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Faculty Members' Awareness of Artificial Intelligence and Its Relationship to Technology Acceptance and Digital Competencies at King Faisal University

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Abstract. Artificial intelligence (AI) is a field of science seeking to develop computer systems with a level of efficiency similar to that of an expert human. By employing the most advanced technologies, such efficiency can contribute significantly to improving the educational process. Therefore, this study aimed to identify the level of AI awareness among faculty members at King Faisal University and examine the relationship between AI awareness and technology acceptance (TA) and digital competencies (DCs). The study used the descriptive-correlational research method, and three analyses were conducted, focusing mainly on AI, TA, and DCs. The sample consisted of 101 faculty members from all departments in the College of Education, representing 43.5% of the college's faculty. They were selected using the simple random sampling method. After analyzing the quantitative data, findings revealed that the faculty members had a medium level of awareness, with a mean score of 3.05 on a 5-point scale. The findings also revealed that there was no statistically significant relationship between AI awareness and TA among faculty members, with a correlation value of 0.139 and a significance value of 0.165. In contrast, the study found a direct and statistically significant positive relationship between AI awareness and DCs among faculty members, with a correlation value of 0.568 and a significance of < 0.001. Therefore, it is essential to prepare faculty members to use AI in education and improve their attitudes towards AI by conducting workshops and providing them with the necessary skills to employ AI applications in education.

Keywords: artificial intelligence; technology acceptance; digital competencies; faculty members; King Faisal University

1. Introduction

Modern technology has affected every aspect of human life, especially education. The world has now moved towards employing the fifth generation of the Internet, the so-called Internet of Things, in education, and there has been a growing interest in integrating artificial intelligence (AI) applications into the teaching and learning process. Hence, AI has grown to hold great significance in this field (Al-Darayseh, 2023; Ilkka, 2018).

Many educational institutions have tended to employ AI techniques in their educational systems and benefit from such techniques by advancing the levels of workers' performances in their various departments and branches. In fact, such integration contributes to investing in this reality, facilitating the management of the education process, and achieving better educational outcomes. Holmes et al. (2019) found that the use of AI tools to support and enhance learning has increased in the past decade, and Zawacki-Richter et al. (2019) confirmed that this use increased after the closure of schools due to COVID-19. Many commercial companies that are specialized in AI applications reported significant increases in registered users in education (Maio et al., 2021).

AI is currently the most prominent technique in the world of technology, and it is based on enabling computer systems to perform tasks that usually require human intelligence. The field of AI is concerned with the theory and practice of developing systems that simulate the distinctive characteristics of human intelligence, and its main goal is to understand the principles of intelligence in human behavior to implement them in a machine (Badawi, 2022; Luo, 2018; Nadimpalli, 2017; Tecuci, 2012). As the development of AI began with the intention of creating intelligence similar to human intelligence and implanting it in machines, making it capable of learning and analyzing data in different situations, showing reactions, and making decisions according to the situation, AI is designed based on many disciplines such as computer science, biology, psychology, linguistics, mathematics, and engineering in order to develop computer functions related to human intelligence such as thinking, learning, and problem solving (Ahmed, 2018).

The development of AI began with the intention of creating artificial intelligence similar to human intelligence by making technology capable of learning, analyzing data and different situations, showing reactions, and making decisions. Given this broad scope, AI is utilized in many disciplines, including computer science, biology, psychology, linguistics, mathematics, and engineering, to develop computer functions related to human intelligence, such as thinking, learning, and problem-solving (Tutorial Point, 2015).

AI is increasingly important in academic institutions as faculty members and students demand high use of the information. Using AI technologies enables faculty members and students to perform their job duties and scientific requirements or develop their capabilities and skills in the field of higher education (Al-Khathami, 2010). AI is thus likely to change education in the coming decades, both in the classroom and at the system level (Organization for Economic Co-operation and Development [OECD], 2020). For example, when it comes to personal learning, AI can provide learning based on the individual needs of the learner and identify educational resources and methods within the framework of the student's learning pace. Luckin (2017) argued that AI technologies aim to enable every learner to access high quality, personalized, comprehensive, ubiquitous, and lifelong education, whether formal or non-formal. Holmes et al. (2022) state that the use of AI in education consists of four levels: (a) learning with AI, in which AI provides supportive resources for the learner, teacher, and educational administration; (b) using AI to learn how to learn through data analysis, identify students' academic level and effective learning methods, and make decisions about the learning process and educational plans; (c) learning about AI, which concerns learners' knowledge of AI techniques; and (d) preparing for AI, in which all citizens are prepared for the possible effects of AI on their lives and are made aware of some of the issues associated with it, such as ethics of AI, databases, monitoring, and the potential impact on jobs in the future. In general, current estimates indicate that AI is impacting the job market, which is leading to rapid changes in the demand for certain skills and competencies, and the educational system must adapt to such changes (Ilkka, 2018).

Marvin Minsky and John McCarthy first used the phrase artificial intelligence (AI) in 1956 as one of the outcomes of a workshop that brought together several researchers in various fields to build machines capable of simulating human intelligence (Kaplan & Haenlein, 2019). McCarthy et al. (2006,) defined AI as "a machine that deals with a certain problem in the manner of human intelligence," (p. 11) while Kaplan and Haenlein (2019) defined it as "a system that is capable of correctly interpreting external data, learning from such data, and using the data to achieve specific goals and tasks through flexible adaptation" (p. 15). Leslie et al. (2021) defined AI as "algorithmic models that perform cognitive functions in areas that were subject to human thinking, judgment, and inference" (p. 8), and UNICEF (2021) defined it as

> *machine-based systems that are able, by providing them with a set of goals, to make predictions, recommendations, and decisions that affect reality or the virtual environment so that AI systems interact with us and work in our environment directly or indirectly and in an independent manner that is able to adapt its behavior by recognizing the context. (p. 16)*

Similarly, UNESCO (2021) defined AI as

> *technical means that are used to process information that integrate models and algorithms in an attempt to enhance the ability to learn and perform cognitive tasks that lead to results such as prediction and decision-making in real and hypothetical conditions independently. (p. 4)*

Recently, AI has been defined as a scientific field (or activity) that manufactures machines that can work appropriately based on the environment. AI is also a technology that can be used in various ways in several fields, including for development in education (Ilkka, 2018). Considering the previous definitions, it is clear that AI is becoming increasingly complex at the level of construction as well as the functions it performs, and the field is forming an independent science. Moreover, the field of AI is receiving increased interest, especially in terms of its potential to improve the quality of life in general. Zhong (2006) asserts that AI is a branch of modern science and technology that aims to explore the secrets of human intelligence and transplant it into machines.

Furthermore, the literature indicates that there are three generations of AI. The first generation is called artificial narrow intelligence (ANI), and in this generation, AI is applied to specific tasks. The second generation is called artificial general intelligence (AGI); in this generation, AI can think, plan, and solve problems independently. The third generation is artificial superintelligence (ASI), in which AI is considered a conscious system capable of social skills and creativity (Kaplan & Haenlein, 2019). Notably, AI applications have raised the expected level of reliability and effectiveness in terms of processing data for solving problems and making decisions. AI can advance the learning and thinking processes, which play a significant role in utilizing and employing knowledge cumulatively. Thus, such features can improve the quality of decision-making based on analyzing data quantitatively and qualitatively, regardless of the complexity of the problem (Chowdhury & Sadek, 2012).

Regarding AI's application in education, Al-Darayseh's study (2023) demonstrated the positive impact of applying the technology acceptance model (TAM) to the use of AI applications and the emergence of many positive factors that improve self-efficacy. In addition, Al-Darayseh's study emphasized the need for reinforcing teachers' awareness of the basic concepts of AI and providing them with the necessary tools to apply such concepts in the teaching and learning processes, The study also suggested conducting experimental studies to develop teachers' competence in utilizing AI in the classroom. Similarly, Zhang and Aslan's study (2021) indicated that AI contributes to meeting the emotional needs of students, in turn improving learning. They additionally emphasized the need for more comprehensive designs and Artificial Intelligence in Education (AIED) technologies to meet the diverse needs and preferences of students. The AIED Association (2023) concluded that there is a need to develop a plan for researchers to conduct empirical studies regarding how AIED can shape the future of education in the next thirty years. Recently, AIED has become one of the most important goals of the United Nations; by using AI in education, it is possible to create a world with effective education at all levels (United Nations, 2023).

Concerning the realistic application of AI in schools, a study by Nazaretsky et al. (2021) found that teachers viewed AI technologies and tools as highly valuable; however, they were not sure that they wanted to adjust their teaching methods to employ such technologies. The study also showed that teachers resisted adopting recommendations that contradicted their beliefs about education. In addition, Al-Subhy's study (2020) aimed to identify the reality of the use of AI applications by faculty members at Najran University, as well as the challenges facing their use and the relationship between some variables such as gender and academic degree. The study had a sample of 301 faculty members at Najran University, and the study concluded that the use of AI applications in education by the respondents was very low. Furthermore, it is concluded that there are many challenges affecting the use of AI applications. Jabali and Al-Qahtani's study (2022) also aimed to identify faculty members' degree of awareness of AI skills in education and its relationship to teaching experience and training programs at King Khalid University in the Kingdom of Saudi Arabia. Their study was based on a sample of 133 faculty members at the university. The results showed that the faculty members had a high degree of awareness of AI and that there were no statistically significant differences in the effect of experience and training programs on the faculty members' degree of awareness.

One of the most important challenges facing researchers in the field of information systems and technology is the extent to which beneficiaries accept or reject this modern technology. For this reason, researchers are interested in developing theories and models that explain how beneficiaries accept a particular technology. Technology Acceptance Model (TAM), presented by Davis in 1989. The TAM is one of the most commonly used models to identify the factors that affect beneficiaries' acceptance of technology (Jeong, 2011) because it analyzes external environments and behavioral factors. It is also characterized by flexibility, which enables the consideration of external factors that are relevant to the study population and are expected to impact their technology acceptance (Al-Alawi et al., 2014).

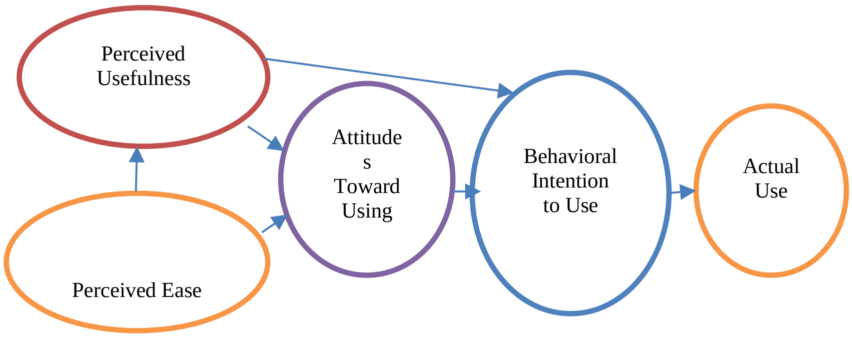

Figure 1: Technology Acceptance Model (Davis, 1989)

The TAM assumes that the acceptance of any particular technology is based on two main factors: perceived usefulness, which expresses the level to which an individual believes that using a particular system will help him or her enhancing functional performance, and perceived ease of use, which refers to the degree to which a person believes that using the technology will be easy. For a particular system, it will be with the least possible effort (Davis, 1989). These two belief-based factors are affected by other external variables and indirectly influence the behavioral intention to use technology (Davis, 1989). Therefore, the TAM is useful in describing user technology adoption behavior in various environmental settings (Fathema & Sutton, 2013). For example, in one study, Teo (2009) attempted to build a model to predict the extent of TA for pre-service teachers at the Female Teachers Training Institute in Singapore and examined the relationships between variables associated with factors affecting TA. Computer self-efficacy was found to directly impact behavioral acceptance of technology use, while perceived ease of use, technological complexity, and facilitating conditions affected the behavioral acceptance of use indirectly.

The introduction of new technology in learning tools such as mobile devices, tablets, laptops, simulators, and virtual laboratories aims to change education in schools and institutions. The globalization of education requires the application of digital technologies (Haleem et al., 2022). Therefore, the teaching profession faces rapidly changing demands that require a set of new competencies that are increasingly broader and more developed (European Commission, 2023). The researchers of the current study believe that digital competencies (DCs) are essential in the present education system and serve as the gateway to the future of education. Workers at all levels of education must develop their digital skills and competencies to keep pace with the current escalation of knowledge and technology. DCs are one of the eight main competencies for the optimal use of a range of digital information and communication technologies as well as basic problem-solving in all aspects of life (Akgün, 2020). DCs include the ability to use digital technologies safely, critically, and judiciously in work, learning, social engagement, and human interactions to achieve various goals (Caena & Redecker, 2019). DCs are also a way of using and understanding technologies and their impacts on the digital world (Becker et al., 2017). In the field of education, DCs include the technical skills that faculty members use to obtain information, formulate it in the form of digital images, store it in files, and publish it on the information network (Amayreh, 2019). With technological development, education professionals must learn to use various tools, improve their DCs, and harness all available online resources and e-learning platforms to ensure that their materials are attractive and up-to-date (Haleem et al., 2022).

Shaheen et al. (2021) classified DCs in the educational process into four categories: (a) computer competencies, (b) computer leadership competencies, (c) Internet network leadership competencies, and (d) software design and educational multimedia competencies. Similarly, Al-Alimat (2012) classified electronic technical competencies into four types: (a) cognitive competencies, (b) performance competencies, (c) emotional competencies, and (d) productive competencies. In the European framework, DCs for teachers in 22 areas are classified into six categories: (a) competencies related to the professional environment; (b) competencies related to providing, creating, and sharing digital materials; (c) competencies related to managing digital tools and regulating their use; (d) competencies related to digital tools and strategies that enhance evaluation; (e) competencies related to using digital tools to empower learners; and (f) competencies related to facilitating DCs for learners. This framework includes DCs for teachers in all stages of education, as it provides a general reference framework for developers of DC models in educational organizations (European Commission, 2006).

DCs are essential in the current day, as they help provide teachers with the appropriate amount of knowledge and skills to use modern technologies in their field of work and keep pace with the development taking place in the field of education. Furthermore, in general, DCs help raise the quality of education and learning (Al-Ghamdi, 2019). Carretero et al. (2017) also identified areas for evaluating DCs among faculty members: knowledge of information and data; communication and collaboration; digital content creation (including programming); safety (including digital well-being and cybersecurity-related skills); and problem-solving (critical thinking). Finally, Chiu et al. (2021) emphasized that DCs in higher education must be further researched.

The Gothenburg Summit in 2017 recommended developing an action plan to enhance digital skills and competencies to expand and increase the purposeful use of digital and innovative education practices. The following priorities were identified: more effectively using digital technology in teaching and learning, developing relevant DCs and skills for digital transformation, and improving education (Ilkka, 2018). Regarding the development of DCs, Moawad (2019) aimed to identify the effectiveness of a pervasive training environment based on the preferred training pattern for developing DCs and TA among faculty members. In the development of DCs and TA among faculty members at the College of Education, the second experimental group with a participatory training style excelled. Ng et al. (2023) also indicated that there is an increasing need to prepare teachers with DCs to use and teach AI in their institutions, especially in the presence of a small number of reference guides that direct them to work in these environments; therefore, they emphasized the need to train teachers with the necessary DCs.

University faculty members are the pillars of the educational process; they determine the strength, level, and quality of the university, and it is their responsibility to achieve the desired goals in educational development, especially in light of technological acceleration, which helps universities compete at the global level (Sharaf El-Din, 2023). Technical education is a natural response to the educational opportunities provided by the information and communications revolution; it can advance teachers' ability to improve teaching methods and develop teaching competencies in the university education system (Al-Khafaji et al., 2021). Teachers have many modern responsibilities and contemporary roles, including the masterful use of knowledge sources such as information networks, computer programs, and applications; influencing direct attitudes and designing activities and experiences based on technology; and innovating the use of educational technologies and knowledge sources. In order for a faculty member to fulfil these roles, they must possess many educational and technical competencies (Abdul Rasul, 2015).

There are several key factors that directly affect institutions' success in adapting to AI, the enormous capabilities it possesses, the recent trends of employing it in the educational process, and what it takes to develop capabilities in various educational institutions to address this modern innovation. The most important factors are the workers' level of awareness of the technology, their acceptance of it, their willingness to use it, and their possession of the necessary DCs (Ahmed, 2020).

King Faisal University seeks to employ modern technologies in managing the educational process, delivering education to beneficiaries in line with the requirements and standards of the present day, and enhancing its efficiency as an educational institution. However, researchers who have worked at King Faisal University for between 8 and 15 years have noticed a discrepancy in the attitudes of faculty members regarding their TA and DCs. In addition, there is a lack of forums, seminars, programs, training courses, and workshops for faculty members to develop the knowledge required for using contemporary technology and understanding its importance in the future of education.

Based on the above considerations and the suggestions of previous literature (Ahmed, 2020; Kleef et al., 2010; Krumsvik, 2008), it is essential to prepare individuals for the new era of technology and discuss the challenges that arise in educational systems. Ahmed (2020) confirmed that digital education in the Arab world still faces challenges at various levels, and there is an urgent need to conduct more studies to address this issue and its various elements. Therefore, the problem of the current study emerged, and the research attempted to answer the following research questions:

1. What level of awareness do faculty members at King Faisal University have regarding AI?

2. What is the correlation between the level of awareness of AI and TA among faculty members at King Faisal University?
3. What is the correlation between the level of awareness of AI and DCs among faculty members at King Faisal University?

2. Methodology

2.1. Approach

After the researchers identified the problem of the study, reviewing the literature related to the subject, and considering the nature of the study, its objectives, questions, and the data to be obtained, they concluded that the appropriate approach to the current study was the descriptive-correlational approach. This approach was chosen due to its ability to identify detailed facts about the reality of the studied phenomenon, which enabled the researchers to obtain a comprehensive description and accurate diagnosis of the problem. The study sample included faculty members from the College of Education at King Faisal University in the Al-Ahsa Governorate. They were selected using the simple random sampling method. A 5-point Likert scale was prepared for the study and was used to identify the level of faculty members' cognitive and performance awareness of AI. Their responses were then analyzed.

2.2. Study population and sample

The study population consisted of all faculty members in the College of Education at King Faisal University in the Al-Ahsa Governorate, which included 232 members in the third semester of 2022–2023. The study instruments were distributed to all members, and 101 members, from various departments of the college, responded, representing 43.53% of the faculty of the College of Education. The researchers obtained research ethics approval from the Deanship of Scientific Research at King Faisal University, Ref. No. KFU-REC-2023-APR-ETHICS775.

2.3. Study instruments

2.3.1. Artificial Intelligence Awareness Scale (AIAS)

The researchers developed a 5-point Likert scale to measure the level of AI awareness among faculty members by looking at the educational literature and referring to several measures related to AI. The scale was presented to a group of experts in educational technologies to ensure its validity. The arbitrators were asked to express their opinions on the scale in terms of the items' appropriateness, their clarity, the soundness of their linguistic formulation, and any other observations. The researchers considered the consensus of 85% of the arbitrators (six out of seven) sufficient to deem the item acceptable. After consulting the arbitrators, three items were deleted, and two new items were added. The linguistic formulations of four items were modified, and the scale ultimately consisted of 12 items measuring two dimensions: cognitive awareness of AI and performance awareness of AI.

The faculty members responded to the items using the 5-point Likert scale method (strongly agree = 5, agree = 4, neutral = 3, disagree = 2, strongly disagree = 1). Each faculty member then received a score between 12 and 60. A high score indicated a high level of awareness of AI, while a low score indicated a low level of awareness. To verify the psychometric efficiency of the scale, the researchers calculated the stability of the scale using Cronbach's alpha coefficient. The Cronbach's alpha coefficient for cognitive awareness of AI was 0.915, and for the performance awareness of AI, the Cronbach's alpha coefficient was 0.940. The Cronbach's alpha coefficient for the two dimensions reached a value of 0.953. The validity of the scale was also verified through the validity of its internal consistency. The internal homogeneity of the scale's 12 items was determined by calculating the Pearson correlation coefficient between the degree of each item and the dimension to which the item belongs, as well as the correlation coefficient for the dimensions of the scale and the total score. The results of the correlation coefficient between each statement and the total score of the dimension to which it belongs.

The results indicated that each item had a positive correlation coefficient with its corresponding dimension, which is statistically significant at the significance level of 0.01 or less. This value demonstrated the reliability and validity of the scale's endogenous consistency (see Appendix 1, Table 1).

The results of the correlation coefficient between each statement and the total score of the dimension to which it belongs showed that all correlation coefficients were statistically significant at the level of 0.01, which indicated the internal consistency of the scale and its validity for application (see Appendix 2, Table 2).

2.3.2. Digital Competence Scale (DCS)

The researchers designed a 5-point scale to measure the level of DCs among faculty members in the College of Education by consulting the educational literature and referring to several scales related to DCs. The scale was presented to a group of experts and specialists in educational technologies, curricula, and teaching methods. To ensure the scale's validity, the arbitrators were asked to express their opinions on the scale in terms of the items' appropriateness, their clarity, the soundness of their linguistic formulation, and any other observations. The researcher considered the consensus of 85% of the arbitrators (seven out of eight) sufficient to deem the item acceptable. According to the arbitrators' feedback, five items were deleted, three items were added, and the linguistic formulations of seven items were modified. After making the necessary modifications based on the observations of the arbitrators, the scale consisted of 14 items measuring three dimensions: technical knowledge competencies, technical performance competencies, and technical production competencies.

The faculty members responded to the items using the 5-point Likert scale method. Then, each faculty member received a score between 14 and 70. A high score indicated a high level of DCs, while a low score indicated a low level of DCs. To verify the psychometric efficiency of the scale, the researchers calculated the stability of the scale using Cronbach's alpha coefficient. The Cronbach's alpha coefficients for technical cognitive, technical performance, and technical productivity competencies were 0.862, 0.888, and 0.860, respectively. The Cronbach's alpha coefficient for all dimensions was 0.938. In addition, the validity of the scale was verified through the validity of its internal consistency. The internal homogeneity of the scale's 14 items was determined by calculating the Pearson correlation coefficient between the degree of each item and the dimension to which the item belongs, as well as the correlation coefficient for the dimensions of the scale and the total score.

The results of the correlation coefficient between each statement and the total score of the dimension to which it belongs indicated that each item had a positive correlation coefficient with its corresponding dimension, which was statistically significant at a level of 0.01 or less. This value demonstrates the reliability and validity of the scale's endogenous consistency (see Appendix 3, Table 3).

The results of the correlation coefficient between the dimensions of the scale and the total score showed that all correlation coefficients were statistically significant at the level of 0.01, which indicated the internal consistency of the scale and its validity for application (see Appendix 4, Table 4).

2.3.3. Technological Acceptance Scale (TAS)

The researchers designed a 5-point Likert scale to measure the level of TA among faculty members in the College of Education by looking at the educational literature and referring to several measures related to TA. The scale was presented to experts in educational technologies in order to ensure its validity. The arbitrators were asked to express their opinions on the scale in terms of the items' appropriateness, their clarity, the soundness of their linguistic formulation, and any other observations. The researcher considered the consensus of 85% of the arbitrators (six out of seven) sufficient to deem the item acceptable. Two phrases were deleted, one phrase was added, and the wording of five phrases was modified. After making the necessary modifications, the scale comprised 16 items measuring three dimensions: ease of use, expected benefit, and satisfaction and attitude toward use.

The faculty members responded to the items using the 5-point Likert scale method. Then, each faculty member received a score between 16 and 80, with a high score indicating a high level of TA and a low score indicating a low level of TA. To verify the psychometric efficiency of the scale, the researchers calculated the stability of the scale according to Cronbach's alpha coefficient. The Cronbach's alpha coefficients for ease of use, expected benefit, and satisfaction and attitude toward use were 0.814, 0.900, and 0.895, respectively. The Cronbach's alpha coefficient for all dimensions was 0.931. In addition, the validity of the scale was verified; the internal homogeneity of the scale's 16 items was determined by calculating the Pearson correlation coefficient between the degree of each item and the dimension to which the item belongs, as well as between the dimensions of the scale and the total score.

The results of the correlation coefficient between each statement and the total score of the dimension to which it belongs indicated that each item had a positive correlation coefficient with its corresponding dimension, which is statistically significant at a significance level of 0.01 or less. This value demonstrated the reliability and validity of the scale's endogenous consistency (see Appendix 5, Table 5).

The results of the correlation coefficient between the dimension of the scale and the total score showed that all correlation coefficients were statistically significant at the level of 0.01, demonstrating the internal consistency of the scale and its validity for application (see Appendix 6, Table 6).

3. Results

3.1. Results for research question 1

The first research question asked: **what level of awareness do faculty members at King Faisal University have about AI?**

The mean and standard deviation of the survey responses were calculated. The results are shown in Table 7.

Table 7. Descriptive statistics of the respondents' level of cognitive awareness related to AI (n = 101)

No.	Item		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std. Deviation	Rank
1	I have sufficient knowledge of AI programs and applications.	Freq.	10	37	30	23	1	3.32	0.97	1
		%	9.9	36.6	29.7	22.8	1			
2	I have sufficient knowledge of the roles of the faculty member in the application of AI in teaching.	Freq.	11	37	27	23	3	3.3	1.03	2
		%	10.9	36.6	26.7	22.8	3			
3	I have knowledge of the basics of designing and implementing lessons using AI programs and applications.	Freq.	9	34	26	22	10	3.01	1.14	4
		%	8.9	33.7	25.7	21.8	9.9			
4	I have knowledge of methods of evaluating student assignments implemented by AI applications.	Freq.	11	27	30	27	6	3.1	1.1	3
		%	10.9	26.7	29.7	26.7	5.9			
Mean* for total								3.2	0.95	

According to Table 7, the general mean for the first dimension was 3.20, with a standard deviation of 0.95. These values indicated that the faculty members had a medium level of cognitive awareness of AI. Item 1, "I have sufficient knowledge of AI programs and applications," was ranked the highest, with a mean score of 3.32 and a standard deviation of 0.97. Item 3, "I have knowledge of the basics of designing and implementing lessons using AI programs and applications," was ranked the lowest, with a mean of 3.01 and a standard deviation of 1.14.

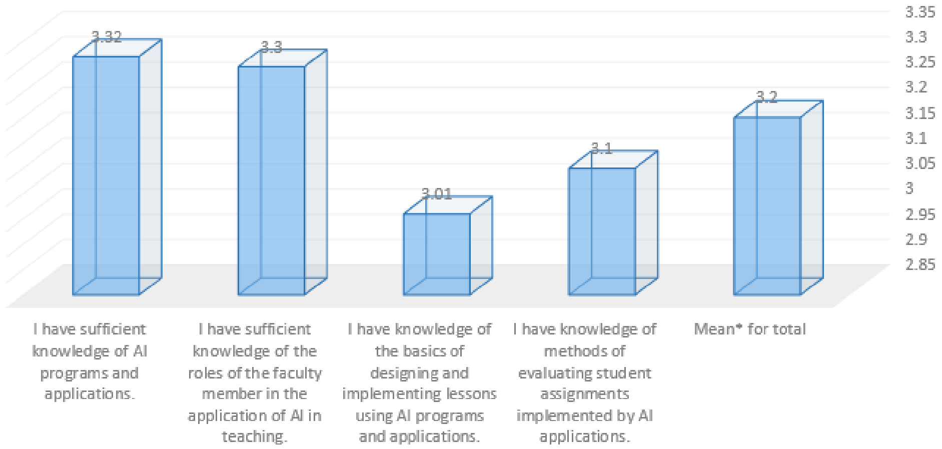

Figure 2: The means of cognitive awareness related to AI

Table 8. Descriptive statistics of the respondents' level of performance awareness related to AI (n = 101)

No.	Item		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std. Deviation	Rank
5	I can create various files using AI applications.	Freq.	12	32	26	26	5	3.2	1.1	1
		%	11.9	31.7	25.7	25.7	5			
6	I can design course content using AI applications.	Freq.	9	31	21	33	7	3.02	1.13	4
		%	8.9	30.7	20.8	32.7	6.9			
7	I can summarize long texts using AI applications.	Freq.	9	29	28	30	5	3.07	1.07	2
		%	8.9	28.7	27.7	29.7	5			
8	I can respond to students' inquiries through the use of chatbots.	Freq.	12	29	19	31	10	3.02	1.22	5
		%	11.9	28.7	18.8	30.7	9.9			
9	I can convert written texts in the course into audio files using AI (sound making) applications.	Freq.	8	25	24	34	10	2.87	1.14	7
		%	7.9	24.8	23.8	33.7	9.9			
10	I can use AI applications based on suspense, challenge, and scientific	Freq.	6	31	25	26	13	2.91	1.15	6
		%	5.9	30.7	24.8	25.7	12.9			

	competition in the educational process.									
11	I can convert printed images or text into editable text files using AI applications.	Freq.	7	32	25	31	6	3.03	1.072	3
		%	6.9	31.7	24.8	30.7	5.9			
12	I can turn written texts into educational films using AI applications.	Freq.	4	21	23	42	11	2.65	1.05	8
		%	4	20.8	22.8	41.6	10.9			
Mean* for total								2.97	0.94	

Based on Table 8, the general mean for the performance awareness dimension was 2.97, with a standard deviation of 0.94. These values indicated that the faculty members perceived themselves as having a medium level of performance awareness of AI. Item 5, "I can create various files using AI applications," was ranked the highest, with a mean score of 3.20 and a standard deviation of 1.10. Item 7, "I can summarize long texts using AI applications," ranked second, with a mean score of 3.07 and a standard deviation of 1.07.

Item 9, "I can convert written texts in the course into audio files using AI (sound making) applications," ranked seventh, with a mean score of 2.87 and a standard deviation of 1.14. Finally, item 12, "I can turn written texts into educational films using AI applications," was ranked the lowest, with a mean score of 2.65 and a standard deviation of 1.05.

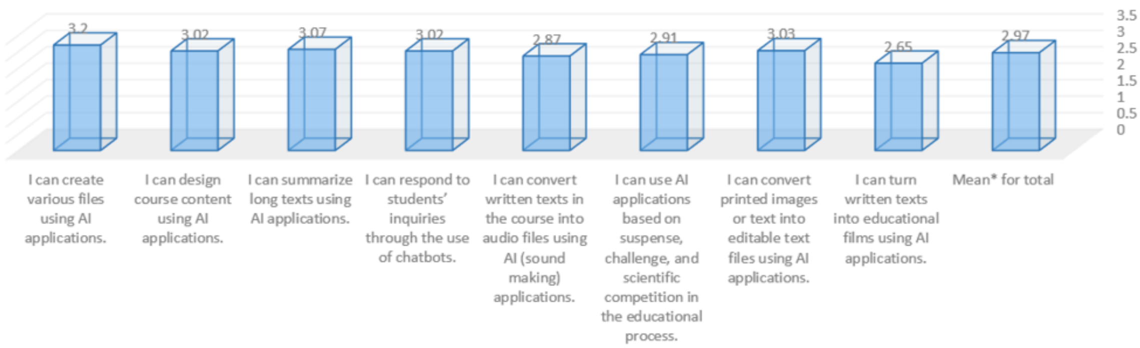

Figure 3: The means of performance awareness related to AI

Table 9. The overall results of the study sample's level of awareness related to AI (n = 101)

Dimensions	Mean	Std. Deviation	Rank
Level of cognitive awareness related to AI	3.20	0.95	1
Level of performance awareness related to AI	2.97	0.94	2
Overall score	3.05	0.89	

According to Table 9, the general mean of the scale was 3.05, with a standard deviation of 0.89. These values indicated a medium degree of awareness of AI among the participants. The first dimension, cognitive awareness of AI, was ranked higher, with a mean score of 3.20 and a standard deviation of 0.95. The second dimension, performance awareness of AI, was ranked lower, with a mean score of 2.97 and a standard deviation of 0.94.

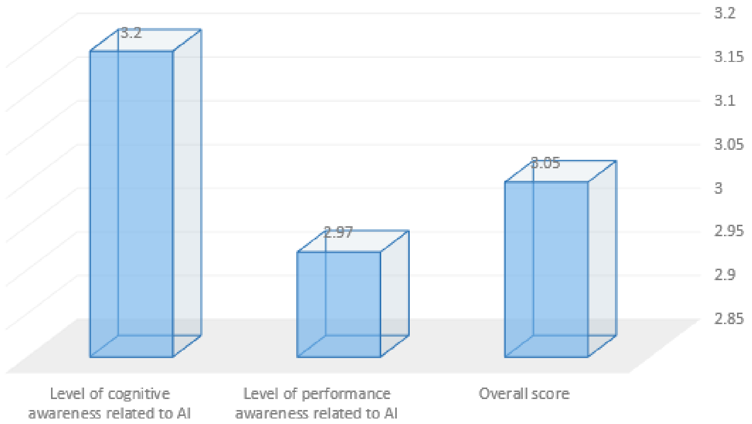

Figure 4: The means of awareness related to AI

3.2. Results for research question 2

The second research question asked: **what is the correlation between the level of awareness of AI and TA among faculty members at King Faisal University?**

The Pearson correlation coefficient was calculated between the respondents' scores on the AIAS and their scores on the TAS. The results are shown in Table 10.

Table 10. Pearson correlation coefficient between the respondents' scores on the two scales

		TA
AI	Pearson correlation coefficient	0.139
	Sig.	0.165
	No.	101

According to Table 10, the value of the correlation coefficient between the faculty members' scores on the AIAS and the TAS was 0.139. The significance value was 0.165, which is greater than 0.05, indicating that there is no statistical significance between AI awareness and TA among the study sample.

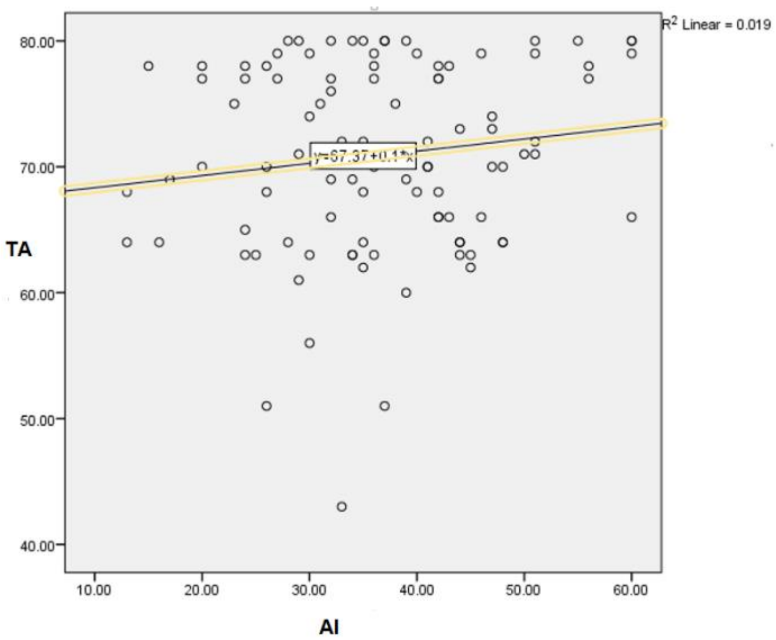

Figure 5: The relationship between AI and TA

3.3. Results for research question 3

The third question asked: **what is the correlation between the level of awareness of AI and DCs among faculty members at King Faisal University?**

The results are shown in Table 11.

Table 11. Pearson correlation coefficient between the respondents' scores on the two scales

		DCs
AI	Pearson correlation coefficient	0.568**
	Sig.	<0.001
	No.	101

**p<0.01

Based on Table 11, the correlation coefficient between the faculty members' scores on the AIAS and the DCS was 0.568, which is a positive value and indicates a positive direct correlation. The correlation is statistically significant, as the significance value was less than 0.001. Therefore, AI awareness is significantly and directly positively correlated with DCs among the study sample.

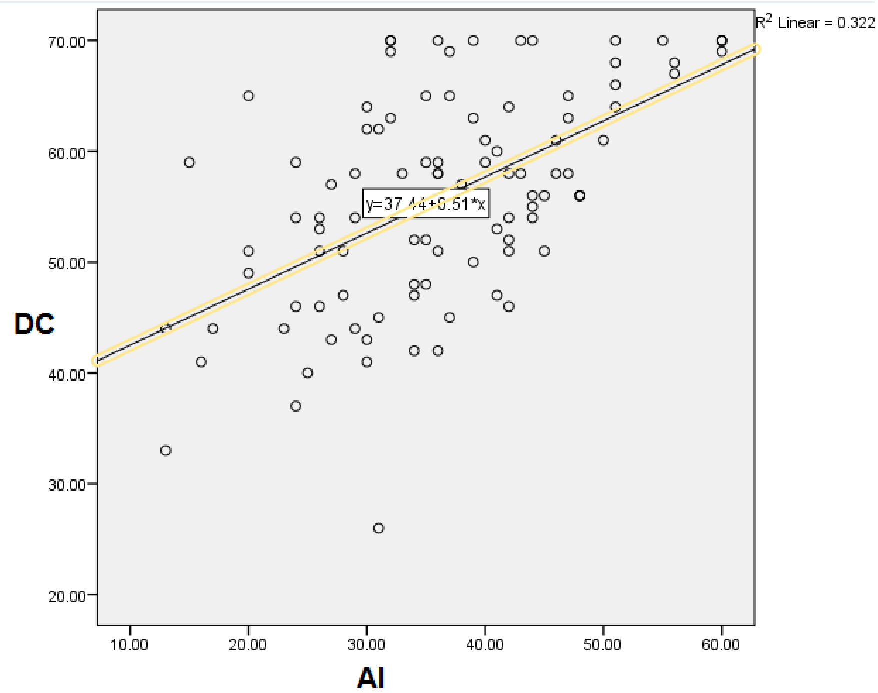

Figure 6: The relationship between AI and DCs

4. Discussion

The findings of the study showed that the study sample had a medium level of awareness with regard to AI. This is perhaps due to the belief that the educational process depends on the main components of people and value and that technology is not an end in itself but rather a means. The results of this study align with the results obtained by Al-Subhy (2020), who found that there are several challenges to the use of AI in teaching, so the use of AI by faculty members occurs at a very low rate. It also aligns with the studies conducted by Badawi (2022) and Jantakun et al. (2021), where the two studies concluded that there are a set of challenges facing the application of AI on university campuses, including the need to train faculty and develop their skills to be compatible with AI. The researchers attribute the average level of AI awareness among the current study sample to a lack of self-efficacy, the presence of some challenges preventing the use of AI, and the sample's lack of experience in integrating AI techniques in teaching. These findings contrast with the study conducted by Al-Darayseh (2023), in which the study sample had a high level of acceptance concerning the use of AI as well as information skills about the basics of integrating AI technologies in teaching. The findings of this study also contradict Jabali and Al-Qahtani's (2022) findings, which indicated a high level of awareness of AI skills among faculty members. They also found that teaching experiences and training courses had no statistically significant effect on AI awareness.

The researchers suggest that the sample might have an average level of AI awareness because of a scarcity of forums and seminars introducing what AI is and how to use it in the teaching and learning processes, as well as a lack of programs, courses, and workshops for training faculty members on AI applications. The lack of awareness might also be due to the high cost of most AI applications related to the field of teaching. Furthermore, there are few Arab educational websites specializing in AI applications in the field of education.

The results also showed that there is no statistically significant correlation between AI awareness and TA. TA is a general concept that may be associated with technologies other than AI, such as the use of social media, office programs, graphic design programs, chat, Zoom, Blackboard, and other university systems that do not include AI. The novelty of the term AI and the lack of awareness of its concept and applications among university faculty, especially members in the humanities, may additionally contribute to the medium degree of AI awareness. This finding aligns with Teo's (2009) finding that technological complexity affects behavioral acceptance indirectly. Finally, the results of the study showed that there is a direct positive correlation between AI awareness and DCs. The application of AI technology poses some concern to faculty members; however, Wisskir et al. (2017) noted that young people in developing countries are optimistic about their future careers and have confidence in their capabilities for professional development related to AI and their technological skills. Therefore, faculty members must understand that developing DCs enables them to utilize the full value of AI in education.

5. Recommendations

Considering the results of this study, the researchers recommend holding seminars to prepare faculty members to use AI in education and improve their attitudes toward AI technologies. Training courses and workshops should also be held for faculty members to learn about what is new in the field of AI applications and provide them with skills to employ in the educational environment. Incentives can additionally be offered for faculty members who use AI in the teaching and learning environment. Universities should be equipped with the necessary devices to employ AI in education, and they should conduct more scientific studies aimed at raising the awareness of faculty members concerning the importance of applying AI and DCs in the teaching process.

6. Conclusions

Based on the results of the current study, which confirm that the participants possess a medium degree of awareness of AI, this is due to the fact that applications of AI in higher education need digital infrastructure and encourage faculty members to enthusiastically integrate into the AI revolution. Also, the use of AI by faculty members came at a very low level as a result of fear of AI and the consequent negative behaviors and practices that are related to the ethics of scientific research, in addition to the material cost, ignorance, and lack of knowledge of using AI in teaching and scientific research. Also, there is a gap between AI and humans, who seem to lack self-awareness. The results also showed that there is a direct positive correlation between AI and DCs among the study sample. The researchers of the current study attribute this to the participants' understanding of the importance of AI for development, vocational education, and the positive impact of applying AI in education.

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Appendix 1

Table 1. The results of the correlation coefficient between each statement and the total score of the dimension to which it belongs

Dimension	No.	Correlation coefficient	Sig.
Cognitive awareness of AI	1	0.861**	< 0.001
	2	0.886**	< 0.001
	3	0.933**	< 0.001
	4	0.894**	< 0.001
Performance awareness of AI	5	0.818**	< 0.001
	6	0.907**	< 0.001
	7	0.826**	< 0.001
	8	0.783**	< 0.001
	9	0.872**	< 0.001
	10	0.886**	< 0.001
	11	0.787**	< 0.001
	12	0.837**	< 0.001

**p<0.01

Appendix 2

Table 2. The results of the correlation coefficient between each statement and the total score of the dimension to which it belongs

Dimension	Correlation coefficient	Sig.
Cognitive awareness of AI	0.895**	< 0.001
Performance awareness of AI	0.974**	< 0.001

**p<0.01

Appendix 3

Table 3. The results of the correlation coefficient between each statement and the total score of the dimension to which it belongs

Dimension	No.	Correlation coefficient	Sig.
Technical knowledge competencies	1	0.815**	< 0.001
	2	0.783**	< 0.001
	3	0.878**	< 0.001
	4	0.904**	< 0.001
Technical performance competencies	5	0.769**	< 0.001
	6	0.855**	< 0.001
	7	0.819**	< 0.001
	8	0.870**	< 0.001
	9	0.750**	< 0.001
	10	0.803**	< 0.001
Technical productivity competencies	11	0.775**	< 0.001
	12	0.877**	< 0.001
	13	0.890**	< 0.001
	14	0.824**	< 0.001

**p<0.01

Appendix 4

Table 4. The results of the correlation coefficient between the dimensions of the scale and the total score

Dimension	Correlation coefficient	Sig.
Technical knowledge competencies	0.896**	< 0.001
Technical performance competencies	0.924**	< 0.001
Technical productivity competencies	0.892**	< 0.001

**p<0.01

Appendix 5

Table 5. The results of the correlation coefficient between each statement and the total score of the dimension to which it belongs

Dimension	No.	Correlation coefficient	Sig.
Ease of use	1	0.744**	< 0.001
	2	0.788**	< 0.001
	3	0.882**	< 0.001
	4	0.813**	< 0.001
Expected benefit	5	0.769**	< 0.001
	6	0.769**	< 0.001
	7	0.778**	< 0.001
	8	0.823**	< 0.001
	9	0.760**	< 0.001
	10	0.812**	< 0.001
	11	0.782**	< 0.001
	12	0.721**	< 0.001
Satisfaction and attitude toward use	13	0.848**	< 0.001
	14	0.911**	< 0.001
	15	0.929**	< 0.001
	16	0.805**	< 0.001

**p<0.01

Appendix 6

Table 6. The results of the correlation coefficient between the dimension of the scale and the total score

Dimension	Correlation coefficient	Sig.
Ease of use	0.836**	< 0.001
Expected benefit	0.937**	< 0.001
Satisfaction and attitude towards use	0.798**	< 0.001

**p<0.01