Apprehensions of Integrating Artificial Intelligence into Higher Learning: A Systematic Review

Norbert Nombo [1*]**, Shuguang Wei** [2]**, Chediel Nyirenda** [3]

[1] Department of Adult and Continuing Education Studies, Institute of Adult Education, Dar es Salaam, Tanzania, ⓘ 0009-0006-3371-8774
[2] School of Education, Huazhong University of Science and Technology (HUST), Wuhan Hubei, P. R. China, ⓘ 0009-0004-8647-6946
[3] Dr. Salim Ahmed Salim Centre for Foreign Relations, Dar es Salaam, Tanzania., ⓘ 0000-0003-0060-7032
* Corresponding author: Norbert Nombo (norbert.nombo@iae.ac.tz)

Article Info

Abstract

The integration of artificial intelligence in higher learning has been studied and commented upon by several researchers. One thing that is obvious is that there are several authors who are hopeful that artificial intelligence has positive prospects for higher learning. On the other hand, there are also several authors who think that artificial intelligence is negatively affecting higher learning. While some authors report on hopes only and others on fears only, some others report both fears and hopes. This systematic review engages a total of 61 reports, including journal articles and grey literature, to address three issues. The first is about the extent to which researchers admit to the existence of negatives of AI in higher education. The second is about the factors that these researchers associate with the fears they admit. The third is a summarized identification of sources of this fear. Literature for this review was collected from various online sources, and the PRISMA 2020 flowchart was used for screening. Finally, content analysis was conducted using NVIVO computer software. Results show that, to a large extent, authors admit to the existence of various kinds of disadvantages in using AI in higher learning. These disadvantages lead to fears related to ethics and compromise established standards of higher education. Higher education policy makers and managers are, therefore, called upon to take necessary precautions in designing AI-supported systems and put in place reliable and effective guidelines for their use.

Introduction

The use of artificial intelligence in learning, particularly learning in higher education, has become a reality that can no longer be overlooked or ignored. Specifically, the use of generative AI in learning has become very common all over the world (Zentner, 2023; Mahbub et al., 2024). Bala et al., (2025) have reported that artificial intelligence is used to improve the learning environment and that in recent years, higher education has progressively been implementing modern technology, presenting a clear transformative power to higher education practices (Kavitha and Joshith, 2024; Yang, 2024). These authors continue to show that, although technology has so much transformed many aspects of education, with substantial impact in areas of language translation, speech recognition, and game simulation, there are questions over how AI can influence higher education. Some authors have gone as far as stating that AI has 'revolutionized' higher learning (Rahiman & Kodikal, 2024).

In the same vein, O'Dea and O'Dea (2023) have added that artificial intelligence in higher education (AIED) is becoming a more important research area with increasing developments and applications of AI within the wider society. The need for more research in AI in higher education finds its rationale from the fact that, as time goes on, more and more universities and colleges will need it as part of their competitive advantage. Just as Hanna and Liu (2021) have argued, amidst various faces of competition for excellence, forward-thinking universities can integrate artificial intelligence (AI) into their operations to set themselves apart from the competition and brace up for long-term growth.

Notwithstanding the perceived positive role of artificial intelligence in higher education, the pace of academic research in the area of artificial intelligence in higher education has increased only recently. In 2019, for example, it was argued that despite the fact that artificial intelligence is a reality, academic research on its application in higher education was still lacking (Hinojo-Lucena et al., 2019). A few years later, though, particularly after the introduction of AI chatbot ChatGPT by Open AI in late 2022, a new wave of instantaneous and widespread discussions on the use of AI in higher education came in (Jensen et al., 2015). This new wave brought in polarized perceptions or positions on the use of technology in higher education. In one extreme are the "doomsters" who present apprehensions that technology will ruin what is already present in the status quo of teaching and learning in higher education. In the other extreme are the "boosters" who believe that the technology will positively revolutionize teaching, learning, and educational management practices in higher education (Selwyn, 2014; Shimpi, 2024). In addition, while Santos and Serpa (2023) argued that AI offers an opportunity to support students by offering personalized learning processes and intelligent tutoring systems that improve performance, the adoption of AI is reported to have introduced challenges to traditional education frameworks (Fitriani et al., 2023). In a nutshell, AI in higher learning presents benefits, hurdles, and controversies (DeBello, 2024). Some have even termed the negative side of AI in higher education as the 'dark side' (Ivanov, 2023).

It is equally important to note that recent years have witnessed a significant increase in research output reporting on various aspects and issues related to artificial intelligence in higher learning, including views from both extremes of the perception spectrum. For example, Crompton and Burke report that in 2021 and 2022, there was a rapid change as publications on artificial intelligence in higher education rose to nearly two to three times the

number of previous years. Sabado (2025) presents a bibliometric study identifying trends and gaps crucial for policy development, higher education management, and future research initiatives. Sabado's two-decade bibliometric analysis provides an overview of the increasing trajectory of research publications concerning artificial intelligence in higher education. A similar study is also presented by Oguntona and Emere (2025). These studies attest to the fact that literature on the use of AI in higher learning has increased significantly in recent years. It is worthwhile, therefore, to review these emerging studies and learn what authors are suggesting about the use of AI in higher education, specifically the sources of concern directed at the possibility that AI comes with disadvantages.

An Overview of Literature

The decision by universities and colleges whether to adopt or not to adopt AI-powered educational programs depends on a forecast of costs and benefits of using AI in higher education. Studies have reported on several issues related to the adoption and use of AI in teaching, learning, and information or data management. For example, Nagy et al. (2024) conducted an exploratory study with the aim of determining the relationship between risk policies, implementation assumptions, and effort assumptions with social expectations regarding the acceptance of computer-based intelligence innovations in advanced educational organizations in North Sulawesi, Indonesia. The results of the study showed that risk perception, performance expectations, and effort expectations had a large influence on behavioural intentions to adopt artificial intelligence (AI) in higher education. It is important to note that the most dominant factor affecting the decision to adopt AI use in higher education, according to this study, is related to risk perception. Risk in this case has several faces and manifests in several different ways, including the fear that AI could compromise rather than improve cognitive learning.

Additionally, issues to do with artificial intelligence in higher learning are extremely varied. They span form economic considerations, through matters related to skills, to matters of risks related to ethics. Vorontsova et al. (2025) focused on identifying the key trends, knowledge gaps, and opportunities for further research in the use of AI in higher learning with emphasis on the economic effects of using artificial intelligence and ChatGPT tools in higher education. The study concluded that the main areas of economic effects of artificial intelligence and ChatGPT tools in higher education included reducing administrative costs, saving time for teachers and students, and improving the quality and accessibility of educational processes.

Another issue that has been studied and discussed in recent literature is that of initial experiences with the new technology. Azmir and Atikuzzaman (2025) explored attitudes toward using ChatGPT based on academic and demographic variables. This study also explored the difficulties the students faced while using ChatGPT in education. This study revealed that ChatGPT and Grammarly were the most used AI tools. It also revealed that most students trust ChatGPT as a useful tool for coursework, saving time and improving learning. However, attitudes towards the use of AI in higher learning significantly varied with geographical location, internet competency, academic discipline, and previous ChatGPT experience or training. These kinds of studies help researchers, users, and policymakers to realize the need for improved access to AI technologies, focused training programs, and AI literacy in the curricula.

In summary, most of the recent studies on AI in higher education could fit into a matrix of the following subjects:

Students' and Teachers' Perceptions of Using AI in Learning

These authors include perceptions, perspectives, and attitudes of teachers and students as they discuss their expectations in using AI in teaching and learning. These kinds of studies are mostly qualitative, and they only collect, interpret, and report on the views of the respondents in evaluating the new technology. Under this category are such authors as DeBello et al. (2023); McGrath et al. (2023); Galindo-Domínguez et al. (2024); Frutos et al. (2024); Johnston et al. (2024); Sharma et al. (2024); and Novozhilova et al. (2024). These studies are key and foundational, as they help to build a platform for further research into lived experiences of users of AI in higher education. Using findings from these studies, further research can focus on the actual impact of AI in higher learning, identification of challenges and opportunities, and even comparing magnitudes of challenges and opportunities of using AI in higher learning.

Impact of AI in Higher Education in General

In this category are found all the authors who identify the way AI changes the teaching and learning processes in higher learning institutions. While some authors discuss positive impact and negative impact, some discuss other cross-cutting issues, including people's behaviour change, new ways of managing things, etc. Under this category are such authors as Bates et al. (2020); Crompton and Song (2021); Slimi (2023); Talan and Kalinkara (2023); Zhang (2023); Aithal and Aithal (2023); Marengo et al. (2024); Begum (2024), Danish et al. (2024); Vieriu and Petrea (2025); and Anderha (2025). These authors show that the situation before and after the introduction of AI in higher learning is not the same. The introduction of AI in higher learning has caused notable changes in higher learning practices and processes. As noted earlier, these authors may or may not have directly pinpointed the existing identifiable contrasts between what is desirable and what is not desirable while using AI in higher learning. What they have in common is that they alert the reader that the inclusion of AI in higher learning may have negative impacts.

Opportunities and Challenges of Introducing AI to Higher Learning

These are authors who narrow their research to clearly focus on a comparative analysis of positive and negative impacts of AI in higher learning. Their reported findings are important, as they make the reader aware that AI is not only impactful in general terms but that it has created two different realities of pros and cons. They help the reader to be able to start a comparative process of deciding whether or not to include AI in higher learning and why. They also help researchers to identify areas of study that need attention as research endeavours to inform education policies that intend or plan to include AI in higher learning. Under this category are such authors as Akinwalere and Ivanov (2022); Michel-Villarreal et al. (2023); Pisica et al. (2023); Yeralan and Lee (2023); Zeb et al. (2024); Arowosegbe et al. (2024); Hoernig et al. (2024); Abulibdeh (2024); Jafari and Keykha (2023), Contreras et al. (2024); Jogezai et al. (2025); Udeh (2025), Foroughi et al. (2024); and Ali (2025). It is noteworthy that most of these studies are qualitative, and they do not engage in comparing the magnitudes of opportunities

brought in by AI in higher learning against the challenges. Rather, most of these studies identify and mention the existing challenges and opportunities. Further research could focus on identifying and even quantifying the negative impacts (challenges) in order to highlight the necessary precautions for policymakers and managers of higher learning. This leads to the next category of literature.

Negative Impacts of AI in Higher Education

In this category are researchers who devote their studies to pointing out the identifiable sources of apprehension in deciding to include AI in higher learning. The focus of studies under this category is on how AI could actually compromise teaching and learning in institutions of higher learning if the necessary precautions are not taken. Under this category are such authors as Walczak and Cellary (2023); Sweeney (2023); Lowe (2024); Moya et al. (2024); Rodzi et al. (2024); Bond et al. (2024); Airaj (2024); Cotton et al. (2024), Adewojo (2025); Buele and Llerena-Aguirre (2025); AL-Qadri and Al-Khresheh (2025); and Itani et al. (2025). These authors point out the 'fear' facing the decision makers who intend to integrate AI into higher learning. This identification of sources of fear is important for this study because the study intends to present the identified sources of apprehension of using AI in higher education.

Methodology

This review employed the content analysis technique to identify the sources of apprehension related to the use of AI in higher learning. The analysis involved the use of NVIVO qualitative data analysis software. The research questions, search protocol, inclusion and exclusion criteria, and analysis process were as follows:

Research Questions

The systematic review aimed at answering three research question (RQs). The questions are arranged below in their cascading order in the analysis process.

RQ1: To what extent do authors admit to the fact that there are disadvantages in using AI in higher learning?

RQ2: To which issues do authors relate the fear of using AI in higher learning?

RQ3: What are the identifiable sources of apprehension related to using AI in higher learning?

Table 1. Literature Sources

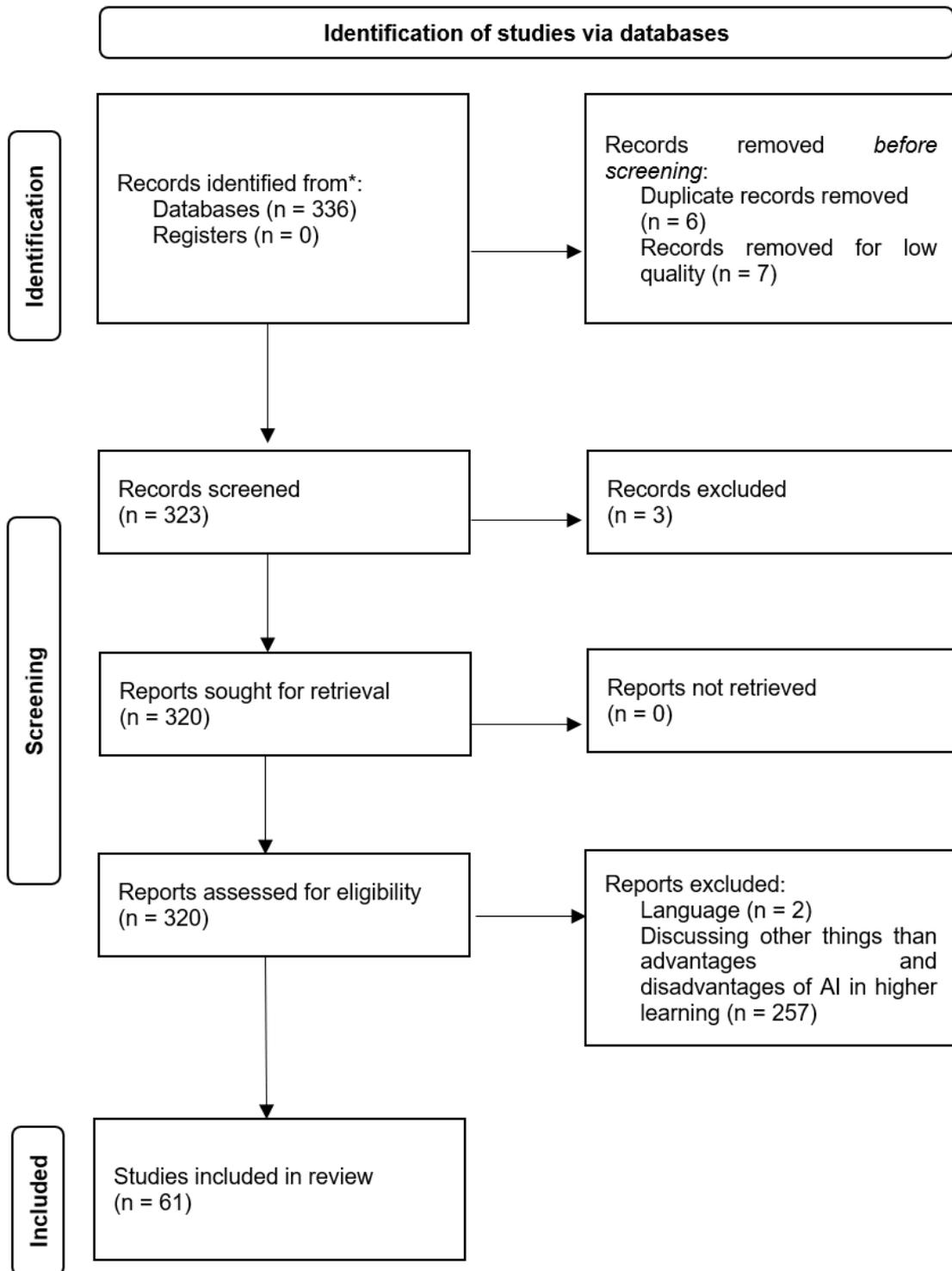| Name of search tool	Documents accessed	Relevant and included	Screened out
ResearchGate	72	12	60
Google Scholar	117	24	93
ERIC	86	9	77
Emerald	39	9	30
Refseek*	22	7	15

Figure 1. PRISMA Flow Chart Showing the Screening Process

A total of 61 files were imported into Zotero reference manager software to prepare them for analysis in NVIVO 12. Then, the 61 files were exported in RIS file format into NVIVO. The files were then classified as cases in order to come up with file attributes for each file. Text search queries were run in order to identify the dominance of themes and words within the 61 documents through a process of content analysis. Text search query outputs such as 'reference' and 'word tree' were used to visualize and present the findings of the content analysis process.

Table 2. Inclusion/exclusion Criteria

Aspect	Inclusion	Exclusion
Publication date	From 2020 to date	Before 2020
Genre/type	Journal Articles and Research Reports	Other genres
Theme/Subject matter	Not only the use/application of AI in higher education but discussing advantages/shortcomings	Other themes
Geography	From anywhere in the world	N/A
Level of education	Articles on higher education (college and university)	Other levels of education
Functional usage	Teaching/learning	Other uses like library or administration etc
Language	English	Non-English
Quality	Good quality based on depth of analysis and publisher reputation	Low quality

Findings

The first step was to explore the use of the term 'disadvantage' in all the documents. This was done using the text search query in NVIVO. The search was expanded from 'exact matches' to 'with generalizations' in order to include all related terms. The query results produced a very complex word tree, which centralized the term 'limitation.' This indicated that the authors who discussed advantages and disadvantages of using AI in higher learning reported thousands of times that AI in higher learning had notable limitations. Then, in order to narrow down and focus the analysis of the texts, text search query was run on two different terminologies across all the files. These two terminologies were "disadvantages" and "fear" (see Figure 1 & 2). The text search query was set only at the level of 'exact matches' because both terminologies were already semantically related.
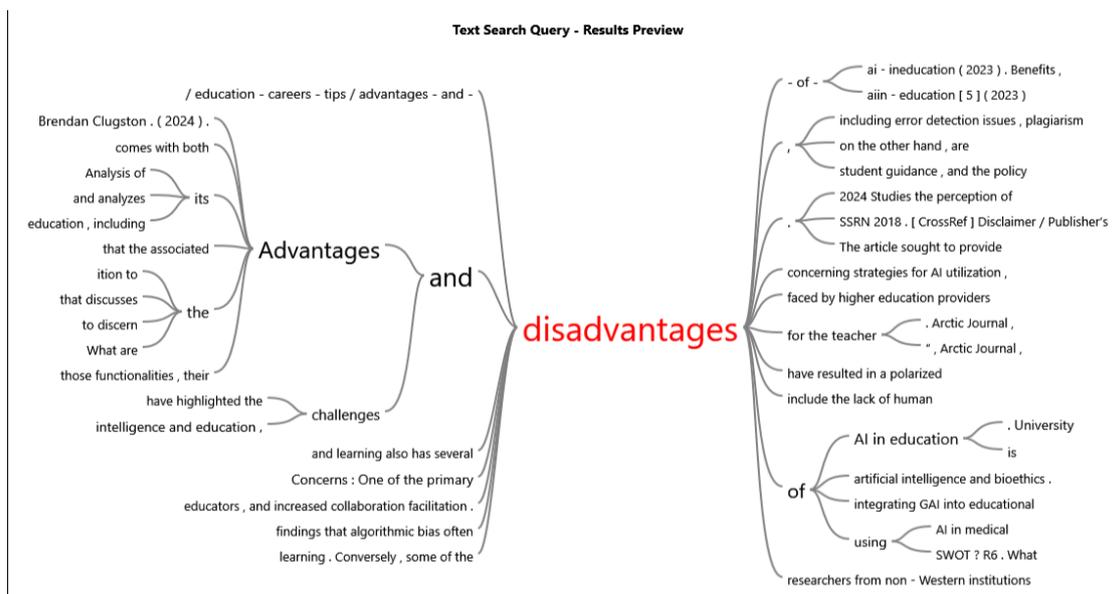

Figure 2. Text Search Query Results for the Word 'Disadvantages'

As can be seen from the word tree visual (see Figure 2), the word 'disadvantages' appears several times in all the analysed texts. The authors admit that the introduction of AI into higher learning 'comes *with both advantages and disadvantages' and* that the process of including AI in higher education must consider '*the associated advantages and disadvantages'*; that policies should ask questions on '*what are the advantages and disadvantages*' related to AI in higher learning; that AI in higher learning comes with '*challenges and disadvantages'*; that '*one of the primary concerns of AI in education is the issue of data privacy.'* All these statements are examples to show that, to a large extent, authors of literature on AI in higher learning admit that there are disadvantages in using AI in higher education.
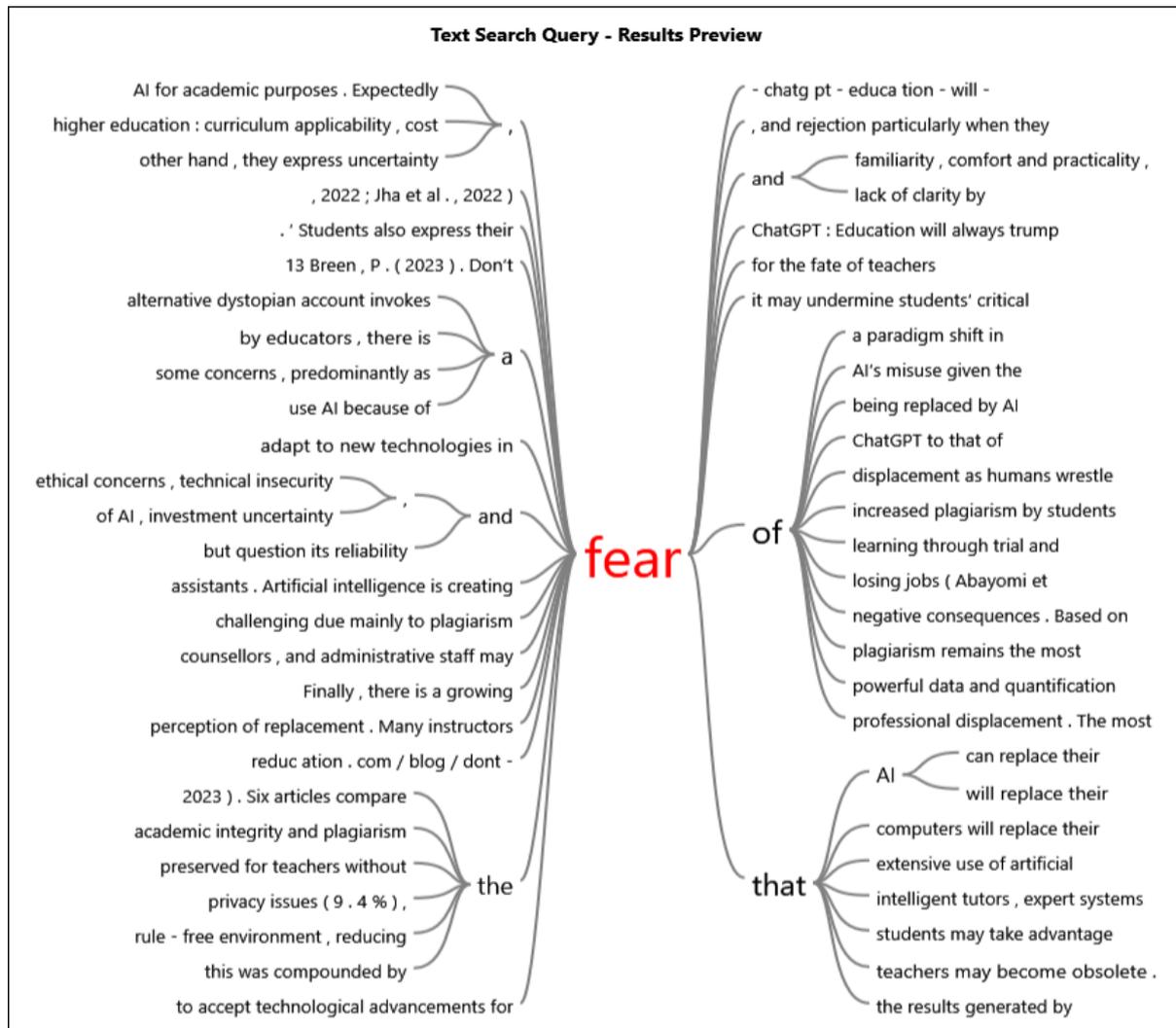

Figure 3. Text Search Query Results for the Word 'Fear'

From these findings of the contents on disadvantages, the analysis was narrowed and focused specifically on reference to disadvantages of using artificial intelligence in learning in institutions of higher learning. Nine documents qualified for this analysis. The aim was to find out the extent to which authors related these disadvantages to apprehensions caused by negative impacts of artificial intelligence. This would help the analyst to pinpoint the sources of concern in the minds of researchers engaging in the use of artificial intelligence in learning in institutions of higher learning. In turn, this would answer the question: What are the identifiable sources

of apprehension related to using AI in higher learning? Therefore, from the references to the word 'fear' as it appeared in the word trees presented above, it was then necessary to narrow the analysis down to the references that actually talked about fear in relation to the use of artificial intelligence in learning in higher learning institutions. The summary results were found to be as presented in Table 3.

Table 3. Actual Reported Challenges of Using AI in Higher Learning

Authors	Reported AI disadvantage/challenge
Michel-Villarreal, Eliseo Vilalta-Perdomo, Ricardo Thierry-Aguilera, and Flor Silvestre Gerardou (2023)	• Relying solely on ChatGPT for personalized learning experiences may overlook certain aspects of individual student needs, such as their learning style, preferences, and unique challenges • ChatGPT suggests that being an AI language model, it "might not possess the same level of human interaction and interpersonal skills as an instructor or peers", which can limit its contribution to certain elements of the educational experience, such as facilitating group work and other collaborative activities • ChatGPT suggests that whilst it "strives to provide accurate and helpful information, there is still a possibility of generating an incorrect or misleading response"
Sencer Yeralan, Laura Ancona Lee (2023)	• While AI-based tools can be useful for brainstorming and generating initial drafts, there is concern about the potential for academic dishonesty • There is also the fear that students may take advantage of AI-based tools to complete their academic assignments with little or no genuine effort and with no understanding. • Professors may also use such tools to generate multiple-choice quizzes or presentations for their classes.
Botelho, C. C., da Rocha, L. T. V., Fernandes, R. M., da Silva, J. M. N., & Martins, V. W. B. (2025).	• While plagiarism has long been a challenge in academia, the advent of AI-generated content introduces new dimensions to academic dishonesty, intensifying concerns about integrity and ethical conduct in education concerns widely shared by educators and institutions alike.
Hasan A. A. Emran, and Fathia. M. Elhony (2025)	• Respondents expressed apprehension about the use of student data, algorithmic bias, and the potential misuse of AI-generated outcomes. (These fears are justified given the absence of comprehensive data protection laws)
Fateme Jafari and Ahmad Keykha (2024)	(There is fear of) • AI replacing thinking • Over-trust in AI-generated content • Unequal access

Authors	Reported AI disadvantage/challenge
	• In the educational process, content is often presented electronically, resulting in a passive learning experience for students.
Doan Hong Nhung, Nguyen Xuan Bao, and Vu Thi Hong Ha (2024)	• Uneven access to AI technology can lead to disparities among students across different universities. • Over-reliance on AI may hinder the development of soft skills and social interaction abilities among students.
Steffen Hoernig, André Ilharco, Paulo Trigo Pereira, and Regina Pereira (2024)	• May also lead to the students' [over-]reliance on software and result in reduced self-assessment and critical thinking among students • Students might find themselves spending more time interacting with machines rather than engaging with peers and educators
Krzysztof Walczak and Wojciech Cellary (2023)	• By their statistical nature, transformer models may generate right, wrong or mixed right-wrong texts. A person without knowledge is unable to distinguish between the right and wrong parts of the generated text • In the case of text, this permits the determination as to whether the person who claims to have prepared a certain piece of text actually possesses the knowledge and skills required to write such material
Nazir Ahmed Jogezai, Diana Koroleva and Ivan Ivanov (2025)	• (There is) the higher risk of plagiarized content and cheating in exams (which) poses substantial threats to the academic honesty • …and (compromised) critical thinking abilities of both faculty and students

Authors who have discussed limitations, hurdles, challenges, risks, and apprehensions of using AI in higher learning have generally shown a leaning towards a concern for ethical compromise in terms of cheating and other forms of dishonesty in academics. Therefore, a further text search query on the 61 documents showed that the word 'ethics' (exact match) appeared in 40 documents. The total count was 285 references, meaning that the word "ethics" appeared 285 times. When the query was run on the word 'ethics' (with its synonyms), the results showed that there were 1,258 references appearing in a total of 57 documents meaning that 57 authors out of the 61 documents that were analysed, mentioned the word 'ethics' or its synonym in their discussion of the usage of AI in higher learning. This shows that one of the greatest fears of students, teachers, managers, and researchers is that AI in higher learning may very likely lead to (or it already is causing) an unethical compromise of academic quality standards. Another great fear (as seen in table 3) is that humans will eventually be replaced by machines in various ways, including cognitively, socially, and professionally.

In summary, this systematic review finds at least five categories of sources of apprehension of using AI in teaching and learning in institutions of higher learning.

Fear related to Replacement

In the first sense, authors present a source of apprehension related to replacement in terms of learning. In this case the fear is that AI is depriving the students of their right or chance to learn and therefore the goal of education is

compromised. Overreliance on machines is killing critical thinking. In other words, with the use of AI in higher learning, what is happening is not active but passive learning dominated by machines. Students get more help than they need for true learning to occur. In another sense, professors are also thought to be professionally replaced by machines (computers/robotics) and teachers are becoming obsolete.

Fear related to Compromise of Morals

Humans are not machines and machines cannot do what humans do in education because education is more than a mechanical transaction involving the transfer of information. Authors think that education systems must keep the human morality that always goes with the process of imparting knowledge. Likewise, dishonesty and cheating are human behaviours, but they are seriously exacerbated by AI in higher learning. Plagiarism becomes rampant, and mechanisms to control it are not effective enough. On the other hand, the use of AI in teaching may lead to the creation of lazy professors who are paid for work they did not do.

Fear related to Machine Shortcomings

There is also the fear that machines are not perfect. Sometimes there are error results that are difficult to identify, control or correct. Some students may rely on wrong answers due to two factors. The first is that they may be too lazy to verify the answers, choosing the easier way of copying and pasting results, and the second is that they may lack the technical know-how to realize that the answers are wrong to begin with. Also, when there is a machine breakdown or malfunction, learning may get stuck altogether.

Fear related to Breakdown in Social Bonds

Humans are social beings. Authors present another source of apprehension related to a perceived compromise in interpersonal skills among users. Interpersonal skills are very important for the social, psychological and mental development of students. With AI in higher learning, students may end up interacting more with machines rather than with their peers and their educators. This may result in anti-social behaviours and unhealthy loneliness. On the other hand, authors raise a concern that the use of AI in teaching and learning may lead to disregard for individual student needs in learning. This creates inequality, which could be easily avoided by a human tutor.

Fear related to Data Privacy

AI systems in learning carry massive amounts of data. Some of this data is personal and private. The use of AI, in many cases, requires students to store electronic personal data on various issues. The data may carry information on students' family, health, history, performance etc. These kinds of data may require advanced legal systems to ensure privacy of AI users. Authors indicate that, in the absence of strict laws directing data handling, AI users are exposed to vulnerability in terms of data privacy.

Finally, a general terminology for the negative effects of AI in higher learning was sought, and a text search query

was run to increase the authenticity of the findings and the reliability of the discussion. This terminology was the word 'compromise,' which was set at the level of 'with synonyms' to ensure wider coverage of its application in the analysed texts. The results were as shown in Figure 4.
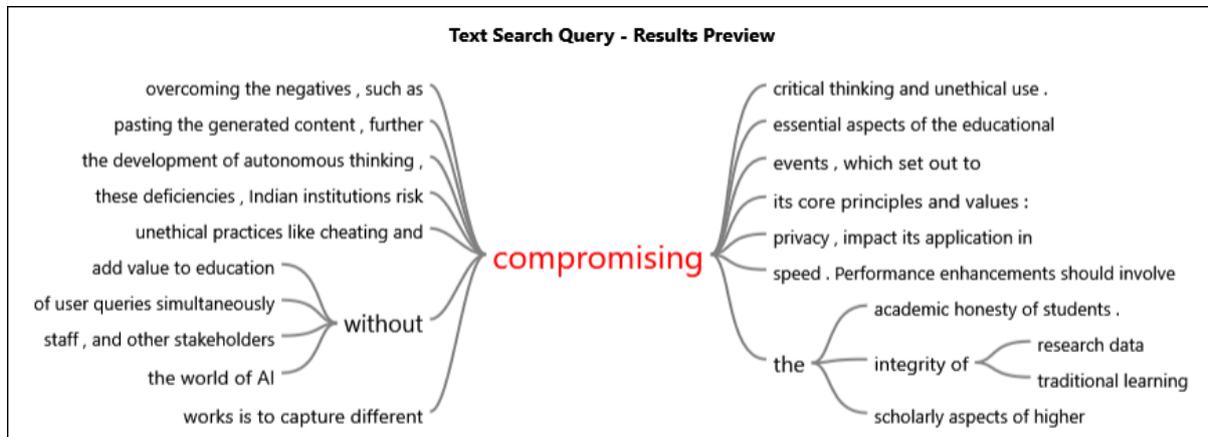

Figure 4. Text Search Query Results for the Word 'Compromise'

As figure 4 shows, on the left-hand side are such phrases as 'overcoming negatives,' 'pasting generated content', 'the development of autonomous thinking', unethical practices', and 'add value to education'. The NVIVO 12 output as presented in the word tree shows that these phases are directly related to other phrases on the right-hand side. These phrases are 'critical thinking and unethical use', 'essential aspects of the educational'. 'its core principles and values', 'privacy, impacts its application in', 'academic honesty of students', 'integrity of traditional learning', and finally 'scholarly aspects of higher education'.

It was then necessary to rerun the text search query to reveal the broad coding context of the phrases, and the results were the following complete statements as directly quoted from texts:

1. 'We conclude that the response from HEIs across the globe is benefiting from the positives, such as personalized learning and online tutoring, and overcoming the negatives, such as compromising critical thinking and unethical use. Key measures such as developing comprehensive guidelines, engaging relevant institutions and providing them with adequate support can mitigate the risks GAI (Generative AI) poses to critical thinking and address broader safety and security concerns' (Jogezai et al., 2025).

2. 'This convenience may tempt some students to misuse generative AI as a substitute for original thinking and research, leading to a decline in academic integrity. There is a risk of simply copying and pasting the generated content, further compromising the academic honesty of students. Moreover, the ability of generative AI to produce high-quality works might entice students to rely on such content instead of engaging in in-depth thinking and research. Additionally, the emergence of generative AI poses challenges in detecting and addressing academic misconduct. As generated works often lack comparability with existing databases and literature, detecting plagiarism and fraudulent practices becomes increasingly challenging (Yang, 2024).

3. 'Challenges, such as biases in GAI outputs and unethical practices like cheating and compromising privacy, impact its application in education and the attainment of SDG4 targets' (Jogezai et al., 2025).

4. 'Overall, students advocate for a thoughtful and responsible approach to AI integration, emphasizing its potential to enhance the learning process when used in a balanced and well-regulated manner. The analysis of these themes highlights the importance of ensuring AI tools add value to education without compromising the integrity of traditional learning methods' (Vieriu and Petrea, 2025).

These quotes further prove that authors of the analysed texts present several apprehensions of using AI in higher learning, relating them to identifiable factors. They also include some recommendations on how to tackle some of the challenges posed by AI in higher learning.

Conclusion

Using content analysis techniques assisted by NVIVO 12 qualitative data analysis tool, this systematic review of literatures aimed at identifying the sources of apprehension of using AI in higher learning. The analysis concludes that, to a great extent, authors acknowledge the existence of several disadvantages or limitations or challenges brought into higher learning by the introduction of AI. The review reveals further that this apprehension of using AI in teaching and learning in higher education is related to several factors, the main among which are fear of professional replacement of humans by machines and ethical compromise of academic standards. Finally, the review finds that these several types of fears could be categorized into at least five groups summarized in terms of fear of replacement, moral compromise, machine shortcomings, compromise of social relations, and data privacy issues. In a nutshell, the apprehensions are based on what AI seems to compromise in already established ways of learning in higher education. Since the use of AI in higher learning is inevitable, policymakers and managers of higher learning need to take precautions before they introduce AI-supported systems in higher education and provide clear, effective, and dependable guidelines once the systems are in place.

Statements and Declarations

existing literature. The study does not involve human participants.

Informed Consent: "Not applicable"

Conflict of Interest: The authors declare no conflicts of interest related to this work to disclose.

References

Abulibdeh, A., Zaidan, E., & Abulibdeh, R. (2024). Navigating the confluence of artificial intelligence and education for sustainable development in the era of industry 4.0: Challenges, opportunities, and ethical dimensions. *Journal of Cleaner Production*, *437*. https://doi.org/10.1016/j.jclepro.2023.140527.

Adewojo, A. A. (2025). Perspectives of academic librarians on ethical challenges of AI-based bibliometric tools: a grounded theory study. *The Electronic Library*, *43*(5), 777–797. https://doi.org/10.1108/EL-05-2025-0166.

Airaj, M. (2024). Ethical artificial intelligence for teaching-learning in higher education. *Education and Information Technologies*, *29*(13). https://doi.org/10.1007/s10639-024-12545-x.

Aithal, S., & Aithal, P. S. (2023). Effects of AI-Based ChatGPT on Higher Education Libraries. *International Journal of Management, Technology, and Social Sciences*. https://doi.org/10.47992/ijmts.2581.6012.0272.

Akinwalere, S. N., & Ivanov, V. (2022). Artificial Intelligence in Higher Education: Challenges and Opportunities. *Border Crossing*, *12*(1). https://doi.org/10.33182/bc.v12i1.2015.

Ali, M. G. (2025). Artificial Intelligence in Higher Education: Benefits and Risks A Review Research. Retrieved from http://files/199/Ali - Artificial Intelligence in Higher Education Benefits and Risks A Review Research.pdf.

AL-Qadri, A. H., & Al-Khresheh, M. H. (2025). Dimensions of artificial intelligence acceptance among pre-service EFL teachers: exploring usability, usefulness, social norms, ethics and intentions using ChatGPT. *The Electronic Library*, *43*(4), 669–690. https://doi.org/10.1108/EL-12-2024-0391.

Anderha, R. R. (2025). The Role of Artificial Intelligence in Mathematics Education in Higher Education: A Literature Review. Retrieved from http://files/226/Anderha - The Role of Artificial Intelligence in Mathematics Education in Higher Education A Literature Revie.pdf.

Arowosegbe, A., Alqahtani, J. S., & Oyelade, T. (2024). Perception of generative AI use in UK higher education. *Frontiers in Education*, *9*, 1463208. https://doi.org/10.3389/feduc.2024.1463208.

Azmir, S. M., & Atikuzzaman, M. (2025). Students' use of AI tools and attitudes towards using ChatGPT in higher education: a developing country perspective. *The Electronic Library*, *43*(6), 937–954. https://doi.org/10.1108/EL-01-2025-0038.

Bala, A., Khan, M. A., & Ramakrishna, D. P. (2025). Artificial Intelligence in Higher Education: Impact and Future. https://doi.org/10.5281/ZENODO.15367068.

Bates, T., Cobo, C., Mariño, O., & Wheeler, S. (2020). Can artificial intelligence transform higher education? *International Journal of Educational Technology in Higher Education*, *17*(1), 42,-s41239-020-00218–x. https://doi.org/10.1186/s41239-020-00218-x.

Begum, I. U. (2024). Role of Artificial Intelligence in Higher Education- An Empirical Investigation. *International Research Journal on Advanced Engineering and Management (IRJAEM)*, *2*(03). https://doi.org/10.47392/irjaem.2024.0009.

Bond, M., Khosravi, H., De Laat, M., Bergdahl, N., Negrea, V., Oxley, E., Pham, P., Chong, S. W., & Siemens, G. (2024). Open Access International Journal of Educational Technology in Higher Education A meta systematic review of artificial intelligence in higher education: a call for increased ethics, collaboration, and rigour. *Int J Educ Technol High Educ*, *21*.

Botelho, C. C., da Rocha, L. T. V., Fernandes, R. M., da Silva, J. M. N., & Martins, V. W. B. (2025). Validation of challenges for the adoption of artificial intelligence in higher education considering the context of an emerging economy country. *Journal of Applied Research in Higher Education.* https://doi.org/10.1108/JARHE-04-2025-0268.

Buele, J., & Llerena-Aguirre, L. (2025). Transformations in academic work and faculty perceptions of artificial intelligence in higher education. *Frontiers in Education*, *10*, 1603763. https://doi.org/10.3389/feduc.2025.1603763.

Contreras, J. R. I., Castillo, E. F. R., Verdezoto, M. K. S., & Liliana, C. L. (2024). Exploring the Implementation of Artificial Intelligence in Higher Education: Advantages and Hurdles. *Migration Letters*, *21*(S2). https://doi.org/10.59670/ml.v20i8.6496.

Cotton, D. R. E., Cotton, P. A., & Shipway, J. R. (2024). Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International*, *61*(2). https://doi.org/10.1080/14703297.2023.2190148.

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). https://doi.org/10.1186/s41239-023-00392-8.

Crompton, H., & Song, D. (2021). The Potential of Artificial Intelligence in Higher Education. *Revista Virtual Universidad Católica Del Norte*, (62), 1–4. https://doi.org/10.35575/rvucn.n62a1.

Danish, M. H., Joiya, S. A., & Ali, Z. (2024). *Implications and Usefulness of Artificial Intelligence in Higher Education Institutions: A Case of Pakistan.* Retrieved from http://files/260/Danish et al. - Implications and Usefulness of Artificial Intelligence in Higher Education Institutions A Case of P.pdf.

DeBello, J. (2024). Benefits, challenges and controversies of artificial intelligence in higher education: all in or anxiety inducing. *Inted 2024 Proceedings*, *1*. https://doi.org/10.21125/inted.2024.1979.

DeBello, J. E., Soydan, M., Mussalli, J., Rambaran, S., Moorti, P., Mattheopoulos, C., & Torres, S. (2023). Student Perceptions and Attitudes of Generative AI in Higher Education and the Workplace. *J. Comput. Sci. Coll.*, *39*(3).

Emran, H. A. A., & Elhony, F. M. (2025). Challenges in Implementing Artificial Intelligence in Libyan Higher Education. *East Asian Journal of Multidisciplinary Research*, *4*(10), 5137–5146. https://doi.org/10.55927/eajmr.v4i10.439.

Fitriani, Lekatompessy, R. L., Tambajong, H., Kontu, F., Laode, I. C., Haris, U., & Jeujanan, W. (2023). Digital Leadership In Managing Public Organization Indonesia. *Technium Social Sciences Journal, 47,* 379–397.

Foroughi, B., Iranmanesh, M., Ghobakhloo, M., Senali, M. G., Annamalai, N., Naghmeh-Abbaspour, B., & Rejeb,

A. (2025). Determinants of ChatGPT adoption among students in higher education: the moderating effect of trust. *The Electronic Library*, *43*(1), 1–21. https://doi.org/10.1108/EL-12-2023-0293.

Frutos, N. D. de, Carrasco, L. C., Maza, M. S. de la, & Etxabe-Urbieta, J. M. (2024). Application of Artificial Intelligence (AI) in Education: Benefits and Limitations of AI as Perceived by Primary, Secondary, and Higher Education Teachers. *Revista Electronica Interuniversitaria de Formacion Del Profesorado*, *27*(1). https://doi.org/10.6018/reifop.577211.

Galindo-Domínguez, H., Delgado, N., Losada, D., & Etxabe, J. M. (2024). An analysis of the use of artificial intelligence in education in Spain: The in-service teacher's perspective. *Journal of Digital Learning in Teacher Education*, *40*(1). https://doi.org/10.1080/21532974.2023.2284726.

Hannan, E., & Liu, S. (2023). AI: new source of competitiveness in higher education. *Competitiveness Review: An International Business Journal*, *33*(2), 265–279. https://doi.org/10.1108/CR-03-2021-0045.

Hinojo-Lucena, F. J., Aznar-Díaz, I., Cáceres-Reche, M. P., & Romero-Rodríguez, J. M. (2019). Artificial intelligence in higher education: A bibliometric study on its impact in the scientific literature. *Education Sciences*, *9*(1). https://doi.org/10.3390/educsci9010051.

Hoernig, S., Ilharco, A., Pereira, P. T., & Pereira, R. (2024). *Generative AI and Higher Education: Challenges and Opportunities.* Retrieved from http://files/106/Hoernig et al. - Generative AI and Higher Education Challenges and Opportunities.pdf.

Itani, A., Gronseth, S. L., Musaad, S., Nguyen, T., Mirabile, Y., & Beech, B. M. (2025). Ethical considerations for teaching with artificial intelligence: a scoping review in medical education settings. *International Journal of Educational Technology in Higher Education*, *22*(1), 68. https://doi.org/10.1186/s41239-025-00563-9.

Ivanov, S. (2023). The dark side of artificial intelligence in higher education. *Service Industries Journal*, *43*(15–16). https://doi.org/10.1080/02642069.2023.2258799.

Jafari, F., & Keykha, A. (2024). Identifying the opportunities and challenges of artificial intelligence in higher education: a qualitative study. *Journal of Applied Research in Higher Education*, *16*(4), 1228–1245. https://doi.org/10.1108/JARHE-09-2023-0426.

Jensen, L. X., Buhl, A., Sharma, A., & Bearman, M. (2025). Generative AI and higher education: a review of claims from the first months of ChatGPT. *Higher Education*, *89*(4), 1145–1161. https://doi.org/10.1007/s10734-024-01265-3.

Jogezai, N. A., Koroleva, D., & Ivanov, I. (2025). *Generative artificial intelligence in higher education: challenges, opportunities and future course of actions to achieve sustainable development goals.* Retrieved from http://files/254/Jogezai et al. - Generative artificial intelligence in higher education challenges, opportunities and future course.pdf.

Johnston, H., Wells, R. F., Shanks, E. M., Boey, T., & Parsons, B. N. (2024). Student perspectives on the use of generative artificial intelligence technologies in higher education. *International Journal for Educational Integrity*, *20*(1). https://doi.org/10.1007/s40979-024-00149-4.

Kavitha, K., & Joshith, V. P. (2024). The Transformative Trajectory of Artificial Intelligence in Education: The Two Decades of Bibliometric Retrospect. *Journal of Educational Technology Systems*, *52*(3). https://doi.org/10.1177/00472395241231815.

Lowe, M. (2024). The More Things Change: The Ethical Impacts of Artificial Intelligence in Higher Education.

Research Issues in Contemporary Education, *9*(2), 19–56.

Mahbub, S., Wafik, H. M. A., Arif, Z., Rahman, M., Uddin, A., & Azim, I. B. (2024). AI consciousness and technological advancement in Bangladesh's higher education: AI awareness among the learners. *Cognizance Journal of Multidisciplinary Studies,* *4*(3), 12–21. https://doi.org/10.47760/cognizance.2024.v04i03.002.

Marengo, A., Pagano, A., Pange, J., & Soomro, K. A. (2024). The educational value of artificial intelligence in higher education: a 10-year systematic literature review. In *Interactive Technology and Smart Education* (Vol. 21, Issue 4). https://doi.org/10.1108/ITSE-11-2023-0218.

McGrath, C., Cerratto Pargman, T., Juth, N., & Palmgren, P. J. (2023). University teachers' perceptions of responsibility and artificial intelligence in higher education - An experimental philosophical study. *Computers and Education: Artificial Intelligence*, *4*. https://doi.org/10.1016/j.caeai.2023.100139.

Michel-Villarreal, R., Vilalta-Perdomo, E., Salinas-Navarro, D. E., Thierry-Aguilera, R., & Gerardou, F. S. (2023). Challenges and Opportunities of Generative AI for Higher Education as Explained by ChatGPT. *Education Sciences*, *13*(9). https://doi.org/10.3390/educsci13090856.

Moya, B., Eaton, S., Pethrick, H., Hayden, A., Brennan, R., Wiens, J., & McDermott, B. (2024). Academic Integrity and Artificial Intelligence in Higher Education (HE) Contexts: A Rapid Scoping Review. *Canadian Perspectives on Academic Integrity*, *7*(3). https://doi.org/10.55016/ojs/cpai.v7i3.78123.

Nagy, A. S., Tumiwa, J. R., Arie, F. V., & Erdey, L. (2024). An exploratory study of artificial intelligence adoption in higher education. Cogent Education, 11(1), 1–15. https://doi.org/10.1080/2331186X.2024.2386892.

Nhung, D. H., Nguyen Xuan Bao, N. X., & Vu Thi Hong Ha, V. T. H. (2024). Harnessing artificial intelligence with higher education in Vietnam: opportunities, challenges, and recommendations for legal undergraduate education. *Conhecimento & Diversidade, Niterói,* 16(43), 621-641.

Novozhilova, E., Mays, K., & Katz, J. E. (2024). Looking towards an automated future: U.S. attitudes towards future artificial intelligence instantiations and their effect. *Humanities and Social Sciences Communications*, *11*(1).

O'Dea, X., & O'Dea, M. (2023). Is Artificial Intelligence Really the Next Big Thing in Learning and Teaching in Higher Education? A Conceptual Paper. *Journal of University Teaching & Learning Practice, 20*(5). https://doi.org/10.53761/1.20.5.05.

Oguntona, O. A., & Emere, C. E. (2025). Mapping the landscape of artificial intelligence in teaching and learning across African higher education. *Interdisciplinary Journal of Education Research*, *7*(2), a17. https://doi.org/10.38140/ijer-2025.vol7.2.17.

Pisica, A. I., Edu, T., Zaharia, R. M., & Zaharia, R. (2023). Implementing Artificial Intelligence in Higher Education: Pros and Cons from the Perspectives of Academics. *Societies*, *13*(5). https://doi.org/10.3390/soc13050118.

Rahiman, H. U., & Kodikal, R. (2024). Revolutionizing education: Artificial intelligence empowered learning in higher education. *Cogent Education*, *11*(1). https://doi.org/10.1080/2331186X.2023.2293431.

Rodzi, Z. M., Mohamad, W. N., Lu, Z., Al-Sharqi, F., Shlaka, R. A., Al-Quran, A., & Alorsan Bany Awad, A. M. (2024). Unraveling the Complexity: A DEMATEL Analysis of the Negative Impact of Artificial Intelligence (AI) Adoption among Students in Higher Education. *Journal of Intelligent Systems and Internet of Things*, *11*(2). https://doi.org/10.54216/JISIoT.110203.

Sabado, W. (2025). Artificial intelligence in higher-level education: A SWOT analysis and 20-year bibliometric analysis using VOSviewer. *Heritage and Sustainable Development*, *7*(2), 783–798. https://doi.org/10.37868/hsd.v7i2.1272.

Santos, A. I., & Serpa, S. (2023). Artificial Intelligence and Higher Education. *International Conference on Research in Education and Science.* May 18-21, Cappadocia, Turkiye.

Selwyn, N. (2014). *Digital technology and the contemporary university: Degrees of digitization.* Routledge.

Sharma, S., Singh, G., Sharma, C. S., & Kapoor, S. (2024). Artificial intelligence in Indian higher education institutions: a quantitative study on adoption and perceptions. *International Journal of System Assurance Engineering and Management.* https://doi.org/10.1007/s13198-023-02193-8.

Shimpi, S. (2024). Exploring Possibilities and Apprehensions About Application of Artificial Intelligence in Higher Education. In *Transforming Education with Virtual Reality.* https://doi.org/10.1002/9781394200498.ch6.

Slimi, Z. (2023). The Impact of Artificial Intelligence on Higher Education: An Empirical Study. *European Journal of Educational Sciences*, *10*(1). https://doi.org/10.19044/ejes.v10no1a17.

Sweeney, S. (2023). Who wrote this? Essay mills and assessment – Considerations regarding contract cheating and AI in higher education. *International Journal of Management Education*, *21*(2). https://doi.org/10.1016/j.ijme.2023.100818.

Talan, T., & Kalinkara, Y. (2023). The Role of Artificial Intelligence in Higher Education: ChatGPT Assessment for Anatomy Course. *Uluslararası Yönetim Bilişim Sistemleri ve Bilgisayar Bilimleri Dergisi*, *7*(1), 33–40. https://doi.org/10.33461/uybisbbd.1244777.

Udeh, C. G. (2025). The role of generative AI in personalized learning for higher education. *World Journal of Advanced Engineering Technology and Sciences*, *14*(2), 205–207. https://doi.org/10.30574/wjaets.2025.14.2.0077.

Vieriu, A. M., & Petrea, G. (2025). The Impact of Artificial Intelligence (AI) on Students' Academic Development. *Education Sciences*, *15*(3), 343. https://doi.org/10.3390/educsci15030343.

Vorontsova, A., Tarasenko, S., Duranowski, W., Durasiewicz, A., Soss, J., & Bilovol, A. (2025). A bibliometric analysis of the economic effects of using artificial intelligence and ChatGPT tools in higher education institutions. *Problems and Perspectives in Management*, *23*(1), 101–114. https://doi.org/10.21511/ppm.23(1).2025.08.

Walczak, K., & Cellary, W. (2023). Challenges for higher education in the era of widespread access to generative AI. *Economics and Business Review*, *9*(2). https://doi.org/10.18559/ebr.2023.2.743.

Yang, S. (2024). Research on Application of Artificial Intelligence in Higher Education Management. *Education Journal*, *7*(1). https://doi.org/10.31058/j.edu.2023.71014.

Yeralan, S., & Lee, L. A. (2023). Generative AI: Challenges to higher education. *Sustainable Engineering and Innovation*, *5*(2), 107–116. https://doi.org/10.37868/sei.v5i2.id196.

Zeb, A., Ullah, R., & Karim, R. (2024). Exploring the role of ChatGPT in higher education: opportunities, challenges and ethical considerations. *International Journal of Information and Learning Technology*, *41*(1). https://doi.org/10.1108/IJILT-04-2023-0046.

Zentner, A. (2023). Applied Innovation: Artificial Intelligence in Higher Education. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4314180.

Zhang, J. (2023). Impact of Artificial Intelligence on Higher Education in the Perspective of Its Application of Transformation. *Lecture Notes in Education Psychology and Public Media*, *2*(1). https://doi.org/10.54254/2753-7048/2/2022483.