Artificial Intelligence Versus Arab Universities: An Enquiry into the Saudi Context

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ABSTRACT

This study aims to identify factors that influence the adoption of artificial intelligence in teaching and learning environments in Saudi universities in light of the Unified Theory of Acceptance and Use of Technology, as well as proposals that effectively support the adoption of artificial intelligence (AI) in Saudi universities' teaching and learning environments. The study employs a qualitative approach based on a semi-structured interview, with the participation of 17 faculty members from Saudi universities specialising in educational technology. According to the Unified Theory of Acceptance and Use of Technology, the study's findings show that there are four aspects that affect how artificial intelligence is adopted in teaching and learning settings in Saudi universities. The facilitating conditions rank first in terms of positive impact, followed by performance expectancy in second, effort expectancy in third, and social influence in fourth place. The study makes a number of recommendations to encourage the use of artificial intelligence in Saudi universities, including teaching faculty members how to use artificial intelligence in the classroom, emphasising the benefits of implementing AI for educational leaders, offering AI tools, programmes, and technical support, as well as offering faculty members incentives and promoting scientific research in the area of AI in higher education.

1. Introduction

Information and communication technology (ICT) is advancing quickly in the modern era. This has a clear impact on all fields, particularly education, and one of the most notable of these contemporary technologies is the emergence of artificial intelligence (AI). According to Karsenti (2019), computer science aims to build machines with intelligence that function and exhibit behaviour akin to those of the human brain. As a result, AI technology is one of the most important modern technologies that has influenced, and will continue to influence, educational features in the future, as educational institutions, particularly universities, seek to invest in artificial intelligence applications in order to improve the quality of their outputs on the one hand and reduce operational costs on the other.

As many previous studies have demonstrated (Barakina *et al.*, 2021; Hemachandran *et al.*, 2022; Ocana-Fernandez *et al.*, 2019), AI plays an important and prominent role in improving Higher Education (HE) quality and development. According to Chatterjee and Bhattacharjee (2020), several benefits can be obtained through the application of artificial intelligence, namely improving decision-making, cost reduction, quality improvement, reducing reliance on the human element, and other benefits that significantly contribute to the enhancement of its ability to provide solutions for a variety of issues. AI applications also enable the development of smart learning environments that improve students' flexibility in learning, including flexible learning, adaptive learning, mobile learning, and personalized learning (Cheung, *et al.*, 2021). According to Abu Ayada (2022), AI has become an urgent necessity in the digital age to harmonize electronic curricula with the student's personality, as AI software can save data on students' mental abilities, response speed, as well as personal, scientific, and cultural preferences, allowing it to provide lessons and conduct tests based on student behaviour and skills.

The design of interactive learning environments which allow for direct interaction between students and smart devices to learn new concepts directly, is made possible by AI and improves our understanding of the mechanisms underlying thinking, knowledge, and intelligent behaviour. These environments also have a positive impact on a variety of learning-related factors, including various thinking styles and problem-solving abilities (How and Hung, 2019). Al-Farrani and Al-Hujaili (2020) assert that in Saudi education specifically, the use of AI in teaching and learning environments has become urgently necessary in light of the demands of the Kingdom of Saudi Arabia's 2030 vision. Consistently, Aldosari (2020) discovered a decreasing level of awareness in the mechanisms of applying AI in HE. He also identified a need for greater awareness in the Saudi environment regarding AI application use possibilities in education.

Various elements have contributed to and influenced the acceptance and usage of AI in Saudi HE, and these need to be explored further in light of relevant theories such as the Unified Theory of Acceptance and Use of Technology (UTAUT). Venkatesh, *et al.* (2003) established the Unified Theory of Acceptance and Use of Technology (UTAUT), which includes four major elements for technology acceptance and use: effort expectancy, performance expectancy, social influence, and facilitating conditions. This took place after reviewing eight theories that explained the acceptance and adoption of technology – such as the Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model (MM), Theory of Planned Behavior (TPB), A Combined theory of Technology Acceptance Model and Theory of Planned Behavior (C-TAM-TPB), the Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT).

Despite the fact that colleges aim to incorporate AI applications, a number of factors affect this, as Wang and Tu's (2021) study reveals. The study demonstrated that self-efficacy has a beneficial effect on the ease-of-use and attitude of teachers towards the adoption of AI-based applications, as well as the projected benefit through ease-of-use. Additionally, there was a negative correlation between instructors' self-efficacy and anxiety, indicating that strengthening teachers' self-efficacy may alleviate their concerns about the usage of AI-based apps in education. The most influential factor was the attitude toward AI intelligence, followed by self-efficacy. Chai *et al.* (2020) identified

four elements that influence AI adoption, namely AI literacy, AI confidence, AI for social benefit, and behavioral intent. The results revealed a favorable relationship between the first three factors and the fourth component. Moreover, the results revealed that the objective of learning AI for societal good is the greatest indicator of students' behaviour intentions. In light of the Unified Theory of Acceptance and the use of technology among King Khalid University students, Al-Shahrani's (2019) study found that the most influential factors for WhatsApp acceptance include expected performance, expected effort, and social impact, with the results of the study showing expected effort to be the most influential factor. The most influential factor on behavioral intent to use WhatsApp is performance, followed by social impact. Merhi's (2022) study evaluated the critical success elements that influence the use of AI, where 19 components were discovered and grouped into four categories: organisation, technology, process, and environment, utilizing the analytical hierarchy technique to assess elements and categories. The analysis yielded two distinct types of results, at category and factor levels. According to the data, technology is the most significant of the four areas. The results also reveal that morality is the most significant of the 19 characteristics considered. Based on technology acceptance theories, Du and Gao's (2022) study identified and analysed the factors that impact teachers' adoption of AI-based applications.

The study provided a multi-criteria model for adoption decision-making that included four core components and ten sub-factors taken from previous research. Following the collection of opinion data from 17 experts, the Analytical Hierarchy Process (AHP) was utilised to weigh and prioritise these issues. Effectiveness, efficiency, and complexity were determined to be the most relevant elements in motivating English as a Foreign Language (EFL) teachers to employ AI-based applications. The importance of perceived charges and rewards was diminished. Time, flexibility, and enjoyment were deemed to be of moderate relevance in AI adoption. Gupta and Bhaskar's (2020) study on the disincentive and motivating factors influencing teachers' adoption of AI-based education and learning solutions found institutional barriers to be the main deterrents, and recognition to be the main driver influencing teachers' behaviours towards adopting AI-based teaching solutions. The study also stressed the significance of institutional support for teachers, in terms of resources, time, and recognition to fully implement AI into the teaching and learning context.

Pai and Chandra (2022) carried out a study to investigate the factors impacting AI adoption, with the findings indicating that infrastructure and organizational aspects of the firm, in addition to future developments, are among the most influential. Chou et al., (2022) investigated the relationship between the effectiveness of AI technology application learning by undergraduate students and the elements that influence it. The results demonstrate that ICT self-efficacy has a significant direct impact on the learning efficacy of AI-based technology applications, while human-computer interaction experience has a considerable indirect impact. The report also recommends that teaching and learning institutions enhance the AI learning environment, provide a suitable platform for the usage and advancement of educational technology, and streamline the teaching and learning experience.

Hao and Yan (2021) investigated the factors influencing AI adoption by educational leaders; the findings of the study reveal that educational leaders have a strong desire to embrace AI in education. However, actual development rate is low, and the results indicate that personal innovation, facilitation of conditions, average effort, performance expectation, and social impact have a significant positive effect on managers' intent to adopt AI, whereas perceived risk has a significant negative effect. Choi et al. (2022) explored the human aspects that influence instructors' adoption of integrating and utilizing AI tools in education. They collected and analysed survey responses from 215 instructors in South Korea using structural equation modelling. Teachers with constructivist ideas are more likely to incorporate AI applications than those with transferrable views, according to the findings. In addition, perceived utility, perceived simplicity of use, and perceived confidence in educational AI technologies (EAIT) should be considered when attempting to explain teacher acceptance of EAIT. It was discovered that the ease of creating an EAIT is the most significant factor in predicting their acceptability.

Choung et al. (2022) conducted a study on trust in AI and its significance on university students' acceptance of AI technologies. The study's findings indicate that trust had a major influence on the intention to employ AI. The results show two dimensions: human-like trust and functional trust, stressing the indirect influence of trust and the effects of perceived usefulness, ease of use, and attitude to purpose to use. Furthermore, within the model, both dimensions of confidence exhibit a similar pattern of effects, with job-related confidence having a stronger overall impact on intention to use than human-like confidence.

Celik (2023) conducted a study on the professional expertise of instructors on the incorporation of AI-based tools in education. The results revealed that educators would have a better grasp of the advantages of pedagogical AI if they had more experience interacting with AI-based tools. Furthermore, teachers are better able to assess AI choices when they have technological knowledge (TK). Traditional knowledge alone, however, is insufficient to integrate AI-based tools into teaching. Teachers must have both traditional knowledge and pedagogical knowledge (PK), which is expressed in technological pedagogical knowledge, in order to effectively implement AI in the classroom (TPK). According to the findings of the Laupichler et al. (2022) study on AI literacy in higher education and adult education, research in this field is still in its infancy and requires further refinement in terms of how it should interpret literacy with AI in adult education, as well as the content. Their survey indicated that AI abilities are significant and will become increasingly more important in the future. This study also recommended that children are taught about AI potential at a young age, as well as adults in HE and beyond.

2. Study Problem

While it is difficult to ignore the significance of AI in increasing educational quality and lowering economic costs in universities, recent studies (Albasalah et al., 2022; Barakina et al., 2021; Hooda et al., 2022) have advocated for the acceptance and use of AI in education. However, there is still a significant gap of AI usage in teaching and learning contexts. This was observed by the researcher throughout his employment as a faculty member specializing in educational technology at a Saudi university, and via his role at the university when responsible for implementing new technology and engaging it in the educational process in the most effective manner possible. Furthermore, according to Al-Farrani and Al-Hujaili (2020), AI application education in Saudi Arabia is in its infancy in comparison to the benefits and services they offer.

As a result, Baroaidah and Al-sanea (2022) proposed that Saudi higher education should prioritize AI integration approaches in teaching and learning environments and provide the appropriate infrastructure. Hariri (2021) also suggested undertaking research to determine the limitations that AI applications face at Saudi universities.

Consequently, due to its rapid growth, there is a serious concern of how to apply AI technology in educational environments in order to increase learning performance and the quality of HE educational processes. In light of appropriate theories, such as the unified theory of technology acceptance and use, as clarified by (Chatterjee and Bhattacharjee, 2020), it has become essential to investigate the factors that influence AI application integration in Saudi teaching and learning environments. This is one of the most appropriate theories for investigating and studying the variables underlying AI adoption in HE.

As a result, the research problem is presented as the following primary question: What factors influence AI application adoption in Saudi university teaching and learning contexts, according to the Unified Theory of Technology Acceptance and Usage?

3. Study Questions

This study set out to answer the following questions:

- What factors affect AI application adoption in teaching and learning environments in Saudi universities based on the Unified Theory of Acceptance and Use of Technology (UTAUT)?
- What recommendations facilitate the effective adoption of AI applications in Saudi university teaching and learning environments?

4. Importance of the Study

The significance of this study stems from the importance of AI, and the associated benefits of its use in university education, as well as the need to invest in AI in order to improve learning outcomes and quality, due to the fact that AI is now one of the most important technological developments. Establishing the factors that influence AI adoption in university teaching and learning environments enables university decision-makers to establish suitable strategic plans to incorporate AI into teaching and learning environments in proportion to its benefits and advantages. Besides providing the library with a theoretical framework regarding the factors influencing AI adoption in HE, this study also includes participant recommendations that facilitate AI application adoption in Saudi university teaching and learning environments.

5. Study Methodology

5.1. Study Approach:

This study uses a qualitative approach based on a semi-structured interview.

5.2. Study Tool:

An interview schedule was used as the study's tool.

5.3. Building the Study Tool:

This tool was developed, and interview questions were created, after studying the theoretical literature and prior research on the study's topic. These questions began with an introduction to the primary data, such as educational background and years of teaching experience. Following this are the fundamental questions, the first section of which consists of 12 questions about the elements that influence AI adoption in Saudi university teaching and learning contexts, in order to determine the response to the study's opening question. The study's second question is addressed in the second segment, consisting of seven questions about ideas for efficiently integrating AI into university instruction. Approximately 45 to 60 minutes were spent on each interview.

5.4. Validity and Reliability of the Study Tool:

The tool was created and presented to a group of experts from the Saudi university faculty, after which it was evaluated. Based on the referees' observations, some of the questions were changed or deleted, whilst others were modified added and added. In order to ensure the sample questions were clear, and to gauge the length of the interview, the researcher also performed a pilot study using the study instrument to interview three academics.

For the purpose of enhancing reliability, the study samples' interview texts were presented, independent of the researcher's explanations, in order to ensure impartiality.

In order to ensure reliability, the results of the analysis were judged by two professors who specialise in educational technologies, and who have an interest in qualitative research.

5.5. Study Population and Sample:

To ensure that the sample accurately reflects the faculty member population at various universities throughout Saudi Arabia, as well as geographical distribution, 17 Saudi university faculty members who specialise in educational technology (both male and female), were chosen. The age of each university in the study sample was also taken into account; this ranged from the older to the more modern universities, as indicated in Table (1). The study was carried out during the first semester of the academic year 2022−2023.

Table (1): Study Sample Distribution

Name of University	Male	Female	Total
King Saud University	2	2	4
King Khalid University	2	1	3
University of Tabuk	1	2	3
Northern Border University	2	1	3
Imam Abdulrahman Bin Faisal University	2	2	4
			17

6. Data Analysis

The semi-structured interviews were analysed using four stages: data transcription, data reduction, thematic analysis, and constant comparative approach:

1. **Data Transcription**: Participant consent was provided to record the interviews. I listened to each interview and took notes as participants spoke in order to transcribe them. In order to guarantee that I had accurately listened to and comprehended what had been said and that I had accurately recorded every word that had been stated by the participants, I reviewed the transcriptions three to four times, whilst gathering important elements from the interviews and creating a preliminary summary of topics (categories).
2. **Reduction of Data**: The semi-structured interviews produced a significant amount of data, which required careful read in addition to repeatedly transcribing the interviews.
3. **Thematic Analysis**: In this study, the semi-structured interview process that consisted of a variety of open-ended questions was combined with thematic analysis. The structure of the interviews with academic staff served as the basic foundation for thematic analysis. The significant themes were centered on the interview schedule's major questions, which were connected to the study's primary research topics. After carefully reviewing every interview transcript line-by-line, a number of sub-themes became apparent. In this study, themes and sub-themes were often found by reviewing the interviews using thematic analysis.
4. **Constant Comparative Approach**: The various perspectives of the academic staff were compared using a consistent comparison strategy.

7. Discussion of Results

7.1. Discussion of the Results Relating to the First Question:

'What factors affect AI application adoption in teaching and learning environments in Saudi universities based on the Unified Theory of Acceptance and Use of Technology (UTAUT)?' Based on the analysis

of the study sample's interviews, it was determined that there are four main factors - expected effort, expected performance, expected social impact, and available facilities - that positively influence AI adoption in Saudi universities' teaching and learning environments. The findings show available facilities to be the most significant factor, followed by expected performance, expected effort, and social impact.

7.1.1. Facilitating conditions

The results of the study sample interview analysis revealed that, among other factors, available facilities is the most significant factor that has a positive impact on the adoption of AI tools and programmes in teaching and learning environments in Saudi universities. The majority of the sample's participants concurred. One of the attendees mentioned the following:

> Given that universities in Saudi Arabia, in particular, have cutting-edge technical services that integrate technology into the educational process, I believe that the facilities that are readily available are the most significant factors that positively influence AI use in universities.

Another participant added:

> In my opinion, Saudi universities' technical resources have the greatest positive impact on AI adoption, notwithstanding the significant influence of other elements.

One of the study sample's participants emphasized the significance of the available material and human resources for incorporating technology into education. He stated:

> It is essential for universities to engage AI integration into learning environments because it cannot function in the education field without access to skilled labour, required facilities, or AI software and applications, all of which are readily available in Saudi universities.

These findings support the notion that the first element favorably influencing AI adoption at Saudi universities is available facilities. This can be explained by the strong Saudi economy and the depth of the government's interest in education, as it provides substantial financial assistance for institutions. It enables them to offer highly technical infrastructure, cutting-edge technical services, and programmes that support their optimum use of current technology, including AI technology in educational disciplines.

This is consistent with other research, including Pai and Chandra's (2022) study, which found infrastructure to be the most important element influencing AI adoption in organisations in general, including educational institutions.

One of the main driving forces behind teachers' acceptance of AI-based education, according to Gupta and Bhaskar (2020), is institutional support for providing the resources, facilities, and services they need to successfully incorporate AI into teaching and learning environments. Furthermore, Merhi (2022) found that technology and the environment are two of the most important success factors that influence AI implementation. This confirms the significance of the services and facilities offered by universities to ensure the achievement of university AI adoption.

7.1.2. Performance expectancy

According to the data, expected performance placed second among the factors influencing Saudi university teaching and learning environments' AI adoption. One of the study's participants stressed the effect and significance of the extent to which decision makers and faculty members consider that utilizing AI applications will assist them in achieving their intended objectives, stating:

> Regarding the adoption of any new technology in education, it

is crucial, in my opinion, for decision-makers and faculty members to be aware of the expected benefits of this technology in reaching their objectives.

Another participant highlighted that, despite the significance of recognizing the expected benefit of technology before adopting it, there is a more favorable element affecting its adoption in Saudi education, namely the availability of facilities. He said:

> Nobody currently holds the opinion that technology in general, including AI, does not assist educational institutions in achieving their objectives and improving their outputs. However, I think that particularly for the Saudi context, the university facilities and technical services offered are the major variables that positively influence AI adoption.

The majority of the survey sample agreed with the previous statements, as they underlined expected performance to be one of the most influential elements significantly affecting AI adoption; nevertheless, it is not the most influential factor, as one of the participants noted:

> I am certain that expected performance is a highly important component that has a demonstrable positive impact on AI integration into university teaching and learning environments, but I do not feel that it is the most crucial factor.

It is evident from the analysis of the interiews that, despite the fact that expected performance is not the most important factor in the impact, the results confirm its significance and its higher ranking in terms of the positive impact on AI adoption in Saudi university teaching and learning environments. This can be ascribed to the multiplicity and variety of benefits and services supplied by AI applications, which add to delivering excellent performance and significant benefit in terms of enhancing the quality of education, and decreasing faculty members' workloads.

This result is comparable with the findings of Wang and Tu's (2021) study, which found that benefit and expected performance are two of the most influential elements positively influencing AI incorporation in education. Choi *et al.* (2022) found that perceived benefit is among the most important criteria that must be considered when explaining teachers' acceptance of AI educational technologies.

The findings of Hao and Yan's (2021) study, on the other hand, suggest that, while expected performance is one of the elements that positively affects educational leaders in AI application adoption, it is not the first.

7.1.3. Effort expectancy

According to the study's findings, one of the major elements influencing AI adoption is expected effort, albeit not the most crucial of the four criteria because it ranks third in terms of impact. One of the sample participants commented:

> One of the primary and significant drivers of AI adoption is ease of use of its applications, although other elements are more crucial for technology's beneficial effects on Saudi HE.

This was confirmed by another participant:

> Indeed, expected effort is an important factor, but particularly for Saudi education, I believe available facilities to be the greatest influential factor in Saudi university AI adoption, followed by expected performance, and then the other factors, such as expected effort and social impact.

The following was added by another faculty member:

> There is an inverted link between expected effort and adoption of technology use; for instance, the greater the expected effort in employing AI, the less likely it is to be implemented in teaching and learning contexts. Although this aspect has a

favorable impact on AI integration into Saudi HE, it is less significant than other factors.

Overall, it is obvious that one of the variables influencing AI adoption in teaching and learning settings at Saudi universities is expected effort. It is less favorable than certain other aspects, though, such the facilities that are available and predicted performance.

This could be due to certain faculty members' lack of information about how to use intelligence programmes and applications, as well as their impressions that it necessitates a great deal of effort to use with it being modern technology that is not well known to many people, and is not commonly used in Saudi education. According to Celik (2022), educators will have a better comprehension of the contributions of Pedagogical Artificial Intelligence if they have detailed information about how to interact with AI-based tools.

According to the findings of Chai *et al.*, (2020), four elements influence AI adoption, the most significant of which is an understanding of how to use AI applications. Hao and Yan (2021) also indicated that the average expected effort has a substantial and beneficial impact on managers' intent to use AI.

Although Al-Shahrani's (2019) study concurs with the current study in that expected effort is one of the elements influencing university acceptability and usage of technology, it differs in terms of impact, indicating that expected effort is the most significant factor influencing the adoption of modern technologies in university teaching and learning environments.

7.1.4. Social influence

Social impact is one of the factors positively promoting AI adoption at Saudi institutions, but it is the least influential, according to the study's findings. Three-quarters of study respondents concurred. One participant, for example, stated:

> Even if I, as a faculty member, assert that social influence is a significant element in the acceptance of artificial intelligence programmes in education, I recognize that this is one of the weaker effect components.

Another participant stated:

> Sure, the faculty member's realization that others important to him expect him to use AI in educational fields is an element that may affect and motivate him to use it to a degree, but this impact is limited in comparison to other elements, including available facilities, performance, and expected effort.

> One of the participants in the study sample reported that the faculty member aims to utilise AI programmes in a solid social approach, which increases his opportunity to expand his expertise in this area and positively influences his use of AI tools in his instruction. He comments: *Any professor, in my opinion, who aspires to present themselves in a way that is consistent with their academic standing, and who believes that being knowledgeable about artificial intelligence tools will elevate their status among their peers, and others who have the power to shape their behaviour will unavoidably have a positive impact on how they use these tools in their teaching activities.*

Although it has a lesser impact than other components, such as social impact, this is one of the factors that positively influences the adoption and use of AI devices in Saudi university teaching and learning contexts (available facilities, effort, and expected performance). This may be due to the relevance of cultural and social factors and their influence on academic disciplines. The adoption and use of cutting-edge technical tools and programmes, including AI programmes, will undoubtedly add social value, regardless of the

level of individuals or institutions, as faculty, students, and educational decision-makers strive to present themselves in the best possible way socially. This finding is consistent Al-Shahrani's (2019) study that found that social impact is one of the positive influencing elements on WhatsApp acceptability in the context of the Unified Theory of Acceptance and Use of Technology among King Khalid University students. However, it is the least important of the other elements, ranking third after expected effort and expected performance.

Chai *et al.* (2020) discovered four factors that influence AI adoption, one of which is AI for social good. Furthermore, students regard the goal of learning AI for societal good as the main determinant of their behavioral intentions.

7.2. Discussion of the Results of the Second Question:

What recommendations facilitate the effective adoption of AI applications in Saudi university teaching and learning environments?

The study's participants made a number of recommendations that could aid Saudi institutions in successfully implementing AI technologies in their teaching and learning environments. The most crucial of these recommendations is to provide faculty with in-depth training in AI application tools in the educational sector. One of the attendees mentioned the following:

> It is crucial, in my opinion, to teach educators how to employ artificial intelligence systems in the classroom.

Another participant advised that decision-makers and university leaders be provided with training on the benefits of utilizing and implementing AI in education, adding that courses should not be restricted to faculty members alone, stating:

> In order for university administrators to fully comprehend the significance and advantages of implementing artificial intelligence in academic settings, the training should first concentrate on them.

Another participant stated that faculty members who use AI in the classroom should be rewarded. He cited:

> For example, moral or monetary incentives are set for faculty members who apply AI in the education system. There needs to be differentiation and incentive for academic staff who are using AI.

Several survey participants, on the other hand, believed that providing the appropriate technical assistance is a prerequisite for the successful implementation of AI applications in teaching and learning contexts. One of the participants mentions:

> The provision of the required technical support with professionalism and high quality is the most crucial requirement to ensure the achievement of integrating AI into education.

Participants in the study also proposed developing appropriate AI programmes for the educational field, as one participant stated:

> The first stage in integrating AI into education is to supply AI programmes, which is not difficult to accomplish because most Saudi institutions have solid technical infrastructure; we simply need to offer appropriate programmes for educational usage.

Additionally, several of the study sample's participants recommended supporting and encouraging research in the area of educational AI. One mentioned the following, for instance:

> Universities are the most suitable institutions for embracing artificial intelligence, and should, therefore, support and

encourage research into the methods and tactics for doing so and integrating it successfully into the educational process.

In general, the most essential recommendations focused on the importance of faculty training and emphasising the benefits of implementing educational AI for educational leaders, in as well as offering AI programmes and technical support. In addition to creating financial and moral incentives for faculty members to employ AI, the report emphasized the significance of encouraging and sponsoring scientific investigations on AI application in education.

According to the findings of the Laupichler *et al.* (2022) study, AI in HE research is still in its inception and requires greater attention because it is currently relevant and will become more essential in the future.

Wang and Tu (2021), on the other hand, demonstrated that self-efficacy influences teachers' usage and perception toward AI-based programmes. It highlights the requirement and importance of training to strengthen faculty members' skills in the field of employing AI in education in order to assure its successful adoption.

8. Conclusion

Finally, it is obvious from the interpretation and discussion of the findings that there are four elements influencing AI adoption in Saudi university teaching and learning settings in view of the Unified Theory of Acceptance and Use of Technology (UTAUT). In terms of positive impact, facilitating conditions rank first, followed by performance expectancy in second, effort expectancy in third, and social influence in fourth place. The study's participants made various recommendations to assist AI implementation in Saudi universities. The most important recommendations are to train faculty members to use AI in education, to highlight the benefits of adopting AI in education for educational leaders, to provide AI tools and programmes, as well as technical support, to provide incentives to teaching staff, and to encourage scientific research in the field of AI in education.

Figure 1: Factors affecting the adoption of AI in teaching and learning environments of Saudi universities in view of the Unified Theory of Acceptance and Use of Technology (UTAUT)
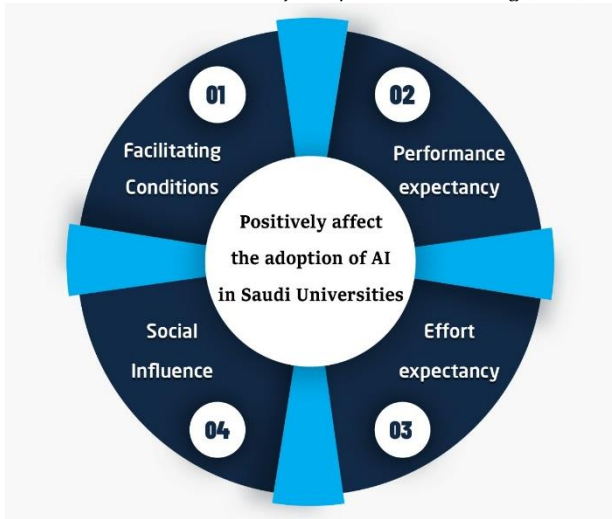
9. Recommendations

Based on the results of the study, the researcher recommends the following:

- Spreading the culture of AI adoption in Saudi university teaching and learning environments.
- Providing AI programs in Saudi universities.
- Training faculty members on the methods of efficiently using

AI programmes and applications in education.
- Providing financial and moral incentives to faculty members to utilize AI in teaching and learning settings.
- Providing high-quality technical help to faculty members experiencing challenges while using AI.
- Increasing investment in higher education through the encouragement of studies and research in the field of AI.

Biography

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