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## Perceptions, Challenges, and Prospects: University Professors' Use of Artificial Intelligence in Education



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### Abstract

Artificial Intelligence (AI) has emerged as a prominent area of investigation in the field of education. Also, perceptions, challenges and threats of AI among university professors show notable variations. This study explores university professors' perspectives regarding AI, including their familiarity with AI, its educational impacts, challenges associated with its implementation, and perceived threats. To achieve this, a survey was administered to 65 university professors from diverse Egyptian institutions, both state and private. Subsequent statistical analyses were conducted to treat the collected data. The outcomes of these analyses reveal that university professors possess varying degrees of familiarity with AI. Despite this, they view AI as a valuable educational tool. The study identifies several challenges hindering AI adoption, encompassing difficulties in comprehending and interpreting AI algorithmic outcomes, the intricate autonomy of AI systems, financial implications of implementation, and concerns regarding data privacy. Additionally, the study identifies apprehensions pertaining to AI's influence on professors' skills, potential dehumanization of pedagogy, adverse effects on students, and the potential obsolescence of professors. These findings bear implications for the integration of AI in educational contexts, highlighting the necessity for further exploration in this evolving field.

**Keywords:** AI research with university professors; perception of AI; challenges of using AI; threats of using AI.

## Introduction

### *Definition of AI*

It can reasonably be asserted that the phrase ‘Artificial Intelligence’ (AI) has recently firmly established itself as one of the most heard concepts. This recognition extends not only within the domain of technology but also across the fields of education and research, to name a few. However, the evolution of the AI definition has led to considerable confusion (Kok *et al.*, 2009). To avoid any misunderstanding, this research adopts a comprehensive definition of AI as “a growing resource of interactive, autonomous, and often self-learning agency that can handle tasks that would otherwise necessitate human intelligence and intervention for successful execution” (Floridi & Cowls, 2019, p. 4).

### *Background*

Artificial Intelligence plays many roles in our daily lives without us realizing it. Whether we search online, check email, schedule appointments, navigate traffic or get personal recommendations, AI is involved. The pandemic has shown how much we rely on AI for healthcare, education, communication and transportation (Akgun & Greenhow, 2022). Now it ‘is hard to avoid AI apps. AI broadly means making computers do smart things like people. It’ is not just for science, tech and engineering anymore. AI also helps education with machine learning and new algorithms (Cheney-Lippold, 2017). For instance, AI enables personalized lessons tailored to each student. It analyzes what they know and do not know to develop learning plans. This helps e-ducation become more effective and efficient. While AI is complex, its goal is simple – to be helpful, harmless and honest. As technology progresses, researchers work to ensure AI benefits humanity. By understanding people and society, AI can support health, knowledge and connection. Though unfamiliar at first, many AI applications now feel natural and nice. With care and cooperation between fields, AI will continue helping improve lives in safe, smart ways (Bendici, 2018; Iman *et al.*, 2020).

AI-driven systems and technology possess significant potential to revolutionize the operations of higher education institutions, as highlighted by Dhawan and Batra (2021). According to their analysis of the United States Education Sector Report, the growth of AI in the US education sector is projected to surge by approximately 48% from 2018 to 2022. Baker and Smith (2019) delineated three perspectives for addressing AI technologies: learner-facing, teacher-facing, and system-facing AIED. Learner-facing tools encompass software utilized by students to study specific subjects, while teacher-facing applications automate administrative

tasks such as evaluation, feedback, and plagiarism detection, thereby aiding educators in understanding student progress. System-facing technologies provide institutional-level data to administrators and managers (Zawacki-Richter *et al.*, 2019).

In the realm of higher education, AI can be harnessed to enhance the learning experience, decrease dropout rates, and cultivate personalized learning environments for students (Pedro, 2020). The Microsoft Education Transformation Framework (ETF) for Higher Education, outlined by Papaspyridis (2020), furnishes practical guidance for formulating comprehensive digital transformation strategies tailored to higher education institutions. The ETF encompasses four primary pillars for successful AI integration: student success, teaching and learning, secure and connected campus, and academic research.

Student success encompasses initiatives aimed at recruitment, retention, and fostering enduring connections with students (Papaspyridis, 2020). AI tools, according to Pedró (2020), can furnish predictive analytics for admission decisions and dropout projections. Tsai *et al.* (2020) demonstrated the efficacy of AI in identifying at-risk students and preemptively addressing their challenges. Notably, FLEXA, a collaboration between MIP Politecnico di Milano Graduate School of Business and Microsoft, aids students in pinpointing skill gaps between their career aspirations and current capabilities (Papaspyridis, 2020).

A secure and connected campus entails efficient management of campus resources and ensuring a safe, technologically advanced campus environment (Papaspyridis, 2020). AI-driven automation streamlines tasks such as facility management, human resources, and financial operations (Dhawan & Batra, 2021). Virtual assistants and chatbots offer prompt, personalized assistance at administrative desks, enhancing operational efficiency (Dhawan & Batra, 2021). Tools like Stellic facilitate financial forecasting and course demand prediction, leveraging shared resources to minimize costs.

In the realm of academic research, AI empowers researchers with robust computing capabilities, facilitating data processing and analysis (Papaspyridis, 2020). AI aids researchers in survey creation, data analysis, and fraud detection, thereby streamlining the research process (Dhawan & Batra, 2021).

In 2019, the Ministry of Communication and Information Technology in Egypt established the National Council for Artificial Intelligence (NCAI), collaborating with governmental bodies, academia, and AI enterprises to formulate Egypt's national AI strategy. This strategy aims to leverage AI to expedite the achievement of Egypt's developmental objectives, particularly the United Nations' Sustainable Development Goals (NCAI, n.d).

Concurrently, in alignment with Egypt's AI strategy, Dell Technologies, in partnership with the Ministry of Communications and Information Technology, introduced a new initiative aimed at educating students from five higher education institutions—American University in Cairo, German University in Cairo, Cairo University, Ain Shams University, and the Arab Academy for Science and Technology—about AI and its practical applications (Alaa El-Din, 2022). As part of this program, Dell will conduct workshops on data science and big data analytics, along with a case study on AI applications (Alaa El-Din, 2022). This initiative aims to enhance the capabilities of AI educators, with Dell implementing the 'Train the Trainers Program' to provide training sessions for university professors in various AI-related technological areas, alongside a competition to recognize the top three student projects conducted in the current academic year (Alaa El-Din, 2022).

Meanwhile, the American University in Cairo (AUC) has initiated efforts to explore the integration of AI into teaching and learning practices. The Center for Learning and Teaching (CLT) at AUC, serving as a support center for AUC faculty, has published "Artificial Intelligence - Resources for AUC Faculty" to assist faculty members in understanding and utilizing AI tools, particularly ChatGPT, which is making an impact on education (CLT, n.d). Additionally, AUC's digital transformation team has developed "Digi-Bot," a chatbot designed to facilitate the university's digital transformation and provide students, faculty, and staff with streamlined access to information and services.

Despite the growing global and local interest in artificial intelligence, a comprehensive review of literature following a systematic approach from general to specific reveals a scarcity of research regarding the application of AI in higher education institutions in Egypt and its potential

'The current study addresses this aim by examining university professors' perception of Artificial Intelligence (AI) in education.

## Literature Review

### *AI in Education*

Several studies have examined the use of AI in education and its projected influence in the forthcoming years. These studies include Crompton *et al.* (2022), Feng and Law (2021), Kabudi *et al.* (2021), Tang *et al.* (2021), Zafari *et al.* (2022), and Zawacki-Richter *et al.* (2019). Some research even dates to the year 2000, as evidenced by Celik *et al.* (2022).

AI can be categorized into two main types: weak AI and strong AI. Weak AI operates within predefined parameters established by programming. It relies on human programming and control, which imposes limitations. On the other hand, strong AI, also known as general artificial intelligence, has emerged more recently with the availability of abundant information and data on the internet. Strong AI does not rely on human intervention from data preparation to processing. It operates more independently and autonomously, as highlighted by Goertzl (2014), Pham and Sampson (2022), and Popenici and Kerr (2017). Machine learning (ML) is a technology that integrates both weak and strong AI. Various applications utilize ML algorithms, encompassing tasks such as product recommendations, facial recognition, academic performance prediction, and disease detection. These applications have been showcased in the works of Akgun and Greenhow (2022), Kabudi *et al.* (2021), Liu *et al.* (2022), and Zhai *et al.* (2021). Having said that, AI surely affects the different aspects of life including education.

### *Outlook of AI in education*

Looking ahead, AI is anticipated to take on various tasks traditionally carried out by educators, such as managing attendance and providing personalized instruction. AI-driven adaptive and personalized learning systems gather information about learners, including their performance, demographics, and behaviors. In return, AI adapts content and learning activities to match learners' interests and preferences. This potential is highlighted by Capuano and Caballé (2020), Li *et al.* (2012), Peng *et al.* (2019), and Xiao *et al.* (2018). Moreover, AI and ML can utilize this data to predict learners' performance or in completion of a course, as indicated by Bañeres *et al.* (2020) and Xing and Du (2019). As a result, it is evident that AI and ML have the potential to enhance learner performance and success. Furthermore, AI provides means of real-time support to students. A student can easily chat with many AI chatbots such as ChatGPT and ask them whatever questions and receive real-time support. S/he no longer needs to wait for a teacher to explain or answer a question that s/he does not know (Chen *et al.*, 2023). Chatbots have implemented many supporting tasks to learners to the extent that the learners perceived them as humans (Wu *et al.*, 2020). In a study conducted by Chen *et al.* (2023), they found that students identified some weaknesses and strengths in chatbots. The weaknesses lie in chatbots' inability to maintain the conversational flow as humans do, and their incapability to understand the nuances of input. Users of chatbots needed to structure their queries clearly. Wu *et al.* (2020) found that students engaged with chatbots in online learning and communicating with chatbots improved students' learning and mental health. In a similar vein, Dhimolea *et al.* (2022) believed that AI conversational chatbots and socially assistive robots enhanced social and emotional states. These findings show that there are some challenges of using AI in education.

### *Challenges of using AI in education*

Although Chatbots are useful tools in education, they still have limitations and drawbacks due to some technological limitations. It was found, for example, that Microsoft Bing's chatbot generated aggressive and pejorative responses (Allyn, 2023). It was also found that some of these advanced Chatbots such as ChatGPT make up stories, ideas and information that look logical but in fact they are mere hallucinations (Schardt, 2023). Another thorny issue of using AI in education is data privacy (Zeide & Nissembaum, 2018). Fiok *et al.* (2022) believed that AI processes were quite complex and difficult to understand their nature, which increases worry towards the use of AI in education. Not less importantly is the fact that teachers in many instances had limited knowledge of AI and they seemed not to be ready to use it (An *et al.*, 2022; Antonenko & Abroamowitz, 2023; Celik *et al.*, 2022;)

In relation to this, Wang *et al.* (2021) investigated Chinese faculty members attitude towards the use of AI in universities and higher institutes. They found that the utilization of AI was determined by factors such as anxiety, self-efficacy, perceived usefulness, perceived ease of use, and attitudes toward its application. They also emphasized that attitude toward use was the highest determining power.

Similarly, Yang and Chen (2023) conducted a study on 26 pre-service information technology teachers in Taiwan. The teachers were given the option to use Learning Management Systems (LMS) or to use Chatbots to learn. The study's findings revealed that teachers utilized both methods; however, they showed a preference for employing chatbots when seeking information not covered in the course material or for enhancing their understanding.

A study by Kaplan-Rakowski *et al.* (2023) investigated teachers' perceptions on open generative AI (GAI) and its potential implementation in education. A survey adapted from Wozney *et al.* (2006) was completed by 147 teachers with diverse backgrounds to assess their views on GAI technology. Using SAS/STAT software and Spearman rank-order correlations for quantitative analysis, and an open coding technique for qualitative analysis, the results revealed positive perspectives towards GAI across different teaching styles. Interestingly, frequent GAI use correlated with more positive perspectives, and teachers saw potential for GAI to enhance professional development and support students. The study acknowledged limitations, such as a small sample size and potential overrepresentation of favorable perceptions due to prior GAI experience. While these perceptions did not guarantee implementation, they emphasized the significance of teachers' initial views in technology integration. Further research should explore teaching practices, assessment impact, and coping strategies for AIED challenges. The rapid evolution of GAI and new

rivals may influence technology integration and reshape perceptions in education. Although the study indicates positive perceptions of ChatGPT, uncertainties persist about its future implementation and widespread use, requiring further investigation.

Lin's (2022) study comprehensively examined the influence of Artificial Intelligence in Education (AIED) on the efficacy of teaching. The research systematically investigated five hypotheses while also introducing the concept of teachers' perceptions of Educational Technology (ET) as a mediating variable. The study designed a questionnaire covering AIED measurement, teaching effectiveness, teachers' perceptions of ET, and descriptive statistics of respondents, collecting 290 valid questionnaires from undergraduates at nine Chinese universities, with an effective recovery rate of 78.80%. The Cronbach  $\alpha$  and KMO of the survey were 0.907 and 0.878, respectively, indicating good reliability and validity. The  $\chi^2$  of Bartlett's test of sphericity reached the 0.01 significance level, further supporting the questionnaire's robustness. The results showed significant improvements in teaching effectiveness through AI-assisted teaching, exercises, exams, and assessment. The study concluded that AIED can positively assist teaching and recommended strategic use of AIED to meet learners' needs. Teachers' perceptions of ET actively contributed as a partial mediating factor in this association, and samples with different periods of AI usage also significantly influenced teaching effectiveness ( $p < 0.01$ ). Further research is needed to explore the effective utilization of intelligent measures and the development of AI-assisted teaching systems.

In a study by Yang, Gao and Shen (2024), the interactions between Chinese university-level English as a foreign language (EFL) student and Pigai, an AI-programmed automated writing evaluation (AWE) system, were examined. The study analyzed how students engaged with Pigtail's feedback using a small data set from five students with 3 to 12 submissions. Initially, students focused on error corrective feedback, but with repeated submissions, they gradually interacted more with non-error corrective feedback, which provided linguistic resources but lacked examples and context. The uptake of feedback with linguistic resources was lower than error corrective and general feedback. The analysis revealed a dynamic process where students' responses evolved from mechanical reactions to more thoughtful approaches based on machine feedback. The findings offer insights for language pedagogy and the future development of AWE for foreign language learning.

Mizumoto and Eguchi (2023) utilized the AI language model ChatGPT, specifically the GPT-3 text-davinci-003 model, to perform automated essay scoring (AES) on 12,100 essays from the ETS Corpus of Non-Native Written English (TOEFL11). The results demonstrated a certain level of accuracy and reliability in AES using GPT, suggesting its

potential to revolutionize writing evaluation and feedback methods in foreign language research, teaching, and learning. Furthermore, incorporating linguistic features improved scoring accuracy, making AI language models like ChatGPT effective tools for enhancing the assessment process. The findings hold practical implications for educators and learners, showcasing how AI can provide valuable support for human evaluations and potentially transform writing assessment practices in both research and application. Future considerations include exploring additional applications of AI language models in language education and addressing potential limitations.

Bin-Hady *et al.*'s (2023) study aimed to construct a framework for ChatGPT research pertaining to English language acquisition. The study investigated the ways in which ChatGPT contributed to students' language learning journey. Employing grounded theory, the researchers collected and analyzed data from 20 participants on ResearchGate (RG) over a two-week discussion concerning the utilization of ChatGPT in language learning contexts. The initial findings suggested that ChatGPT holds potential for enhancing learners' language proficiencies. It achieves this by offering feedback, scaffolding the learning process, and serving as a language practice partner through recommended activities. Additionally, the study introduced a model with five dimensions for artificial intelligence-assisted language learning (AIALL). This model underscored the significance of adaptable teacher roles, fostering learner autonomy, creating enjoyable learning experiences, driving future innovation, and exploring a range of application possibilities. The research highlighted the need for teachers to provide proper guidance on using ChatGPT as a new language learning tool. The study's findings were considered tentative, as they were based on the personal opinions of 20 university professors who shared their views on ChatGPT's use in language learning. These professors may have varied backgrounds, motivations, and expectations, influencing their perspectives on the technology during its early phase. Data collection did not involve students because ChatGPT is still in its early stages, and it may take time for students to become aware of and familiar with this technology. Further investigations are necessary to validate and expand on these initial findings.

Kim and Kim (2022) investigated teachers' perceptions of an AI-enhanced system designed to support students' scientific writing in STEM education. They argued that while efforts to incorporate AI into teaching and learning have been ongoing, there has been limited research on how teachers perceive AI utilization in the classroom. The results showed that most STEM teachers had a positive experience with AI as a scaffolding tool. However, they also highlighted potential threats, such as the changing role of teachers in the classroom and concerns about the transparency of decisions made by the AI system. These findings



can serve as a foundation for creating guidelines for integrating AI into STEM education in schools, offering insights into teachers' experiences and considerations for its effective implementation.

William, Kaputsos and Breazeal (2021) discussed the development and implementation of the "How to Train Your Robot: AI and Ethics Curriculum" which was designed for middle school teachers to introduce AI to their students. The goal was to prepare students to engage with emerging technologies like AI and develop critical thinking and ethical skills. The study interviewed teachers who used the curriculum before and after implementation, assessing their opinions on pedagogical approaches, meeting students' needs, and the feasibility in the classroom. The results indicated that with proper training, even teachers new to computer science felt prepared and successfully engaged their students in the AI topic. The insights gained from this study can inform future efforts to incorporate AI education into primary and secondary classrooms, empowering students to participate fully in the future society. However, the study participants raised concerns about cost, internet connection, and access to computers, and hence, they will need to be addressed in future research.

An *et al.* (2023) conducted a study to investigate K-12 English as foreign language (EFL) teachers' perceptions and behavioral intentions concerning the integration of Artificial Intelligence (AI) to support English teaching in middle schools. The research combined elements from the Unified Theory of Acceptance and Use of Technology (UTAUT) and Technological Pedagogical and Content Knowledge (TPACK). The survey, carried out in a Chinese AI education demonstration district, collected 470 valid responses using a 5-point Likert scale. The results revealed that EFL teachers held a positive attitude towards AI integration, with factors such as Performance Expectancy (PE), Social Influence (SI), AI language technological knowledge (AIL-TK), and AI technological pedagogical knowledge (AI-TPK) significantly predicting Behavioral Intention (BI) to use AI. Additionally, Effort Expectancy (EE), Facilitating Conditions (FC), and AI-TPK had indirect effects on BI. The study offered a theoretically grounded framework for educators and policymakers to promote the effective use of AI in English language teaching. The researchers suggested that future research should consider exploring negative factors, and it is essential to verify the findings in other regions and countries beyond the selected AI education demonstration area in China.

Qasem *et al.* (2023) investigated the impact of using chatbots, specifically the Dialogflow chatbot, on English for Specific Purposes (ESP) students in the Business Department at the University of Bisha during the COVID-19 pandemic. The study aimed to determine how the chatbot can be utilized as an interactive online platform to assist ESP learners in

effectively learning vocabulary. The research employed an experimental design with two groups: an experimental group using the chatbot and a control group without it. Pre-tests and post-tests were conducted to assess vocabulary knowledge, and an informal interview was used to gather additional data on the participants' experience with the chatbot. The findings revealed that using chatbots significantly enhances ESP vocabulary learning, as students in the experimental group outperformed those in the control group. The study demonstrated the potential pedagogical benefits of incorporating chatbots in language learning, and it contributed to the understanding of their role in improving L2 lexical development in English as a Foreign Language settings. The researcher recommended expanding the study to various language learning environments and comparing chatbot-assisted learning with other methods would provide comprehensive insights into the potential benefits of chatbots in language education.

The previously reviewed studies underscore the importance of studying the implementation of AI in education and reveal a gap in AI studies among university professors; therefore, this research aims to answer the following questions:

1. To what extent university professors are familiar with AI?
2. To what extent do university professors perceive AI as a useful tool in education?
3. What challenges are perceived by university professors as the most determining in the use of AI?
4. What threats are perceived by university professors as the most determining in the use of AI?

## Hypotheses

University professors are unfamiliar with AI

AI tools are effective in Enhancing Teaching

There is no significant difference between the factors that constitute a challenge for using AI in education

Do the participants have statistically significant high positive perception towards the use of AI in education?

What are underlying relationships between the threats of using AI variables?

## Methodology

This study adopts a quantitative approach to address the research questions. The selection of a quantitative approach is considered appropriate for this study, as it aims to provide objective answers to the research questions which target a particular sample with the intention of comprehending its specific behaviors and perceptions (Creswell & Creswell, 2018). Alongside, the quantitative findings are likely to be generalized to an entire population or a sub-population due to their derivation from a larger randomly selected sample (Carr, 1994).

## Instrument

### *Survey item generation and construction*

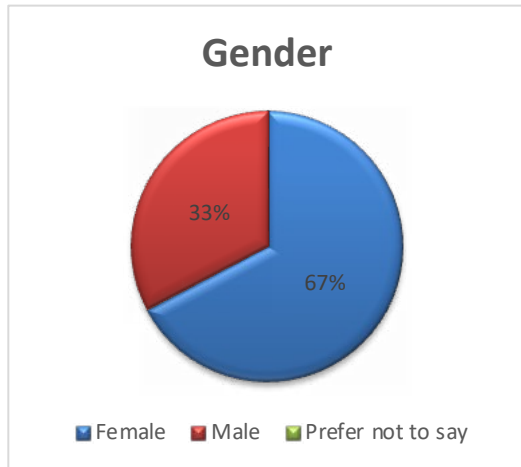
The initial pool of items was generated by identifying studies that examined perceptions regarding the integration of AI in education (Kim & Kim, 2022; Chan & Hu, 2023; Chai *et al*, 2021; McGrath *et al*, 2023; Wozney *et al.*, 2006). Items from previous research instruments were selected based on their frequent appearance in the literature (utilized in two or more research papers) and their relevance to the Egyptian context. To enhance content validity, an academic reviewed the questionnaire, ensuring clarity of wording and eliminating ambiguous statements and potential wording bias. The suitability and alignment of the scale with the items' phrasing were also confirmed.

The survey comprised two sections of closed-ended questions. The initial section gathered demographic details, while the second part investigated professors' awareness of AI, their viewpoints on AI in education, AI integration, encountered challenges, factors encouraging AI use, and potential risks. The survey used a 5-point Likert Scale, ranging from "strongly disagree" to "strongly agree."

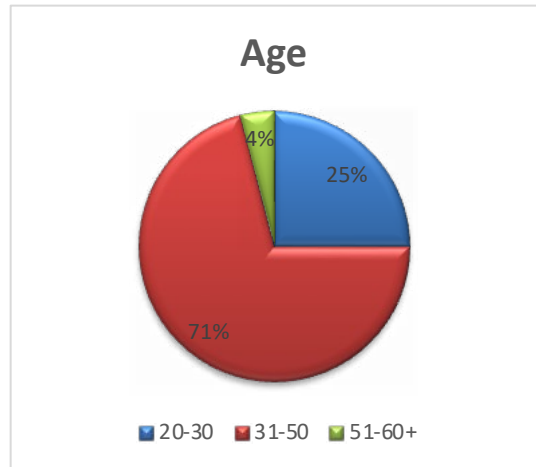
### *Participants*

The survey was converted into an electronic Google Form for user convenience and distributed to university professors across various Egyptian universities via a unique link provided to department heads or identified staff members. Participation was voluntary, and participants were informed about the survey's objectives in the introduction. Responses were collected anonymously to ensure privacy. Data was recorded only upon pressing the 'submit' button, allowing for one response per participant. Implied consent was established through submission. A total of 65 valid responses were collected, comprising 67.2% females

and 32.8% males aged between 24 and 63. Subsequently, the data underwent coding and analysis using SPSS. Various statistical tests were applied to address the research questions. Demographic summaries related to gender and age are presented in figures (1) and (2)



**Figure 1.** Gender of participants



**Figure 2.** Age of participants

**Results and discussion**

To address the research questions and research hypotheses, SPSS was used to run statistical tests.

**1. Average Level of Familiarity with AI:**

To address the first research question, viz., to what extent university professors are familiar with AI, descriptive statistics were implemented. Table 1 below summarizes the findings.

**Table 1 Familiarity with AI**

	N	Minimum	Maximum	Mean	Std.	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Deviation	Statistic	Std.	Statistic	Std.
					Statistic		Error		Error
D1	65	0	1	.09	.292	2.884	.297	6.517	.586
N1	65	0	1	.32	.471	.775	.297	-1.445	.586
SD1	65	0	1	.11	.312	2.591	.297	4.863	.586
A1	65	0	1	.26	.443	1.111	.297	-.791	.586
SA1	65	0	1	.20	.403	1.536	.297	.369	.586
Valid N (listwise)	65								

Note: D1: “Disagree”, .....

As seen in Table1, participants’ responses to Question 1, gauging their familiarity with AI, serve as the bedrock for this investigation. These responses were captured across five Likert scale items:

- D1: “Disagree”
  - SD: Strongly disagree
  - N1: “Neutral”
  - S1: “Agree”
  - SA1: “Strongly Agree”
- Descriptive Insights:

*Analyzing responses from a pool of 65 participants, intriguing descriptive insights emerged:*  
 D1: The distribution revealed a minimum score of 0 and a maximum score of 1. The average familiarity score was approximately 0.09, indicating a relatively lower level of familiarity with AI. The skewness of about 2.884 suggested a right-skewed distribution, implying that some participants exhibited a higher level of familiarity. A kurtosis value of around 6.517 reinforced this observation, indicating a distribution with heavy tails and a peak that diverges notably from a normal distribution.

N1, S1, SA1: As participants’ perceptions traverse the spectrum of familiarity, a panorama of scores emerges. Mean scores of approximately 0.32 (N1), 0.11 (S1), and 0.20 (SA1) reflect varying degrees of familiarity. These mean values are accompanied by skewness values,

primarily positive, indicating right-skewed distributions and the presence of longer tails on the right side. The descriptive statistics offer insights into the diversity of familiarity perceptions across these items.

**Implications:**

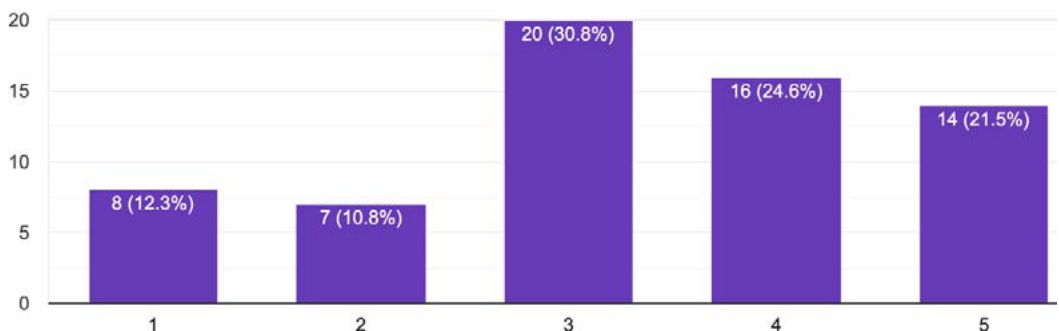
The descriptive analysis provides a snapshot of participants' familiarity perceptions across Likert scale items. The skewness and kurtosis values underline the non-normality of the distributions, emphasizing the diversity and asymmetry in familiarity perceptions.

In summary, this descriptive exploration uncovers the intricate tapestry of familiarity perceptions among participants regarding AI. The skewness, kurtosis, means, and standard deviations offer a preliminary glimpse into the distributional characteristics of these familiarity scores. As further analyses unfold, a richer understanding of the factors influencing differing familiarity levels will emerge, contributing to a holistic view of individuals' interaction with AI technology.

In short, the participants showed different variations regarding their familiarity with AI, the highest mean was 'neutral', which shows that many participants were uncertain of their familiarity with AI. Many others showed that they are familiar while others expressed their unfamiliarity with AI. The graph below showcases a clear picture of these findings.

I am familiar with AI.

65 responses



**Figure 3.** Percentage of familiarity with AI.

## 2. Effectiveness of AI Tools in Enhancing Teaching

The second research question aims to measure the extent AI tools are perceived as useful tools in teaching by the participants (i.e. university professors). For this purpose a descriptive statistics were conducted followed by a t-test.

**Table 2 Effectiveness of AI Tools in Enhancing Teaching**

	N	Minimum	Maximum	Mean	Std.	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Deviation	Statistic	Std.	Statistic	Std.
					Statistic	Statistic	Error	Statistic	Error
SD4	65	0	1	.08	.269	3.251	.297	8.840	.586
D4	65	0	1	.06	.242	3.736	.297	12.335	.586
N4	65	0	1	.15	.364	1.964	.297	1.917	.586
A4	65	0	1	.20	.403	1.536	.297	.369	.586
SA4	65	0	1	.49	.504	.032	.297	-2.063	.586
Valid N (listwise)	65								

As seen in Table 2, the responses vary across the Likert scale items, indicating a range of perceptions regarding whether AI enhances teaching.

The positive skewness for all items suggests that the distributions are skewed to the right, implying that more participants tend to agree or strongly agree that AI enhances teaching.

The relatively higher positive skewness and kurtosis values for “SD4” and “D4” suggest more pronounced right-skewed distributions and potentially higher agreement with AI’s enhancing role in teaching.

The positive skewness for “N4” and “A4” items indicates that most participants tend to agree to some extent that AI enhances teaching, while the relatively lower positive skewness for “SA4” suggests a more balanced distribution of responses.

In conclusion, participants’ responses reveal varying degrees of agreement regarding whether AI enhances teaching. The positive skewness and kurtosis values across the Likert scale items suggest that more participants lean towards agreeing with this notion, albeit to different extents.

To see how in general the participants perceive and use AI in education, a one sample t-test was run. A one-sample t-test is used to determine whether the mean of a single sample differs significantly from a known or hypothesized population mean. It's typically used when you have a single group of subjects and you want to compare their mean score to a known value or a hypothesized population mean (i.e. p value).

**Table 3 One-Sample Test: Participants' perceptions and use of AI in Education**

Test Value = 0

	t	df	Sig. (2-tailed)	Mean Difference	95% Interval Difference Lower	Confidence of the Upper
I have used AI tools or technologies in my teaching	12.767	65	.000	2.515	2.12	2.91
I have used AI tools or technologies in my research	12.939	64	.000	2.554	2.16	2.95
AI tools are effective in enhancing my research activities	19.892	65	.000	3.439	3.09	3.78
I explore new opportunities offered by AI in general	24.271	64	.000	3.846	3.53	4.16
I have concerns about the ethical implications of AI in education	25.129	64	.000	3.877	3.57	4.19
AI will positively impact the field of education.	23.288	64	.000	3.708	3.39	4.03
AI has the potential to enhance the quality of education.	22.378	64	.000	3.785	3.45	4.12

In Table 3, the sample as a whole scored relatively high. Based on the results of one sample t-test, since the significant value ( $p = .000$ ) was smaller than alpha ( $\alpha = .05$ ), the null hypothesis is rejected. It can be concluded that the participants have high positive perception towards the use of AI in education. In conclusion, based on the provided survey answers, it seems that participants' responses to these statements significantly differ from the hypothesized test value of 0. This suggests that participants generally hold positive views about AI in education based on the mean differences reported in the "Mean Difference" column. The 95% confidence intervals also give you an idea of the range of plausible population mean differences. To sum up, both the descriptive statistics and t-test results show that the participants believe that AI can enhance education.



### 1. Perceived Challenges of Using AI in Education

Repeated measures anova was run to test the following null hypothesis: there is no significant difference between the factors that constitute a challenge for using AI in education. A repeated measures ANOVA can potentially be used to test the hypothesis regarding the factors that constitute a challenge for using AI in education, provided that the data is collected in a repeated measures design. The following table showcases the results.

**Table 4 Mauchly’s Test of Sphericitya: Challenges of Using AI in Education**

Measure: MEASURE\_1

Within Subjects Effect	Mauchly’s W	Approx. Chi-Square	df	Sig.	Epsilon <sub>b</sub> Greenhouse-Geisser	Huynh-Feldt	Lower-bound
factor1	.829	11.755	5	.38	.894	.937	.333

**Table 5 Tests of Within-Subjects Effects**

Measure: MEASURE\_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
factor1	Sphericity Assumed	7.600	3	2.533	2.548	.057
	Greenhouse-Geisser	7.600	2.682	2.833	2.548	.064
	Huynh-Feldt	7.600	2.811	2.704	2.548	.061
	Lower-bound	7.600	1.000	7.600	2.548	.115
Error(factor1)	Sphericity Assumed	190.900	192	.994		
	Greenhouse-Geisser	190.900	171.678	1.112		
	Huynh-Feldt	190.900	179.901	1.061		
	Lower-bound	190.900	64.000	2.983		

A one-way repeated measures ANOVA was conducted to test the significance of difference between the participants’ challenges of using AI scores. Mauchly’s test indicated the assumption of sphericity was met ( $p < .05$ ). Based on the Greenhouse-Geisser’s results, there was a statistically significant difference of the challenges scores,  $F(2.69, 171.7) = 2.55, p < .05$ . The null hypothesis fails to be rejected. This indicates that the four factors are of equal importance in terms of causing a challenge to using AI. Put clearer, *the fact that outcomes*

*of AI algorithms are difficult to trace or understand, the AI's complex level of autonomy, the high costs associated with the implementation of AI, and that using AI makes data privacy / confidentiality at stakes all together constituted a challenge to using AI.*

## 2. Threats of using AI

Factor analysis was run to identify underlying relationships between the threats of using AI variables, and to uncover patterns within the dataset. Factor analysis is a statistical technique used to identify underlying factors or latent variables that explain patterns of correlations among observed variables. Factor analysis aims to achieve this by grouping correlated variables into clusters called factors, which represent underlying dimensions or constructs that explain the observed patterns in the data. First, KMO and Bartlett's Test was conducted to ensure that the data is suitable for Factor analysis.

**Table 6 KMO and Bartlett's Test: Threats of using AI**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.691
Bartlett's Test of Sphericity	Approx. Chi-Square	97.445
	df	6
	Sig.	.000

As seen in table (6), the Bartlett's test of sphericity is significant since its value ( $p = .000$ ) is less than alpha ( $\alpha = .05$ ). On the other hand, the Kaiser-Meyer-Olkin measure of sampling adequacy (.691) is more than the threshold of (.6). According to these two statistics, the data set is suitable for factor analysis. Based on this, Factor analysis test was run. The tables below summarizes the findings.

**Table 7 Component Matrixa**

	Component 1
One of the threats of using AI is that it will reduce professor's skills	.846
One of the threats of using AI is that professors may become redundant	.804
One of the threats of using AI is the high possibility of Dehumanization of teaching	.794
One of the threats of using AI is that AI will eventually harm students	.776

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

The variable “One of the threats of using AI is that it will reduce professor’s skills” has a factor loading of .846 on the extracted component. Similarly, the other variables also have high factor loadings, indicating that they are strongly associated with the extracted component. Since we have only one extracted component, this suggests that the questions we listed share a common underlying theme or dimension. The extracted component explains a significant portion of the variance in these questions, and the high factor loadings indicate that the questions are strongly related to this dimension.

Based on the high factor loadings, we can infer that the extracted component represents a perceived threat related to AI’s impact on professors’ skills, the possibility of their redundancy, and the potential dehumanization of teaching. In sum, while the output does not explicitly show the factor loadings, based on the communalities, we can infer that the extracted factor represents a shared theme or dimension related to perceived threats of using AI in education. This theme possibly involves concerns regarding the influence of AI on instructors’ skills, the potential dehumanization of teaching, potential negative effects on students due to AI, and the likelihood of educators losing relevance due to AI.

The growing significance of Artificial Intelligence (AI) research in education has led to an interesting area of investigation, particularly in understanding the diverse ways in which university professors perceive and interact with AI technologies. This study which was done within the context of Egypt’s higher education to examine how university professors perceive AI. Through a comprehensive survey circulated among both state and private universities, a thorough understanding of these perceptions has emerged.

The study’s results unveil a diverse range of viewpoints among university professors regarding AI. It is evident that while AI is garnering increasing attention in educational discourse, familiarity with its intricacies remains varied among university faculty. This diversity in familiarity underscores the need for tailored interventions to enhance AI literacy among professors, ensuring that they are equipped to harness its potential effectively.

## Conclusions

The perceived impacts of AI on education emerged as a significant aspect of this study. University professors' consensus on AI as a valuable tool for education signifies the growing recognition of its transformative capacity. This recognition, coupled with the identified challenges of AI adoption, underscores the complex balance between innovation and practicality. The study identifies challenges associated with AI adoption, including the complex interpretation of algorithmic outcomes, the intricate autonomy embedded in AI systems, financial implications, and concerns surrounding data privacy. These challenges are pivotal considerations in designing effective AI integration strategies within the educational sphere.

This study notably contributes to the present scientific endeavors in the field by highlighting perceived threats linked to AI use in education. University professors participating in the study express concerns about its potential effects on teaching dynamics and educator roles. Worries about diminishing personal interaction in teaching, possible harm to students, and the prospect of educators becoming redundant due to AI adoption showcase a range of ethical and pedagogical concerns. Consequently, these findings emphasize the need for a thorough exploration of AI deployment's ethical, social, and economic consequences in education.

In conclusion, this study provides invaluable insights into the perceptions, challenges, and aspirations of university professors regarding AI in the educational landscape. The diverse range of perspectives reflects the evolving nature of AI's integration in education. While professors acknowledge the potential benefits of AI, their concerns about its challenges and threats underscore the need for a balanced and ethical approach to its implementation.

This study's significance lies in its potential to inform policy decisions, professional development initiatives, and curriculum design. Tailored interventions aimed at enhancing AI literacy among educators are warranted to maximize the benefits of AI while addressing concerns. Furthermore, fostering interdisciplinary collaboration between educators, technologists, and policymakers can facilitate the responsible integration of AI in educational practices.

Amidst the dynamic technological changes in education, this study timely underlines that AI's potential must be balanced with a comprehensive understanding of its impacts. Successful integration of AI mandates ethical, fair, and student-focused implementation. Continued research in this domain is imperative to ensure that the evolution of AI aligns with the goals of education in nurturing critical thinking, creativity, and more importantly human connection.

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