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Awareness, benefits, threats, attitudes, and satisfaction with AI tools among Asian and African higher education staff and students

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Abstract

Artificial intelligence (AI) tools are now used in our daily lives. This study aimed to explore the level of awareness, perceived benefits, threats, attitudes, and level of satisfaction with AI tools among individuals within higher education in Asia and Africa. A cross-sectional study was conducted in August 2023. Snowball sampling was used with a convenience sample of 815 highly educated Asian and African participants from 11 countries. About 56% of participants have Bachelor's degrees. 312 participants (38%) were unaware of AI tools and AI tools were used rarely by 316 (63%) of 503 participants who were aware of them. ChatGPT is the most popular of this study's AI tools (N=405, 81%). Participants who used AI tools reported greater benefits than those who did not ($p < 0.05$). ¬Of the four educational groups, those with a Master's degree reported a higher AI tool threat than those with a Diploma ($P < 0.05$). Female participants reported more AI-related threats than males ($P < 0.05$). In conclusion, this research is important because of the rapid development of modern technology around the world. Nevertheless, Asia and Africa still lag behind developed nations in AI technology awareness.

Introduction

Artificial intelligence (AI) is the technology that enables a computer system or computer-controlled robot to learn, reason, observe, infer, communicate, and make judgments similarly to or better than humans (Crompton & Burke, 2023; Ismail et al., 2023; Robert, 2019). It is one of the most revolutionary technologies of the twenty-first century, with profound effects on the economy and society (Scherer et al., 2023). In recent years, AI has made tremendous advancements, generating a vast array of tools and applications. AI is now an indispensable element of modern civilization. These tools can facilitate decision-making, enhance information transmission, and close knowledge gaps (Rajagopal et al., 2022).

The significance of using AI tools is immense and growing. AI systems improve decision-making by analyzing vast volumes of data to identify patterns and trends that are difficult or impossible for humans to recognize (Aitkazinov, 2023; Bani et al., 2023). These data can be used to improve decisions in various areas, including product development, health care, and customer service. AI technologies that can be tailored to provide each client with the information and services they demand can be used to provide an exceptional customer experience (Adarkwah et al., 2023; Bharadiya, 2023), which could increase client satisfaction (Hu et al., 2023).

Tools for AI are now used in our daily lives (García-Peñalvo, 2023). Education and research based on AI have entered a new, rapidly increasing era. The improvement of research and educational precision and efficiency is one of the primary benefits (Ali et al., 2023; Basilotta-Gómez-Pablos et al., 2022). AI systems can quickly scan large data sets and identify links that are difficult for humans to recognize. This may result in more productive research, allowing scientists to focus on novel and demanding endeavors (Chan & Hu, 2023). For educational reasons, AI systems may assess the learning preferences and aptitudes of students and provide individualized guidance and support to help them achieve their goals (Dergaa et al., 2023).

The evolution of AI has had a major effect on contemporary culture and daily life (Hassoulas et al., 2023). Artificial intelligence has become indispensable, with predictive algorithms improving user experiences and virtual assistants easing activities (Rudolph et al., 2023). It revolutionizes businesses by providing power to recommendation systems, driverless vehicles, and healthcare diagnostics (Chen et al., 2020). However, cautious implementation is required due to ethical considerations, challenges related to data protection, and bias (Bohr & Memarzadeh, 2020). The undeniable impact of AI's ongoing development on our work, communication, and navigation is accompanied by a range of responsibilities and prospects associated with its pervasive integration (Thakur, 2024).

In higher education, AI is revolutionizing the learning environment. By adapting instructional information to the specific requirements of each user, adaptive learning platforms enrich personalized learning experiences (Thakur, 2024). Assessments are streamlined by automated grading systems, which also deliver quick feedback (Hassoulas et al., 2023). The identification of at-risk students is facilitated by predictive analytics, which permits proactive interventions. Notwithstanding these progressions, ethical deliberations and the imperative for conscientious AI deployment continue to be pivotal in guaranteeing fair and impartial access and upholding the integrity of schooling (Wong et al., 2024).

Furthermore, AI in health studies has grown dramatically in the past decade (Abdullah & Sofyan, 2023). AI can boost healthcare efficiency and affordability. Large IT companies have invested billions in AI research because healthcare uses AI. Technology may replace human interaction and violate care ethics, among other disadvantages (Couture et al., 2023). Technology increases control needs. Healthcare AI has received little legal and ethical scrutiny (Bærøe & Gundersen, 2023).

There may be a limited number of research located in Africa or Asia that are comparable to ours. The benefits, threats, and attitudes of academics regarding AI tools were evaluated using a novel instrument that was constructed based on an extensive literature review. Understanding how faculty members and students use AI tools is essential since their viewpoints and behaviors can have a significant impact on the success of these technologies in their professions. By inquiring about their awareness of AI ideas and comprehension of its potential applications, we may estimate the depth of their expertise in this topic. Thus, this study aims to answer the following questions:

1. What is the level of awareness of AI tools among individuals within higher education in Asia and Africa?

2. Are there differences in the perceived benefits, threats, attitudes, and level of satisfaction with AI tools based on participant characteristics (age, gender, level of education, frequency of use, and country)?

Methods

Design

A cross-sectional study was conducted with Asian and African participants, with the majority from the Middle East, during the month of August 2023.

Sample and setting

Participants represented 11 nations, including nine Asian nations (Jordan, Palestine, Lebanon, Saudi Arabia, Iraq, Thailand, India, Philippines, and Kuwait) and two African nations (Egypt and Sudan). Google Forms were used to collect data from students and faculty at higher education institutions.

In this study, data were collected using a convenience sample because of its practicability and ease of access to participants (Polit & Beck, 2013). The developed online questionnaire link was sent to potential participants in all participating countries via WhatsApp, Facebook Messenger, and email

using the contact lists of the seven researchers of this study who are affiliated with higher education institutions. Each questionnaire link was sent with a message asking them to forward the study questionnaire to their colleagues and students who meet the eligibility requirements.

Eligibility requirements included being a resident of Asia or Africa, possessing a diploma or higher, and/or being a faculty member at a college or university. Because the research instrument was written in English, participants were also required to be able to read English.

Measures

The study measure consisted of three components. The sociodemographic and personal characteristics are covered in the first section. The second section was designed to measure attitudes, benefits, and threats toward AI tools in higher education. The third section was the satisfaction scale with AI tools in higher education.

The following sociodemographic characteristics were collected: age, gender, country, education, and employment type. Other information pertaining to AI tools was collected such as awareness of different types of AI tools (BardAI, ChatGPT, BingAI, Chatsonic, Writesonic, playground, Claude, Socratic, OpenAI, LaMDA2, Jasper2, and FalconLLM), and frequency of their use.

The psychometric instrument (Appendix 1) was developed by the research team to assess attitudes, benefits, and threats of AI tools among faculty members and students in higher education institutions (Ahmad et al., 2023). The research team reviewed the literature that discussed issues related to AI tools. Each one of the research team extracted main features and then assigned them under the theme of attitudes, benefits, and threats in a draft. The three suggested drafts were merged, and the duplicate items were removed. Then, the psychometric tests were conducted.

Visual Analogue Scale (VAS) was used to determine the level of participant satisfaction with AI tools. The participants were asked to rate their satisfaction with AI tools on a scale from 0 to 100 (Byrom et al., 2022). The higher the score, the more participant satisfaction with AI tools is implied.

Psychometrics of the attitudes, benefits, and threats instrument

The pre-final draft included 40 items, with seven items to assess the benefits of AI tools, 16 items to assess threats, and 17 items to assess attitude. The research teams agreed on the cleaned version of the instrument. Using the content validity index (CVI), the developed instrument's validity was evaluated. Three experts—one in information technology, one in nursing, and one in medical education—were consulted to determine the validity. The expert panel graded the applicability of each item on the tool. The average of the expert ratings is then used to calculate the CVI. Five of the study's items were removed because their CVI scores were less than .70 or irrelevant. Five experts—three from the original panel and two new ones from the physics and sociology departments—evaluated the remaining 35 items. The minimum score for each item was .85, and the scale's overall CVI score was .95. Each item was measured using a 5-point Likert scale ranging from strongly disagree (0) to strongly agree (4).

Construct validity assessment on the study scale was performed through exploratory factor analysis (EFA). The 35 items were split up into three factors: 15 items were assigned to attitude, 14 to threat, and 6 to benefits. This analysis's overall explained variance was 55%.

For the three subscales as well as the overall scale, Cronbach's alpha was calculated. The benefits subscale score was 0.82, the threat subscale score was 0.91, and the attitude subscale score was 0.90. Additionally, the overall scale had a reliability score of 0.93.

Pilot study

A pilot study was conducted during the last week of July 2023, using Google Forms to evaluate the viability of the data collection methods and tools. Thirty faculty members and students were recruited for the piloting using an online survey. The survey comprised sociodemographic and personal data, assessments of attitudes, benefits, and threats regarding AI tools in higher education, as well as a satisfaction scale pertaining to such tools. Both the study scales and the sociodemographic questionnaire were distributed to participants. The principal investigator (PI) observed the participants and recorded any problems with the tools and procedures, such as misinterpretations of the questions or technical problems. The PI also requested participant feedback on the processes and instruments, such as questionnaire length and clarity of instructions.

The data from the pilot study were analyzed to make any necessary adjustments prior to the main study. The minor modifications based on the pilot study included clarification for the first page of the online questionnaire, which served as the consent form's cover sheet, had its font size clarified, the option to select 'other countries' was added, and the option to select the responding student's year of study was removed. The original draft contained 10 common types of AI tools, but pilot participants suggested adding two more, so the final version included twelve types. A final option was added to allow participants who were unfamiliar with the AI tools to submit their responses directly after they complete the sociodemographic questionnaire.

Ethical considerations

This study was conducted following the ethical guidelines set by the Helsinki declaration (Ashcroft, 2008). The Institutional Review Board (IRB) at the School of Nursing approved the study. The first page of the questionnaire includes the information of the research purpose, method, their rights not to participate and the confidentiality assurance. An email for members of the research team was provided to receive and answer expected participants' questions. The

informed consent was obtained through clicking "yes" for the question "Do you agree to participate in the current study?" The data were saved on the principal investigator's (PI) desktop, and only authorized research team members had access to the data.

Data analysis

IBM SPSS 29.01 was used for data analysis (IBM, 2023). Using tables and histograms, descriptive statistics were employed to summarize the demographic and participant characteristics. Analysis of Variance (ANOVA) was used as inferential statistical comparison between the benefits, threats, attitudes, and satisfaction with AI tools and the characteristics of the participants. A post-hoc test was performed on the significant ANOVA results to determine which groups have differences. An Independent sample t-test was used when gender was the independent variable.

Results

This study included 815 participants with a high level of education from 11 Asian and African countries. Approximately half of the participants (56%) hold a Bachelor's degree, while nearly 35% hold a Master's or Doctoral degree. This study has attracted more women than men (57.8%). The age range was from 18 to 69 years. The interesting findings concerned the frequency of AI tool usage and awareness with the 12 most common types of AI tools presented in this study. There were 312 participants (38%) who reported not being aware of any AI tools. In addition, 316 (63%) of the 503 participants who said they were aware of AI tools reported that they had used them rarely (Table 1).

Table 1: Descriptive statistics of the sample (N=815).

Variable	Aware of AI tools N=503		Not aware of any AI tools N=312		All sample N=815	
	n	%	n	%	n	%
Gender						
Male	246	48.9	98	31.4	344	42.2
Female	257	51.1	214	68.6	471	57.8
Age (Mean=30.98, SD=11.71)						
18-20 year	111	22.1	79	25.3	190	23.3
21-30 year	162	32.2	99	31.7	261	32.0
31-40 year	116	23.1	51	16.3	167	20.5
41-69 year	114	22.7	83	26.6	197	24.2
Education						
Diploma	37	7.4	26	8.3	63	7.7
Bachelor	266	52.9	194	62.2	460	56.4
Master	108	21.5	45	14.4	153	18.8
PhD	92	18.3	47	15.1	139	17.1
AI tool usage frequency						
Daily	37	7.4	-	-	38	4.7
Weekly	88	17.5	-	-	90	11.0
Monthly	59	11.7	-	-	59	7.2
Rarely	316	62.8	-	-	316	38.8
Never	-	-	-	-	312	38.3
Country						
Egypt	30	6.0	17	5.4	47	5.8
Sudan	17	3.4	24	7.7	41	5.0
India	17	3.4	29	9.3	46	5.6
Iraq	53	10.5	39	12.5	92	11.3
Jordan	136	27.0	64	20.5	200	24.5
Kuwait	63	12.5	23	7.4	86	10.6
Lebanon	100	19.9	43	13.8	143	17.5
Palestine	67	13.3	45	14.4	112	13.7
Philippine	5	1.0	6	1.9	11	1.3
Saudi Arabia	15	3.0	4	1.3	19	2.3
Thailand	-	-	18	5.8	18	2.2

The 12 different types of AI tools presented in this study's frequency distribution are shown in Figure 1. ChatGPT appears to be the most well-known and frequently used type (N=405); 81% of the 503 participants who indicated that they are aware of or have used AI tools. Open AI (this is not a type, but the company that owns ChatGPT) (N=173, 34%) was the second most popular mention of AI. About half of the participants (N=255, 51%) claimed to be aware of more than one type of AI tool. Despite being produced by the same company, OpenAI and ChatGPT serve distinct functions (Roumeliotis & Tselikas, 2023). OpenAI Playground is trainable, while ChatGPT is pre-trained and users cannot train it with their own data. While ChatGPT offers a simpler text-based interface for producing natural language responses to user queries, OpenAI Playground gives users a more interactive and visual way to experiment with AI models.

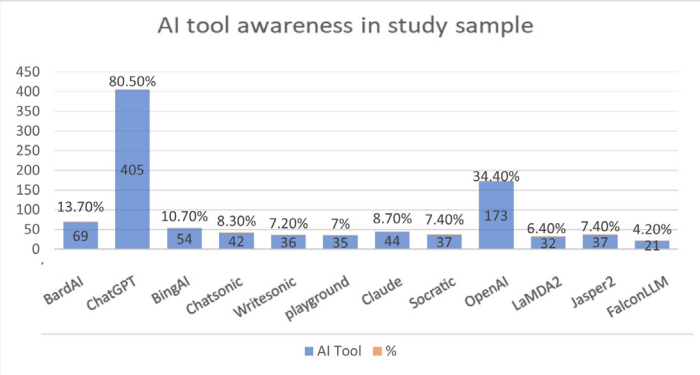

Figure 1: The frequency awareness for the 12 AI tools among the study participants. [What is the meaning of "OpenAI2"?] corrected as OpenAI.

The number of AI tools used, as reported by the 503 participants, is depicted in Figure 2. It is evident that 214 (43%) of the participants have used only one AI tool. Participants who reported using four or more types made up 58 (12%) of the total.

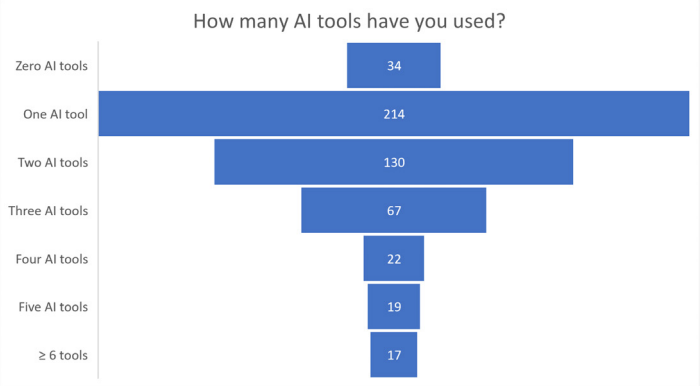

Figure 2: Number of AI tools the participants were aware of and or have used.

Table 2 presents the descriptive statistics for the four study scales. To facilitate interpretation, the original scores for the scales of attitudes, benefits, and threats were transformed to percentages. The final column of the Table shows the range for the four scales of the study between 59.69% and 68.71%. The top two items from each scale are included: for benefits,

AI tools save time and are used in education and research; for threats, AI tools require constant Internet access and reduce creativity and critical thinking; and for attitudes, AI tools may be used if edited and cited appropriately.

Table 2: Descriptive statistics for the study scales and the highest two items in each scale (N=503).

Scales	Mean	Standard deviation	Skewness	Min^	Max^	% Mean Scor
Benefit (6 items)	16.49	4.05	-.82	0	24	68.71
It saves time	2.97	.91				
AI tools are used in education and research	2.80	.98				
Threat (14 items)	36.52	16.9	-.68	0	56	65.24
It needs the Internet all the time	2.87	.99				
It decreases creativity and critical thinking	2.82	1.06				
Attitude (15 items)	38.35	8.87	-.93	0	60	63.92
I review and edit the response that generated by AI tools before using them in my work	2.76	.88				
Can be used if properly cited and documented	2.71	.87				
Satisfaction (VAS)*	-	-	-	0	100	59.69

*VAS= Visual Analogue Scale, one items %, ^min=Minimum, ^max=Maximum

Those who are aware of one or more AI tools reported higher benefits than those who were unaware (p.<05). Among the four groups of educational attainment, we found that those with a Master's degree reported a higher AI tool threat than those with a Diploma (P<.05). Female participants reported more AI-related threats than males (P <.05). There were no significant differences based on education, age groups, gender, or country in terms of the benefits of AI tools. Threats posed by AI tools did not differ significantly by age group, country, or level of awareness. In addition, attitude and satisfaction with AI tools did not differ significantly across all the studied variables (Table 3).

In order to rule out type-II errors in ANOVA analysis and because some countries had small sample sizes, the Kruskal-Wallis test was used to compare the countries against the AI tools in the study. Consistent with the ANOVA analysis, the result indicated that there were no significant differences between the countries.

Discussion

In the past decade, research and development of AI-based technologies in healthcare, industry, business, and education have increased dramatically. There is a growing awareness of AI tools among faculty and students in higher education institutions around the world (Chan, 2023; Ifelebuegu, 2023). AI tools are becoming more popular for several reasons. Increasing tool availability is one factor. A growing media coverage of AI is another factor. The majority of participants in our study have only used one AI tool, ChatGPT being the most popular. Geographic location affects the degree of familiarity with AI tools. Of the total sample (815 participants), it is interesting to note that 38% of respondents claimed to be unaware of AI tools. Additionally, we found that of the 503 participants who are aware of AI tools, nearly 63% have rarely used it. Compared to the 72% of college students in the United States who are familiar with artificial intelligence (AI) and the 58% who believe AI will have a positive impact on their lives (Rodway & Schepman, 2023). This finding

Table 3: Comparison of the participant characteristics and the benefits, threats, attitudes, and satisfaction with AI tools (N=503).

Characteristics	Benefits of AI tools		
	Statistics test	P value	Scheffe post hoc
Education level	F=0.69	.558	
Age (groups)	F=0.57	.636	
Gender	t=-0.26	.795	
AI tools awareness	F=2.71	.013	All who use AI tools ≥1, reported higher benefit than those who are not aware about it (p<.05)
Country	F=0.61	.789	
	Threats of AI tools		
Education level	F=3.92	.009	Master>Diploma (p<.05)
Age (groups)	F=2.22	.085	
Gender	t=-2.04	.041	Females>Males (p<.05)
AI tools awareness	F=1.51	.172	
Country	F=1.03	.416	
	Attitudes of AI tools		
Education level	F=1.90	.129	
Age (groups)	F=1.71	.164	
Gender	t=0.30	.768	
AI tools awareness	F=0.69	.657	
Country	F=1.24	.270	
	Satisfaction with AI tools		
Education level	F=1.58	.193	
Age (groups)	F=2.35	.071	
Gender	t=1.71	.089	
AI tools awareness	F=1.39	.339	
Country	F=0.57	.820	

indicates a lack of awareness among our study sample.

According to our findings, 55% of those who used AI tools were under the age of 30, when most people are still enrolled in college as bachelor's or master's students. This could be justified by the fact that people of this age are used to using electronic devices, have grown up in a time where technology is an essential part of daily life, and use these devices for learning, for studying, and even for casual purposes. Many educational institutions have included platforms based on AI into their curricula, exposing students to AI ideas at a young age (Timotheou et al., 2023). Additionally, due to their cognitive flexibility and one of the most economical means of developing young brains, the younger generation is frequently more able to adapt to new technology (Kulkov, 2023).

There are conflicting findings in research regarding gender inequalities in information technology (Liang et al., 2023). In Asia and Africa, men have easier access to IT resources than women do (Kukulska-Hulme et al., 2023). This is consistent with our findings that women made up nearly 69% of participants who were unaware of any AI technologies.

Literature has focused on the possible roles in the medical field, notably in terms of education, research, and clinical settings (Periaysamy et al., 2023). Participants in the current study evaluated AI tools to be beneficial. However, the most troublesome aspect of deploying AI tools is not the level of recognizing AI tools' benefits; rather, the most challenging aspect is proving that AI tools are being used in daily attitude (Himeur et al., 2023).

Academic staff and students in higher education in Asia and Africa have different perspectives on the use of AI tools. Our research found that AI tools pose threats. The main two threats to AI tools were the need for constant Internet access and it also reduced creativity and critical thinking.

The literature, however, recognized many categories of threats. This finding is consistent with previous studies that reported numerous threats posed by AI tools (Alqahtani et al., 2023; Ifelebuegu et al., 2023). In education, students may use AI to write the entire assignment rather than revising it; the data provided by ChatGPT require continuous updating (Periaysamy et al., 2023). Furthermore, Benvenuti et al. (2023) argue that AI tools cannot replace human interaction and that they may lead to a lack of critical thinking skills among students. Furthermore, in the current study, females more than males and those with a master's degree were more likely than those with a diploma degree to perceive AI technologies as threatening. No research has yet directly examined threats in education or by age or gender, but it might be presented as violence due to technology (Novitzky et al., 2023).

Despite the concerns, there are many benefits to using AI tools in higher education. AI can help reduce administrative tasks for teachers and staff, allowing them to focus on more important tasks (Chan, 2023). In our study, the top two benefits for AI tools were saving time and that it is used in education and research. Furthermore, our results support using AI tools if they are edited and cited appropriately. This finding has been emphasized in the recent literature in order to maintain ethics in using AI tools (Atenas et al., 2023; Kooli, 2023).

Implications

The study could help identify the specific benefits and threats of AI in higher education that are most relevant to students and faculty in Asia and Africa. This knowledge could be used to develop policies and practices that maximize the benefits of AI while minimizing its threats. The research could also assist in determining the level of student and faculty satisfaction with AI in higher education. Furthermore, the study could increase awareness of the potential of AI in higher education; promote the use of AI in higher education in a responsible and ethical manner; inform the development of policies for the use of AI in higher education; and contribute to the body of knowledge on the use of AI in education.

Conclusion

The application of artificial intelligence in higher education is still in its infancy, but it has the potential to revolutionize how we learn and teach. Asian and African countries included in this study still have lower levels of awareness of AI technology than Asian leaders, like South Korea and China. It is essential to be aware of the potential benefits and threats of AI and to implement safeguards to mitigate the threats. This research is more exhaustive because it includes a large number of participants from eleven Asian and African nations. Investigating 12 common types of AI tools provides valuable insight into the potential benefits, threats, attitudes, and satisfaction with AI tools in education and research. The application of AI in higher education is a difficult and complex issue. However, we must address this issue to ensure that our educational systems are future ready. Concerns regarding ChatGPT differ based on gender and level of education, despite its increasing global usage. Given the rapid advancement of technology on a global scale, the findings underscore the importance of addressing the lack of awareness regarding artificial intelligence in the studied countries. A limitation of this study could be the non-proportional sampling, despite the fact that the sample size was relatively large and that there was a variety of settings. Moreover, the fact that African respondents originated from two different nations may also limit the generalizability of the findings.

References

Abdullah, K. H., & Sofyan, D. (2023). Machine learning in safety and health research: A scientometric analysis. *International Journal of Information Science and Management (IJISM), 21*(1), 17-37. https://doi.org/10.22034/ijism.2022.1977763.0

Adarkwah, M. A., Amponsah, S., van Wyk, M. M., Huang, R., Tlili, A., Shehata, B., Metwally, A. H. S., & Wang, H. (2023). Awareness and acceptance of ChatGPT as a generative conversational AI for transforming education by Ghanaian academics: A two-phase study. *Journal of Applied Learning and Teaching, 6*(2), 78-93. https://doi.org/10.37074/jalt.2023.6.2.26

Ahmad, M., Alhalaiqa, F., & Subih, M. (2023). Constructing and testing the psychometrics of an instrument to measure the attitudes, benefits, and threats associated with the use of Artificial Intelligence tools in higher education. *Journal of Applied Learning and Teaching, 6*(2), 114-120. https://doi.org/10.37074/jalt.2023.6.2.36

Aitkazinov, A. (2023). The role of artificial intelligence in auditing: Opportunities and challenges. *International Journal of Research in Engineering, Science and Management, 6*(6), 117-119. https://doi.org/10.7176/RJFA/14-15-03

Ali, O., Abdelbaki, W., Shrestha, A., Elbasi, E., Alryalat, M. A. A., & Dwivedi, Y. K. (2023). A systematic literature review of artificial intelligence in the healthcare sector: Benefits, challenges, methodologies, and functionalities. *Journal of Innovation & Knowledge, 8*(1), 100333. https://doi.org/10.1016/j.jik.2023.100333

Alqahtani, T., Badreldin, H. A., Alrashed, M., Alshaya, A. I., Alghamdi, S. S., bin Saleh, K., Alowais, S. A., Alshaya, O. A., Rahman, I., & Al Yami, M. S. (2023). The emergent role of artificial intelligence, natural learning processing, and large language models in higher education and research. *Research in Social and Administrative Pharmacy, 19*(8), 1236-1242. https://doi.org/10.1016/j.sapharm.2023.05.016

Ashcroft, R. E. (2008). The declaration of Helsinki. *The Oxford textbook of clinical research ethics,* 141-148.

Atenas, J., Havemann, L., & Timmermann, C. (2023). Reframing data ethics in research methods education: a pathway to critical data literacy. *International Journal of Educational Technology in Higher Education, 20*(1), 1-27. https://doi.org/10.1186/s41239-023-00380-y

Bærøe, K., & Gundersen, T. (2023). Trustworthy bioethicists within lifecycles of artificial intelligence in health. In *AI and society* (pp. 249-264). Chapman and Hall/CRC.

Bani Hani, S. H., & Ahmad, M. M. (2023). Machine-learning algorithms for ischemic heart disease prediction: A systematic review. *Current Cardiology Reviews, 19*(1), 87-99. https://doi.org/10.2174/1573403X18666220609123053

Basilotta-Gómez-Pablos, V., Matarranz, M., Casado-Aranda, L.-A., & Otto, A. (2022). Teachers' digital competencies in higher education: a systematic literature review. *International Journal of Educational Technology in Higher Education, 19*(1), 1-16. https://doi.org/10.1186/s41239-021-00312-8

Benvenuti, M., Cangelosi, A., Weinberger, A., Mazzoni, E., Benassi, M., Barbaresi, M., & Orsoni, M. (2023). Artificial intelligence and human behavioral development: A perspective on new skills and competences acquisition for the educational context. *Computers in Human Behavior,* 107903. https://doi.org/10.1016/j.chb.2023.107903

Bharadiya, J. P. (2023). A comparative study of business intelligence and artificial intelligence with big data analytics. *American Journal of Artificial Intelligence, 7*(1), 24. https://doi.org/10.11648/j.ajai.20230701.14

Bohr, A., & Memarzadeh, K. (2020). The rise of artificial intelligence in healthcare applications. In *Artificial Intelligence in healthcare* (pp. 25-60). Elsevier. https://doi.org/10.1016%2FB978-0-12-818438-7.00002-2

Byrom, B., Elash, C. A., Eremenco, S., Bodart, S., Muehlhausen, W., Platko, J. V., Watson, C., & Howry, C. (2022). Measurement comparability of electronic and paper administration of visual analogue scales: A review of published studies. *Therapeutic Innovation & Regulatory Science, 56*(3), 394-404. https://doi.org/10.1007/s43441-022-00376-2

Chan, C. K. Y. (2023). A comprehensive AI policy education framework for university teaching and learning. *International Journal of Educational Technology in Higher Education, 20*(1), 1-25. https://doi.org/10.1186/s41239-023-00408-3

Chan, C. K. Y., & Hu, W. (2023). Students' voices on generative AI: Perceptions, benefits, and challenges in higher education. *International Journal of Educational Technology in Higher Education, 20*, 43. https://doi.org/10.1186/s41239-023-00411-8

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

Couture, V., Roy, M., Dez, E., Laperle, S., & Bélisle-Pipon, J. (2023). Ethical implications of artificial intelligence in population health and the public's role in its governance: perspectives from a citizen and expert panel. *Journal of Medical Internet Research, 25*, e44357. https://doi.org/10.2196/44357

Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. *International Journal of Educational Technology in Higher Education, 20*(1), 1-22. https://doi.org/10.1186/s41239-023-00392-8

Dergaa, I., Chamari, K., Zmijewski, P., & Saad, H. B. (2023). From human writing to artificial intelligence generated text: examining the prospects and potential threats of ChatGPT in academic writing. *Biology of Sport, 40*(2), 615-622. https://doi.org/10.5114/biolsport.2023.125623

García-Peñalvo, F. J. (2023). The perception of artificial intelligence in educational contexts after the launch of ChatGPT: Disruption or panic? *Education in the Knowledge Society (EKS), 24*, e31279-e31279. https://doi.org/10.14201/eks.31279

Hassoulas, A., Powell, N., Roberts, L., Umla-Runge, K., Gray, L., & Coffey, M. (2023). Investigating marker accuracy in differentiating between university scripts written by students and those produced using ChatGPT. *Journal of Applied Learning & Teaching, 6*(2), 71-77. https://doi.org/10.37074/jalt.2023.6.2.13

Himeur, Y., Elnour, M., Fadli, F., Meskin, N., Petri, I., Rezgui, Y., Bensaali, F., & Amira, A. (2023). AI-big data analytics for building automation and management systems: a survey, actual challenges and future perspectives. *Artificial Intelligence Review, 56*(6), 4929-5021. https://doi.org/10.1007/s10462-022-10286-2

Hu, K., Lou, B., & Baloch, B. (2023). *Reducing human bias in decision making and improving customer satisfaction through artificial intelligence: Empirical evidence from a knowledge service company.* SSRN 4436554.

IBM. (2023). *IBM SPSS statistics for Windows, Version 29.0.* Armonk. IBM Corp.

Ifelebuegu, A. O. (2023). Rethinking online assessment strategies: Authenticity versus AI chatbot intervention. *Journal of Applied Learning and Teaching, 6*(2), 385-392. https://doi.org/10.37074/jalt.2023.6.2.2

Ifelebuegu, A. O., Kulume, P., & Cherukut, P. (2023). Chatbots and AI in Education (AIEd) tools: The good, the bad, and the ugly. *Journal of Applied Learning and Teaching, 6*(2), 332-345. https://doi.org/10.37074/jalt.2023.6.2.29

Ismail, F., Tan, E., Rudolph, J., Crawford, J., & Tan, S. (2023). Artificial intelligence in higher education. A protocol paper for a systematic literature review. *Journal of Applied Learning and Teaching, 6*(2), 56-63. https://doi.org/10.37074/jalt.2023.6.2.34

Kooli, C. (2023). Chatbots in education and research: A critical examination of ethical implications and solutions. *Sustainability, 15*(7), 5614. https://doi.org/10.3390/su15075614

Kukulska-Hulme, A., Giri, R. A., Dawadi, S., Devkota, K. R., & Gaved, M. (2023). Languages and technologies in education at school and outside of school: Perspectives from young people in low-resource countries in Africa and Asia. *Frontiers in Communication, 8,* 1081155. https://doi.org/10.3389/

fcomm.2023.1081155

Kulkov, I. (2023). Next-generation business models for artificial intelligence start-ups in the healthcare industry. *International Journal of Entrepreneurial Behavior & Research, 29*(4), 860-885. https://doi.org/10.1108/IJEBR-04-2021-0304

Liang, M., Lim, C. P., Park, J., & Mendoza, N. B. (2023). A review of ICT-enabled learning for schoolgirls in Asia and its impacts on education equity. *Educational technology research and development, 71*(2), 267-293. https://doi.org/10.1007/s11423-022-10178-w

Novitzky, P., Janssen, J., & Kokkeler, B. (2023). A systematic review of ethical challenges and opportunities of addressing domestic violence with AI-technologies and online tools. *Heliyon, 9*(6). https://doi.org/10.1016/j.heliyon.2023.e17140

Periaysamy, A. G., Satapathy, P., Neyazi, A., & Padhi, B. K. (2023). ChatGPT: Roles and boundaries of the new artificial intelligence tool in medical education and health research–correspondence. *Annals of Medicine and Surgery, 85*(4), 1317. https://doi.org/10.1097/MS9.0000000000000371

Polit, D. F., & Beck, C T. (2013). *Essentials of nursing research: Appraising evidence for nursing practice*. Lippincott Williams & Wilkins.

Rajagopal, N. K., Qureshi, N. I., Durga, S., Ramirez Asis, E. H., Huerta Soto, R. M., Gupta, S. K., & Deepak, S. (2022). Future of business culture: An artificial intelligence-driven digital framework for organization decision-making process. *Complexity, 2022,* 1-14. https://doi.org/10.1155/2022/7796507

Robert, N. (2019). How artificial intelligence is changing nursing. *Nursing Management,* 50(9), 30. https://doi.org/10.1097/01.NUMA.0000578988.56622.21

Rodway, P., & Schepman, A. (2023). The impact of adopting AI educational technologies on projected course satisfaction in university students. *Computers and Education: Artificial Intelligence*, 100150. https://doi.org/10.1016/j.caeai.2023.100150

Roumeliotis, K. I., & Tselikas, N. D. (2023). ChatGPT and open-ai models: A preliminary review. *Future Internet, 15*(6), 192. https://doi.org/10.3390/fi15060192

Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education? *Journal of Applied Learning and Teaching, 6*(1), 342-363. https://doi.org/10.37074/jalt.2023.6.1.9

Scherer, A. G., Neesham, C., Schoeneborn, D., & Scholz, M. (2023). New challenges to the enlightenment: How twenty-first-century sociotechnological systems facilitate organized immaturity and how to counteract it. *Business Ethics Quarterly, 33*(3), 409-439. https://doi.org/10.1017/beq.2023.7

Thakur, R. (2024). Introduction to artificial intelligence and its importance in modern business management. In *Leveraging AI and emotional intelligence in contemporary business organizations* (pp. 133-165). IGI Global. https://doi.org/10.4018/979-8-3693-1902-4.ch009

Timotheou, S., Miliou, O., Dimitriadis, Y., Sobrino, S. V., Giannoutsou, N., Cachia, R., Monés, A. M., & Ioannou, A. (2023). Impacts of digital technologies on education and factors influencing schools' digital capacity and transformation: A literature review. *Education and Information Technologies, 28*(6), 6695-6726. https://doi.org/10.1007/s10639-022-11431-8

Wong, B. K. M., Vengusamy, S., & Bastrygina, T. (2024). Healthcare digital transformation through the adoption of artificial intelligence. In *Artificial Intelligence, big data, blockchain and 5G for the digital transformation of the healthcare industry* (pp. 87-110). Elsevier. https://doi.org/10.1016/B978-0-443-21598-8.00014-2

Appendix

Appendix 1: Attitudes, benefits, and threats associated with the use of Artificial Intelligence tools in higher education.

Please answer each of the following questions about what you know, how you feel, and what you do with AI tools. (Please note that there is no best answer; we just want to know your opinion about each item.)

	Attitudes (15 items)	**Strongly disagree 0**	**Disagree 1**	**Neutral 2**	**Agree 3**	**Strongly agree 4**
A1	AI tools content can be used if properly cited and documented					
A2	Authors should have proper knowledge on how to use AI tools					
A3	I recommend AI tools to a friend or colleague					
A4	I'm interested in using of a premium version of AI tools with advanced features					
A5	AI tools has a positive impact on my education/learning					
A6	There is a need for specific training on how to use AI tools in order for them to be useful.					
A7	I suggest providing adequate information on establishing ethical guidelines for the use of AI tools.					
A8	I think AI tools should be included in the study curricula					
A9	To improve AI applications in the real world, it is essential to encourage researchers to be honest and transparent about their methods.					
A10	I review and edit the response that generated by AI tools before using them in my work					
A11	AI tools can be listed as an author based on its significant contribution					
A12	I feel comfort with ethical and responsible use of AI-generated content from AI tools.					
A13	AI tools could enhance research (e.g., assisting the researchers in framing the sentences, improving the content drafted by the authors.					
A14	I think the responses generated by AI tools are overall easy and coherent					
A15	I trust the information that I read and see on AI tools?					
	Benefits (6 items)	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
B1	Easy to use					
B2	Save time					
B3	Accessible with low cost					
B4	Help students to ask questions and interact with the material at their own pace					
B5	AI tools are user-friendly					
B6	I know that AI tools are used in education and research					
	Threats (14 items)	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
T1	Lack of human interaction					
T2	Legal issue (eg, copyright issues, authorship)					
T3	Decrease creativity and critical thinking					
T4	AI tools does not replace practical training					
T5	Security concerns					
T6	Technical issue					
T7	Over-reliance on technology					
T8	Ethical dilemma/concerns such as plagiarism					
T9	Need Internet all the time					
T10	Difficulty in handling complex task in research					
T11	Inaccurate/incorrect or biased information					
T12	Over-detailed, redundant, excessive content					
T13	Using AI tools will reduce skills and abilities of person who use it (e.g., writing skills, critical thinking ….etc)					
T14	I see AI tools as a threat to human ethics					