the highest scores were obtained for only three items within this dimension. Their mean scores ranged from 4.24 to 4.43. These items were related to data analysis, machines, and natural language processing (see Table 4).

Table 3. Teaching Experience with AI

Description		Frequency	Percent
Have you any experience of teaching using AI?	No	37	58.7
	Yes, in a regular classroom.	10	15.9
	Yes, in a private lecture		
	Yes, as part of extracurricular activities	16	25.4
	Total	63	100.0

The responses of the individuals on these items indicated a consensus that the most important aspects of linking education and AI were data analysis, machine learning, and natural language processing. Furthermore, the analysis showed that the lowest mean score was for "sorting algorithms," with an average score of 4.06. "Knowledge," had the second-lowest mean score of 4.08 (see Table 4).

Table 4. Linking Educational Aspects to AI

S.No.	Aspects	Mean	Std. Deviation
1	Knowledge	4.08	1.98
2	Search	4.19	1.91
3	Statistical methods/theory of probability	4.22	1.89
4	Ethics	4.11	1.91
5	Classification	4.14	1.84
6	Machine learning	4.11	1.96
7	Sorting algorithms	4.06	1.95
8	Simulation	4.29	1.87
9	Reasoning	4.17	1.86
10	Robotics	4.21	1.94
11	Algorithms	4.33	1.93
12	Cloud computing	4.25	1.89
13	Natural language processing	4.29	1.92
14	Turing machines	4.24	1.94
15	Approximation	4.22	1.97
16	Data Analysis	4.43	1.86
	Total	4.21	1.80

For the integration of AI into Curricula, the results showed that the majority of the participants acknowledged their desire for the explicit integration of AI into the curricula (see Table 5). The results showed that the mean scores for the total items related to student empowerment requirements in using AI (AI) as a whole were 4.36. This suggests that the dimension of student empowerment requirements in using AI was moderate. The responses of the sample individuals on these items indicated a consensus that the most important student empowerment requirements in using AI included the ability to determine AI system use cases, evaluate the intelligence of AI

systems, and identify the technical limitations of AI systems (see Table 6).

Table 5. AI Integration

Description		Frequency	Percent
I would like to see an explicit integration of AI into the curriculum	Very strongly agree	8	12.7
	Strongly agree	2	3.2
	Somewhat agree	3	4.8
	Somewhat disagree	7	11.1
	Strongly disagree	13	20.6
	Very strongly disagree	30	47.6
	Total	63	100.0

Table 6. Empowerment Requirements in Using AI

Description	Mean	Std. Deviation
1 -Can assess the ethical implications of AI systems, especially chances and risks for society	4.25	1.68
2 - Can identify the technical limitations of AI systems	4.40	1.64
3 - Can use AI libraries	4.32	1.63
4 - Effectively utilized AI systems	4.38	1.65
5 - Can assess the intelligence of AI systems	4.41	1.64
6 - Compare different methods that are used in AI systems	4.32	1.65
7 - Can identify use cases for AI systems	4.46	1.55
Total	4.36	1.59

The results revealed that the mean scores for the total items related to challenges and difficulties in using AI as a whole were 4.83, showing the dimension of challenges and difficulties in using AI was high. These items were related to the availability of suitable educational materials, the lack of required expertise in the field, and the complexity of the subject (see Table 7).

Table 7. Challenges and Difficulties in Using AI

Description	Mean	Std. Deviation
1 - I do not have the required experience in this field	4.97	1.68
2 - There is a lack of suitable teaching materials	5.14	1.48
3 - There are no good best-practice examples	4.73	1.56
4 - The subject is too complex	4.78	1.57
5 - There is little or no time to deal with extra-curricular content in class	4.56	1.67
Total	4.83	1.40

The findings related to scenarios for education using AI were 482, with a relative weight of 80.3%. These items were related to personalized smart teaching, smart schools, and online and mobile distance education (see Table 8).

Table 8. Scenarios for Education Using AI

Description	Mean	Std. Deviation
1 - Assessment of students and schools	4.73	1.57
2 - Grading and evaluation of papers and exams	4.76	1.52
3 - Personalized intelligent teaching	4.87	1.34
4 - Smart School	4.86	1.28
5 - Online and mobile remote education	4.86	1.33
Total	4.82	1.34

In addition, for study variables i.e., type, academic degree, academic department, inferential statistics were used, the t-test for independent samples with the gender variable, and the analysis of variance test for the variables (the academic degree and the academic department). There were statistically insignificant differences attributed to gender, academic degree, and academic department (see Table 9, 10, 11) except for the challenges and difficulties of using AI between the males and the females (p value= .067) (see Table 9).

Table 9. t-Test Results between the Gender Variable

Dimensions		t	Sig. (2-tailed)
Faculty members' attitudes toward AI	Male	0.78	.440
	Female		
Empowering students to use AI	Male	-1.27	.210
	Female		
Challenges and difficulties of using AI	Male	-1.86	.067
	Female		
Education scenarios using AI	Male	-0.41	.685
	Female		
Applications related to AI	Male	-0.88	.383
	Female		

Table 10. Differences between Academic Degree Variables

Dimensions		Sig.
Faculty members' attitudes toward AI	Between Groups	.135
	Within Groups	
	Total	
Empowering students to use AI	Between Groups	.268

Dimensions		Sig.
	Within Groups	
	Total	
Challenges and difficulties of using AI	Between Groups	.052
	Within Groups	
	Total	
Education scenarios using AI	Between Groups	.279
	Within Groups	
	Total	
Applications related to AI	Between Groups	.227
	Within Groups	
	Total	

Table 11. Differences between Academic Department Variables

Dimensions		Sig.
Faculty members' attitudes toward AI	Between Groups	.760
	Within Groups	
	Total	
Empowering students to use AI	Between Groups	.716
	Within Groups	
	Total	
Challenges and difficulties of using AI	Between Groups	.963
	Within Groups	
	Total	
Education scenarios using AI	Between Groups	.892
	Within Groups	
	Total	
Applications related to AI	Between Groups	.959
	Within Groups	
	Total	

Discussion

It is noted that there is a remarkably high consensus that AI will benefit humanity and education from the perspectives of the faculty members of Kuwait University. The results indicated that the majority lacked prior teaching experience with AI. Despite this, there was a consensus that the most important aspects of linking education and AI were data analysis, machine learning, and natural language processing. The findings established

that the most important student empowerment requirements in using AI were the ability to determine AI system use cases, evaluate the intelligence of AI systems, and identify the technical limitations of AI systems. The dimension of challenges and difficulties in using AI was high. Most of the challenges included the availability of suitable educational materials, the lack of required expertise in the field, and the complexity of the subject. Moreover, there was no statistical difference attributed to gender, academic degree, and academic department. However, differences in terms of facing challenges and difficulties of using AI between the males and the females were statistically significant.

These results are similar to the study by Nguyen et al. (2023), emphasizing the potential of AI for education and other different fields but with the condition of formulating an AI ethical framework to be used in education. Also, the results of the Zhai et al (2021) supported the findings of the present study through the content analysis of AI and education and concluded that despite the promising aspects of AI for education, this transition can be potentially hampered by challenges such as disruptive transitions in the role of teachers and students, the emergence of social and ethical concerns, the lack of transparency in the data generation, modeling, training and the usage. The results of another study are congruent with the findings of the present study which stated that the transition of AI in the domain of education can increase the dearth of critical thinking. Also, this adoption could be affected negatively due to the lack of synergies between the currently used AI models for education and the established pedagogies which could trigger the detraction from the learning outcome that is predefined and the current AI-enabled educational achievements and trajectory (Zawacki-Richter et al., 2019; Ali et al., 2021). The findings of the present study are not aligned with the results of the study by Dwivedi et al. (2023). The study found that the impact of AI is transformative on the teaching, research, and learning process. In addition, the study suggested to tackle with the bias, the dearth of transparency, and the implementation of effective policies for a careful adoption of AI into education and research as well as to protect mankind from bias and misuse of disruptive AI (Dwivedi et al., 2023).

Regarding the teachers' preparedness for AI usage in education, Chiu and Chai (2020) derived their findings through the lens of self-administration theory and stated that amid the lack of teachers" preparedness about AI integration into education, four major areas to be modified as a greater strategy for upgrading the current educational practices. It included content, product, praxis, and process modification to align the current educational system with an AI-led changing environment. Besides, these similar findings, Vincent-Lancrin and Van der Vlies (2020) emphasized increasing the trust of stakeholders for AI in education as in many parts of the world, AI has not gained the trust of both the common man and stakeholders. These findings are dissimilar to the findings of the present study. Additionally, the challenges investigated by the present study were dissimilar to the results of Vazhayil et al. (2019), in the Indian context which revealed that the gaps in policy communication, poor infrastructure, poorly pedagogy, and content delivery, and cultural barriers were the significant challenges reported by the teachers, concerning the adoption of AI into education. Likewise, in the present study, no gender-based statistical differences were found concerning the challenges and difficulties of using AI.

The study provides novel aspects in the context of the Arab region, in particular, Kuwait. One of the limitations of the present study included that it did not take the perspectives of students into account. Thus, future studies can

examine AI to inculcate skills and policy-related challenges at the institutional levels to provide input for policy-makers. Future studies can conduct further research with a larger sample size from different universities.

Conclusion

The study concluded that according to the perspective of educational experts, both the apprehensions and potentiality are higher concerning integrating AI in the domain of education. It showed that there is a nuance of vitality amid multiple apprehensions, revealing that a lot has to be done to prepare AI for education rather than misaligning education for AI in the absence of technologically-aligned pedagogy. Also, it indicated several challenges with the adoption of AI which need reforms. The results of this study will help evaluate the possibilities and apprehensions in the landscape of AI in education by the College of Education Staff at Kuwait University Policy decisions will be made regarding the future contribution of AI to the content and delivery of the educational curriculum. Proactive decisions will be made to address any concerns about the challenges and difficulties that the staff observes in teaching with AI.

Acknowledgements

The author is thankful to all the associated personnel who contribute for this study by any means.

References

AlAfnan, M. A., Dishari, S., Jovic, M., & Lomidze, K. (2023). Chatgpt as an educational tool: Opportunities, challenges, and recommendations for communication, business writing, and composition courses. *Journal of Artificial Intelligence and Technology*, *3*(2), 60-68.

Alam, A. (2021, November). Possibilities and apprehensions in the landscape of artificial intelligence in education. In *2021 International Conference on Computational Intelligence and Computing Applications (ICCICA)* (pp. 1-8). IEEE. https://doi.org/10.1109/ICCICA52458.2021.9697272

Ali, M., & Abdel-Haq, M. K. (2021). Bibliographical analysis of artificial intelligence learning in Higher Education: is the role of the human educator and educated a thing of the past? In *Fostering Communication and Learning with Underutilized Technologies in Higher Education* (pp. 36-52). IGI Global.

Alnaqbi, A. M. A., & Yassin, A. M. (2021). Current Status, Challenges and Strategies of Artificial Intelligence and E-learning the UAE Military Education System. *International Journal of Sustainable Construction Engineering and Technology*, *12*(3), 352-361.

Arkorful, V., & Abaidoo, N. (2015). The role of e-learning, advantages and disadvantages of its adoption in higher education. *International journal of instructional technology and distance learning*, *12*(1), 29-42.

Baleni, Z. G. (2015). Online formative assessment in higher education: Its pros and cons. *Electronic Journal of e-Learning*, *13*(4), pp228-236.

Buabbas, A. J., Miskin, B., Alnaqi, A. A., Ayed, A. K., Shehab, A. A., Syed-Abdul, S., & Uddin, M. (2023, May). Investigating Students' Perceptions towards Artificial Intelligence in Medical Education.

In *Healthcare* (Vol. 11, No. 9, p. 1298). MDPI. https://doi.org/10.3390/healthcare11091298

Carifio, J., & Perla, R. (2008). Resolving the 50-year debate around using and misusing Likert scales. *Medical education*, *42*(12), 1150-1152. https://doi.org/10.1111/j.1365-2923.2008.03172.x

Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *Ieee Access*, *8*, 75264-75278. doi: 10.1109/ACCESS.2020.2988510.

Chiu, T. K., & Chai, C. S. (2020). Sustainable curriculum planning for artificial intelligence education: A self-determination theory perspective. *Sustainability*, *12*(14), 5568. http://dx.doi.org/10.3390/su12145568

Malik, T., Dwivedi, Y., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., & Wright, R. (2023). "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, *71*, 102642. https://doi.org/10.1016/j.ijinfomgt.2023.102642.

Goyal, S. (2012). E-Learning: Future of education. *Journal of Education and Learning (EduLearn)*, *6*(4), 239-242.

Horton, W. (2018), 'Types of e-learning', Retrieved from: http://horton.com/consulting/types/player.html

Kim, N. J., & Kim, M. K. (2022, March). Teacher's perceptions of using an artificial intelligence-based educational tool for scientific writing. In *Frontiers in Education* (Vol. 7, p. 142). Frontiers. https://doi.org/10.3389/feduc.2022.755914

Lameras, P., & Arnab, S. (2021). Power to the teachers: an exploratory review on artificial intelligence in education. *Information*, *13*(1), 14. https://doi.org/10.3390/info13010014

Lindner, A., Romeike, R., Jasute, E., & Pozdniakov, S. (2019). Teachers' perspectives on artificial intelligence. In *12th International conference on informatics in schools,"Situation, evaluation and perspectives", ISSEP*.

Nguyen, A., Ngo, H. N., Hong, Y., Dang, B., & Nguyen, B. P. T. (2023). Ethical principles for artificial intelligence in education. *Education and Information Technologies*, *28*(4), 4221-4241. https://doi.org/10.1007/s10639-022-11316-w

Wollowski, M., Selkowitz, R., Brown, L., Goel, A., Luger, G., Marshall, J., & Norvig, P. (2016, March). A survey of current practice and teaching of AI. In *Proceedings of the AAAI Conference on Artificial Intelligence* (Vol. 30, No. 1).

Olsen, C., & St George, D. M. M. (2004). Cross-sectional study design and data analysis. *College entrance examination board*, *26*(03), 2006.

OneRageTime. (2018). Usage of Artificial Intelligence. Retrieved from https://www.oneragtime.com/24-industriesdisrupted-by-ai-infographic

Ooi, K. B., Tan, G. W. H., Al-Emran, M., Al-Sharafi, M. A., Capatina, A., Chakraborty, A., & Wong, L. W. (2023). The potential of generative artificial intelligence across disciplines: perspectives and future directions. *Journal of Computer Information Systems*, 1-32. https://doi.org/10.1080/08874417.2023.2261010

Rouhiainen, L. (2018). *Artificial Intelligence: 101 things you must know today about our future*. Lasse Rouhiainen.

Shaqra, R. A., Alkailanee, K., & Essa, H. B. (2022). The Effect of Artificial Intelligence on Developing Leadership Skills Among Academic Leaders in Public and Private Universities in The Northern Region

from Faculty Members Point of View. *Multicultural Education*, *8*(3).

Sindermann, C., Sha, P., Zhou, M., Wernicke, J., Schmitt, H. S., Li, M., & Montag, C. (2021). Assessing the attitude towards artificial intelligence: Introduction of a short measure in German, Chinese, and English language. *KI-Künstliche intelligenz*, *35*, 109-118. https://doi.org/10.1007/s13218-020-00689-0

Tang, J. (2023). Artificial intelligence-based needs analysis for English specific purposes in digital environment. *Learning and Motivation*, *83*, 101914.

Ullah, S., Azim, P., & Asghar, N. (2014). Political Economy of Human Development: An Empirical Investigation for Asian Countries. *Pakistan Economic and Social Review*, 75-97.

Vazhayil, A., Shetty, R., Bhavani, R. R., & Akshay, N. (2019, December). Focusing on teacher education to introduce AI in schools: Perspectives and illustrative findings. In *2019 IEEE tenth international conference on Technology for Education (T4E)* (pp. 71-77). IEEE. https://doi.org/10.1109/T4E.2019.00021.

Vincent-Lancrin, S., & Van der Vlies, R. (2020). Trustworthy artificial intelligence (AI) in education: Promises and challenges. https://doi.org/10.1787/19939019

Wollowski, M., Selkowitz, R., Brown, L., Goel, A., Luger, G., Marshall, J., & Norvig, P. (2016, March). A survey of current practice and teaching of AI. In *Proceedings of the AAAI Conference on Artificial Intelligence* (Vol. 30, No. 1).

Wu, H., & Leung, S. O. (2017). Can Likert scales be treated as interval scales? —A Simulation study. *Journal of social service research*, *43*(4), 527-532. https://doi.org/10.1080/01488376.2017.1329775

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education–where are the educators? *International Journal of Educational Technology in Higher Education*, *16*(1), 1-27. https://doi.org/10.1186/s41239-019-0171-0

Zhai, X., Chu, X., Chai, C. S., Jong, M. S. Y., Istenic, A., Spector, M., & Li, Y. (2021). A Review of Artificial Intelligence (AI) in Education from 2010 to 2020. *Complexity*, *2021*, 1-18. https://doi.org/10.1155/2021/8812542.

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