AI in Higher Education: Opportunities, Challenges, and Policy Recommendations

Haifa Al Ashkar

Abstract

AI (Artificial intelligence) has become a topic of debate given its transformative impact on various fields, and at the same time, it has been widely implemented in different applications across different sectors. Generative AI applications such as ChatGPT, GitHub Copilot, Gemini and more have found a wide audience in academia and higher education. Despite this high popularity among students and educators, the gap persists in understanding the full potential AI and GenAI stand to offer if implemented efficiently. This paper aims to explore the recent integration of AI and GenAI tools in higher education institutions by studying the potential opportunities and the challenges it introduced. It also offers an overview of the topic for researchers, educators, and policymakers by addressing the questions: How is AI and GenAI currently being utilized in higher education? What are the main benefits and challenges of adopting them in academia? What measures and policies can be implemented to maximize their positive impact while keeping in mind the challenges they pose? Current studies highlight both the improvements offered in facilitating learning and reducing administrative burdens, along with the ethical and practical challenges introduced. Relying on recent research and multiple case studies, this paper also explores the areas most affected by AI and GenAI adaptation in higher education, and highlights the importance of a policy-driven approach in shaping higher education's future.

Contents

Introduction

Over the last couple of years, advancements in AI have allowed for a prominent and lasting impact on various sectors including academia and higher education. From saving instructors' times by answering students' simple, yet repetitive, questions on online learning platforms, to providing AI-powered assessments that monitor students' strengths and shortcomings which gives instructors better insight into what gaps the students might have when it comes to the material in question [1], AI's potential to enhance higher education is immense. As intuitions seek to improve the student learning experience, it is crucial to learn more about the importance behind the integration of AI and GenAI within the educational system, especially focusing on higher education degrees, as its widespread use introduces as much challenges as the advantages it offers. To keep propelling the educational system forward, we need to fully understand what the future of education holds and what lies in its integration with AI.

Drawing on existing research and study cases, this whitepaper aims to explore the uses of AI in higher education highlighting the offered advantages, while also mentioning the challenges it poses along with proposed policies for an effective integration.

While AI has the potential to transform higher education by personalizing learning and automating operational tasks, its successful integration requires following targeted policies that help navigate the inevitable challenges.

Overview of AI and GenAI

Artificial Intelligence (AI) refers to the ability of compute-based algorithms to perform tasks that usually requires human intelligence. Many would think AI is a new technology, but AI has been around for many decades, and we use it daily in programs like YouTube, Amazon, Google Translate, and Google Maps. These systems can recognize, process and create new content, they can also make decisions and translate languages. Recent advancements such as deep learning have significantly enhanced AI's capability and talents [2].

Generative AI (GenAI) is a subset of AI specified in generating new content that mimics existing data sets. GenAI models can learn patterns and create similar data in form of text, images, sound, video and code. Examples of GenAI tools include ChatGPT, Bard, Stable Diffusion, and Dall-E. These tools can respond to complex prompts and produce human-like outputs, which facilitated their integration into various fields such as healthcare, education, media, and tourism [2].

AI and GenAI have been recently introduced to higher education, promising an enhanced teaching and learning experience. The integration of AI in education (AIEd) for instance aims to provide learners with access to material and support anywhere anytime, overcoming spatial and temporal limitations[3]. Similarly, ChatGpt, along with other GenAI tools, has earned a big popularity in higher education since its release in November 2022. ChatGpt, developed by OpenAI, can maintain conversations with users using human-like responses and hence transforming and enhancing educational practices [4].

Opportunities

AI and GenAI have the potential to enhance higher education through various disciplines. Introduced to universities, they showed a transformative effect on the student learning experience, instructor practices and admission processes.

Enhancing the Student Learning Experience

Personalized Learning

A student's learning experience is the collection of interactions they perform with the course material through readings, explanations, assignments, or assessments. This experience extends beyond classroom time and continues through Learning Management Systems (LMS), which present the course material along with the assignments and quizzes to the student in an ordered manner. Common LMS like Blackboard, Moodle, Canvas, and others have been adopted by universities, especially following Covid-19 when educational institutions experienced a shift into digital learning [5].

Introducing AI to these LMS offers a potential to transform the learning experience and tailor it to each student. LMS, with an AI twist, can play a tutoring role and help the student address the gaps in their knowledge by creating customized lesson plans, tutoring sessions, and assessments. AI helps educational institutions create a personalized learning experience that accommodates students with different proficiencies and diverse backgrounds [5].

For instance, McGraw-Hill developed ALEKS, an AI-based tool that tracks students' progress throughout a course. Institutions, such as Arizona State University, Clemson University, Washington State University, University of Central Oklahoma, and Triton Community College, have adopted ALEKS and reported improved pass rates in STEM courses. Adopting ALEKS at Arizona State University in college algebra helped increase the pass rates from 57% to 79% between 2016 and 2019. Similarly, in 2018, Trinton Community in Illinois created iLaunch Lab

using ALEKS to assist students in STEM courses. After a year, math course pass rates improved from 52% to 61% [5].

In fall 2019 and spring 2020, faculty member Kiran Budhrani at University of North Carolina at Charlotte oversaw the integration of Realizieit adaptive learning platform into courses. This transformation was so successful that it led to the removal of an algebra course prerequisite. Students performed so well and expressed high satisfaction given their improvement and the reduced cost associated with the shift from textbooks and equipment to digitalization [6].

Instructional Support for Instructors

GenAI tools also offer substantial benefits for instructors by offering assistance in answering questions and enhancing assessment and grading systems [7].
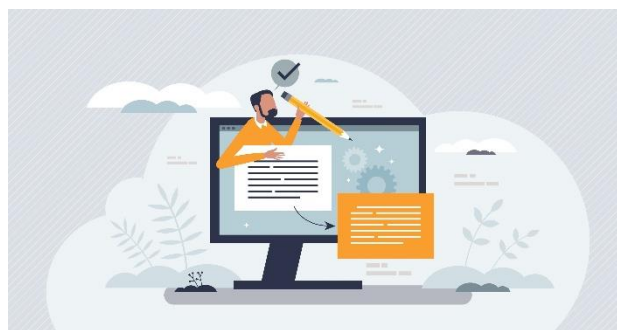
AI has gained the ability to support instructors by acting as real time teacher assistants. Trained on specific topics and fields, AI assistants can answer questions and offer individualized assistance where instructors might lack the time to answer students [7].

Jill Watson is the first AI Teaching Assistant who serves as a chatbot for a remote course,. Adopted by Ashok Goel, a professor of computer science and human-centered computing and director of Georgia Tech's Design & Intelligence Laboratory, Jill participated in courses online and in person, at the undergraduate and graduate level, while keeping her AI identity hidden. It was not until later that the identity of Jill as an artificial intelligence agent was revealed, proving the ability of AI to provide a quality of teaching almost equivalent to that of human teacher assistants. Now, used in different courses, Jill continues to support students [7].

Additionally, AI can take on time consuming tasks like proctoring or grading. Automated grading systems, like Gradescope give the instructor a deeper understanding of the similar trends among

answers provided by students, helping them spot misconceptions and unclear topics. At Oregon State University, Gradescope has been adopted to grade a college algebra exam, a course taken by 600-800 students and taught by over 11 instructors. This considerable number of students present invaluable data into students understanding of the course, and while instructors might be overwhelmed, or tend to overlook common lacking points, Gradescope automatically groups similar answers, offering the instructors the common trends amongst answers and also allows them to give the same feedback for similar responses [8].

AI reduces the time by automating routine tasks and provides instructors with enough data and time to improve curriculums based on students understanding.

Enhancing Enrollment

Student Acquisition and Enrollment Management

AI is transforming colleges and universities student acquisition and enrollment management by enhancing their search for their "ideal" student candidate. Relying on marketing automation and predictive analytics, prospective students will receive tailored marketing material that highlights why the institution matches their profile [8].

Early Identification and Recruitment

Predictive analytics can help speed college selection to start as early as elementary school. Based on state testing data, AI can determine students in need of intervention, and support students likely to succeed at specific colleges. This enables universities to start their recruitment process early and build connections with potential students well before they reach secondary school [8].

Cost Management and Outcome Focus

AI can help reduce the cost of education by helping students stick to their major and avoid unnecessary course enrollments. Colleges will shift their focus to student's outcome, such as job placements and return on investment due to a potential shift in regulations or policies that require institutions to demonstrate these positive outcomes. This focus on outcomes could lead to a rise in programs like income-sharing agreements, deferred tuition and employer-funded degrees. Employers, recognizing the importance of raising a skilled workforce, will be encouraged to establish relationships to hire and sponsor future employees [8].

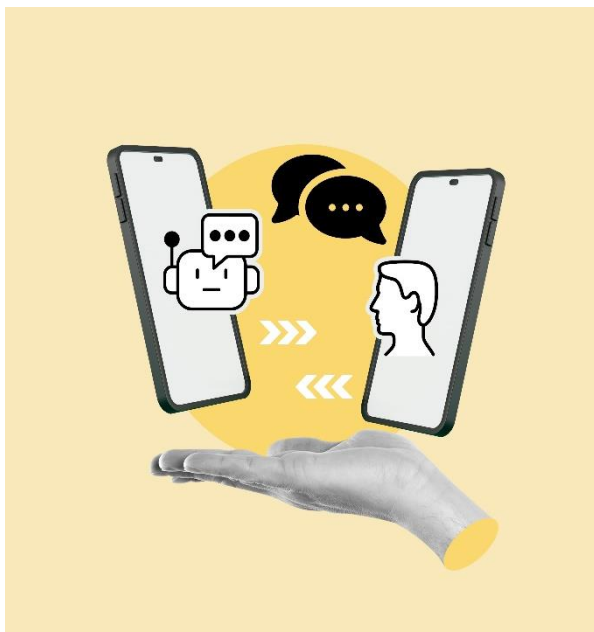## Improving Student Support Services

Universities have adopted AI-driven student advising and support systems as chatbots. These chatbots have significantly enhanced student support services to applying and enrolled students, especially during the COVID-19 pandemic where they maintained connections between students and campuses. Over time, they have become more effective in improving student retention, reducing summer melt, and boosting graduation rates (Viano, 2023).

Admissions Support

Chatbots like CSUNny at California State University, Northridge, and Beacon at Staffordshire University help prospective students by answering their inquiries around the clock. These chatbots guide students through the enrollment process, remind them about financial aid applications, and help them stay connected until they visit campus. This immediate assistance helps maintain engagement and ensures that students have the information they need to make informed decisions [10].

Ongoing Student Support

Once students are enrolled, chatbots continue to offer significant support. CSUNny has been effective in helping students stay enrolled and graduate by providing reminders about exams and assignments and offering emotional support. Students using CSUNny were more likely to have already graduated (5.6 percent) than their control group counterparts (3.6 percent), (Viano, 2023). Similarly, Georgia State University's chatbot, Pounce, reduced summer melt by 22% and helped students achieve better grades. These tools are particularly helpful for first-generation and minority students who might feel uncomfortable asking for assistance or consider their questions to be "stupid questions" [10].

Beacon at Staffordshire University recognizes students when they log in and allows interaction via text or voice conversation. It offers similar assistance to that of CSUNny, and flags students who may need additional support. As its use among students increases, Beacon becomes smarter and more effective in providing personalized support, and helps the university build a positive connection to enhance student experience [11].

Personalized Interaction and Early Intervention

AI models have improved early intervention strategies by identifying students at-risk of failing or dropping out. Traditional linear models that track such statistics have been overtaken by AI, which is identifying those likely to discontinue enrollment at twice the rate (70%). It is also notable that 40% of these identified students were high achievers academically that the linear

model failed to spot. This advanced predictive capability allows the university to intervene at the appropriate time and offer academic advising and personalized support, improving overall retention rates [12].

Challenges:

Considering the novelty of AI and the fast transformation of the educational system in recent years, integrating AI in higher education institutions has introduced challenges yet to be resolved in terms of privacy, bias and staff readiness and acceptance of this update.

Ethical and Social Concerns

Privacy Concerns

AI integration introduced questions of privacy. Anonymous identities are at risk when AI can be used to help re-identify individuals [13]. Students and instructors alike are subject to sharing personal data with AI tools and chatbots. In fact, AI systems rely heavily on this data to monitor the user behavior, and are trained to predict future preferences and actions, which raises high concerns regarding access, security, and potential data breaches [14]. Additionally, AI access to user data poses an obligation of acquiring a user's consent, whether it is a student, a parent of an underage, or an educator, which introduces further complications to the privacy landscape [14].

Bias and Fairness

According to the research conducted by Suleman Khan (2023) [15] AI educational tools revealed various occurrences of bias. Research was able to detect bias in form of gendered preferences, discriminations, and cultural insensitivities. For instance, when asked to recommend courses in mathematics or sciences for students, certain algorithms recommended basic or introductory level courses for female students and advanced courses for male students. Similarly, algorithms proved to misrepresent different cultures and fail at delivering authentic information about societal norms and history, which ties back to these algorithms being trained on Western-centric datasets. This reinforces existing stereotypes and limit students' potential, while also

promoting marginalization and insensitivities [15]. Building and training models to not accidentally introduce bias, avoiding building new models on inherent built biased models, and ensuring to introduce test factors to remove unconscious bias still remain one of the greatest challenges of building AI tools and adopting them in higher education [12].

Educational Impact and Integration

Teacher Readiness and Integration

The integration of AI tools into educational institutions requires teachers' readiness in terms of cognitive preparation, technological proficiency, and ethical awareness [16]. Teachers represent a central factor in the success of AI in education (AIEd) [16]. They will determine when and how to use AIEd tools and manage the various resources at hand [17]. A possible challenge might be including participatory design methodologies involving teachers and learners in the design of AIEd tools, and delivering the support educators need rather than what technologists and designers think they need [17].

Attitudes Towards AI

Attitudes towards AI among educators and students play a significant role in the successful integration of these technologies. A recent study showed that participants have moderately positive sentiments towards AI systems with a mean value of 3.29 for positive attitudes and 2.63 for negative attitudes. The following results are optimistic in AI acceptance, however negative attitudes should still be accounted for given the challenge they present [18].

Technological Concerns

Reliability and Academic Integrity

The variability and unpredictability of AI-generated content pose significant challenges for academic integrity. Verifying information provided by AI tools can be complex and inconsistent, and may unintentionally cause differences in academic work [2]. This calls for adopting clear guidelines and educational efforts to promote responsible AI use. Additionally, GenAI introduced "AI Hallucinations" where AI generates references that appear credible but are totally fabricated. These hallucinations lead to misinformation and further raise the question of AI reliability [19].

Plagiarism Detection
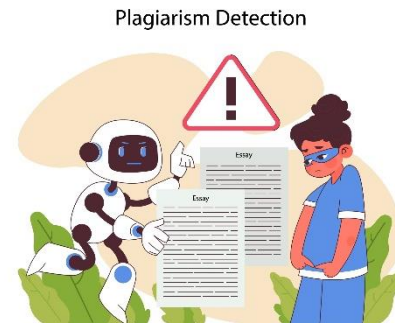
AI language models based on an extensive database like ChatGPT put the users under a risk of information overload. ChatGPT has knowledge about almost any topic and can easily distract students from focusing on core curriculum topics, by leading them down an endless thread of information. The issue becomes particularly problematic if students lack focus of interest in their foundational curriculum concepts and prioritize peripheral AI-generated content [2].

Human-Centered Perspectives

Emotional Bonds and Trust

Satya Nitta, former global head of the AI solutions for the learning department at IBM Research, says that AI will always fail to provide a teaching experience that lives up to a humane one [20]. The study by Aly et al. (2024) highlights situations where human teachers were considered more trustworthy than AI tools, as participants consistently and subconsciously tended to place a higher level of trust in human instructors than AI ones [21].

This phenomenon, also known as algorithm aversion, underlines the resistance AI integration in educational institutions faces, by educators, students and parents.

Policies and recommendations

Considering the challenges that AI and GenAI introduce, several policies should be set and adopted in higher education institutions. The policies should be clear and precise to guarantee an ethical and efficient implementation of AI. In this section we study existing policies, and frameworks set by educational institutions and institutions involved in accrediting universities.

Why policies are important

Policies are essential for institutions for the following reasons:

Ethical Use of AI: Policies ensure that AI model decisions are fair and protect individuals against any possible instance of bias.

Data Privacy and Security: Policies ensure the security of the institution's data accessed by AI along with the individuals' personal info.

Standardization: Policies ensure a consistent standard to implement AI, for a more equitable outcome across institutions.

Innovation and Risk Management: Well-constructed policies help balance risk management when innovation takes place.

Accreditation: Policies ensure that institutions' practices conform to accreditation guidelines.

Accreditation Considerations

Regional accreditation of institutions is a consideration when modifying existing policies to accommodate AI integration or implementing new ones. When applying changes, educational institutions should communicate with accrediting bodies to ensure that institutional accreditation is not affected [22].

Accrediting bodies, on the other hand, should adopt a level of flexibility to accommodate for new educational practices, and judge institutions based on employment expectations and emerging trends in workforce credentials, which are of the highest priority for students [22].

While no new comprehensive guidelines specific for AI integration has emerged yet, accrediting bodies mandate that learning and assessment practices using AI should still respect the existing guidelines. For instance, TEQSA (The Tertiary Education Quality and Standards Agency), Australia's independent national quality assurance and regulatory agency for higher education, does not mandate a particular form of assessment be used but requires institutions to assess a student's knowledge and understanding of the subject [23].

Similarly, The National Academic Integrity Network (NAIN), a peer-driven network, established in November 2019 by Quality and Qualifications Ireland (QQI), the state agency responsible for promoting the quality, integrity and reputation of Ireland's further and higher education system, has published [Generative AI Guidelines for Educators](#), that aims to provide educators with an understanding of GenAI along with its potential and limitations. They present advice for educators to reflect on and share and discuss with their students to enable them to understand and appreciate what is and isn't permitted. They offer advice on curriculum and program design and setting assessments appropriate to the new educational practices [24].

Existing Policies:

Currently, existing policies managing AI adoption to higher education and academia fall into two categories: Universities code of conduct detailing appropriate use of GenAI (ChatGpt and others) to avoid plagiarism, or general guidance that focuses on setting ethical considerations to be applied when using AI tools. While these documents are not specific for higher education, they can serve as a starting point for policymaking.

GenAI tools:

GenAI tools like ChatGpt, Github Copilot and others present an ethical risk for universities given their free access to the public. Following their emergence, universities have included AI plagiarism in their codes of conduct policies. These policies dictate that educators are free to prohibit all content that is not human generated or accept AI generated work when properly cited and referenced.

AI CONTENT DETECTOR
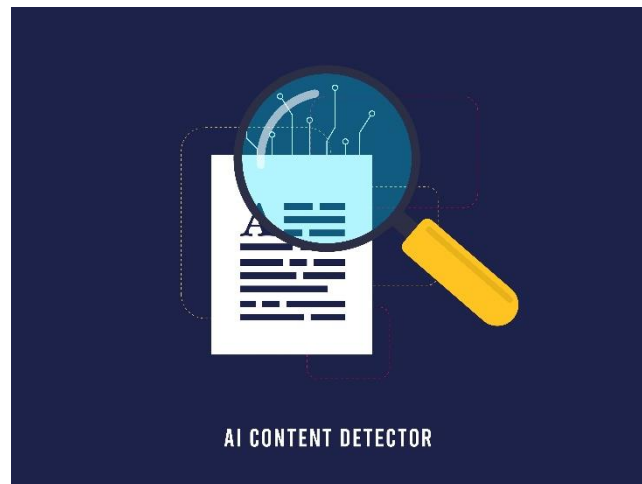
Some official universities policies are presented in Libguide (2024) as follows [25]:

Harvard Business School - Using ChatGPT and AI tools

Official policy from Harvard Business School. Faculty "may allow the use of ChatGPT and similar technologies in some circumstances". Citation is required and guidance will evolve as these technologies evolve.

Rice University - Honor Council limits use of ChatGPT

The Honor Council sent an email to all undergraduates on April 11th, 2023, announcing an Honor Code amendment explicitly prohibiting the use of artificial intelligence software such as ChatGPT without proper citation. Additionally, the email clarified professors' right to ban the use of AI software for their classes. "Utilizing AI software to generate ideas and pass them off as one's own will also be considered plagiarism and will be adjudicated as such by the Honor Council," the email said. The email also clarifies that use of AI software "for your own study purposes is allowable."

Stanford University - Generative AI policy guidance

"Absent a clear statement from an instructor, use of or consultation with generative AI shall be treated analogously to assistance from another person. In particular, using generative AI tools to substantially complete an assignment or exam (e.g. by entering exam or assignment questions) is not permitted. Students should acknowledge the use of generative AI (other than incidental use) and default to disclosing such assistance when in doubt."

UNESCO's Guidance for Generative AI in Education and Research

UNESCO has issued their own guidance for AI integration in schools and universities and released it during UNESCO's Digital Learning Week on September 7, 2023. This guidance was to ensure an ethical and effective implementation of AI in education, and argues that GenAI adoption should be under a human-centered approach, supported by frameworks and teacher training [26].

It mentions seven essential steps for governments to follow, in order to ensure an ethical adoption of GenAI use in education and research, that respects global, regional, and national data protection and privacy standards. The guidance also highlights the importance of prioritizing human rights and dignity, promoting inclusion, equity, gender equality, and cultural and linguistic diversity [26] [27].

Institute for Ethical AI in Education's Blueprint

The Institute for Ethical AI in Education (2020) [28] has proposed a blueprint designed to ensure that AI usage benefits learners without posing significant risks. It set the key principles to balance AI underuse and overuse/misuse:

Clear Benefits: AI should only be used for educational purposes where it presents benefits for learners

Risk Mitigation: AI should not be used if it poses significant risks to learners. If there is any risk of harm, the following conditions must be met:

Decisive steps are taken to reduce risks and communicate clearly.

The benefits outweigh the risks.

The risks are not significant.

Ensure continuous monitoring to verify that these conditions are met.

If one of the mentioned conditions is not met, the institution must terminate or improve AI use.

Frameworks to Follow

Several frameworks can guide the higher education institutions development of appropriate policies:

1. **Council on Integrity in Results Reporting (CIRR)**: This framework tracks outcomes like graduation rates, job placement, and salaries (Klutka et al., 2018). CIRR provides these statistics to prospective students. Higher education institutions (HEI) should take CIRR into consideration while accommodating for AI policies.

2. **UNESCO's Guidance for GenAI**: Follow UNESCO's seven essential steps for ethical and effective GenAI use in education and research. These measures include bias free AI integration, monitoring AI systems, developing AI-related skills for teachers and researchers, testing and reviewing to study long term implications [26][27].

3. **Institute for Ethical AI in Education's Blueprint**: This framework helps ensure AI is used where there are clear benefits and appropriate risk management [28].

4. **European Commission's Ethical Guidelines**: This framework helps policies focus on human agency, fairness, transparency, and accountability in AI systems used in education, and calls for clear documentation and support [29].

5. **The Edtech Firm Anthology's Framework**: This framework provides HEI with some guiding questions to be considered when drafting ethical AI policies and procedures [30].

Mechanisms for Realizing Ethical AI in Education

The following mechanisms, adapted from **Interim Report: Towards a shared Vision of Ethical AI in Education**, can be built for ethical AI in higher education [28]:

1. **Regulation**: Revise, adapt, or introduce regulations forcing HEI to act and make decisions ethically.

2. **Codes of Conduct**: HEI could voluntarily or be required to sign up to an ethical framework for AI in education, adhering to their policies accordingly.

3. **Certification**: AI systems can be reviewed by certification and accrediting bodies to ensure that they conform to standards.

4. **Standardization**: Develop standards for AI in education focusing on transparency, bias prevention, and data governance.

5. **Education and Awareness**: Teach stakeholders about AI's ethical implications.

6. **Diversity and Inclusive Teams**: Work on developing diverse and inclusive teams for AI development in education.

7. **Architectures for Trustworthy AI**: Implement design measures to ensure ethical data collection and usage.

8. **Quality of Service Indicators**: Manage data security, transparency, and accuracy to inform decision-making.

Recommended Policies

To effectively integrate AI in higher education, several new policies are recommended:

1. **Ethical AI Use Guidelines**: Create policies on the ethical use of AI, that covers AI decision-making processes to reduce bias.

2. **Ethical GenAI Use Guidelines**: Create policies for the ethical use of GenAI tools like ChatGpt, Github Copilot and others by both students and faculty.

3. **Standardized Reporting and Accountability**: Create policies to collect, analyze and report data of AI integration, to track outcomes like graduation rates, job placement, and student satisfaction, similar to those used by medical accrediting bodies.

4. **Stakeholder Consensus on Data Use**: Create policies that require institutions to ensure stakeholders' consent regarding data access and utilization, particularly involving third-party AI providers.

5. **Institutional AI Readiness Assessment**: Create policies that encourage institutions to assess their readiness for AI adoption, considering their current operational assets and needs.

Conclusion:

The integration of AI, particularly generative AI (GenAI) in higher education introduces significant opportunities and challenges and calls for the adoption of new AI-specific policies. AI enhances higher education by personalizing student learning experience, supporting educators in their teaching practices, and transforming admission processes to ensure student support . However, higher education institutions are concerned regarding privacy, integrity, bias and readiness of educators and staff to integrate AI.

After reviewing existing policies and frameworks, such as those of UNESCO, the Institute for Ethical AI in Education and various universities, the need for ethical guidelines, transparency, and stakeholder involvement in AI adoption is clear. The frameworks set by these organizations help institutions to develop more specific and effective policies. By implementing these policies and adopting policies that ensure reporting, assessment for readiness and data consensus, higher education institutions will potentially maximize the benefits of AI while safeguarding ethical standards, promoting equity and maintaining academic integrity.

References

[1]   Seo, K., Tang, J., Roll, I. *et al.* The impact of artificial intelligence on learner–instructor interaction in online learning. *Int J Educ Technol High Educ* **18**, 54 (2021). https://doi.org/10.1186/s41239-021-00292-9

[2]   Chan, C. K. Y., & Colloton, T. (2024). Generative AI in higher education. https://doi.org/10.4324/9781003459026

[3]   Wang, Y., Liu, C., & Tu, Y.-F. (2021). Factors Affecting the Adoption of AI-Based Applications in Higher Education: An Analysis of Teachers Perspectives Using Structural Equation Modeling. *Educational Technology & Society*, *24*(3), 116–129. https://www.jstor.org/stable/27032860

[4]   Chan, C.K.Y., Hu, W. Students' voices on generative AI: perceptions, benefits, and challenges in higher education. *Int J Educ Technol High Educ* **20**, 43 (2023). https://doi.org/10.1186/s41239-023-00411-8

[5]   Hannan, E., & Liu, S. (2021). AI: new source of competitiveness in higher education. *Competitiveness Review*, *33*(2), 265–279. https://doi.org/10.1108/cr-03-2021-0045

[6]   UNC Charlotte. (2022, April 27). Kiran Budhrani wins staff employee of the year for innovation. *Inside UNC Charlotte*. https://inside.charlotte.edu/news-features/2022-04-27/kiran-budhrani-wins-staff-employee-year-innovation

[7]   Peterson, T. (2020). Improve online learning and more with artificial intelligence. *EdTech Magazine*. https://edtechmagazine.com/higher/article/2020/08/improve-online-learning-and-more-artificial-intelligence

[8]   Dumelle, K. (2020). Grading exams: How Gradescope revealed deeper insights into our teaching. *Faculty Focus*. www.facultyfocus.com/articles/educational-assessment/grading-exams-how-gradescope-revealed-deeper-insights-into-our-teaching/

[9]   Klutka, J., Ackerly, N., & Magda, A. J. (2018). Artificial intelligence in higher education: Current uses and future applications. *Learning House, a Wiley brand*. Retrieved from https://universityservices.wiley.com/wp-content/uploads/2020/12/201811-AI-in-Higher-Education-TLH-with-new-bage.pdf

[10]   Viano, A. (2023). How Universities Can Use AI Chatbots to Connect with Students and Drive Success. *Technology Solutions That Drive Education*. https://edtechmagazine.com/higher/article/2023/02/how-universities-can-use-ai-chatbots-connect-students-and-drive-success

[11]   Staffordshire University. (2019, January 21). *Introducing Beacon – a digital friend to Staffordshire University students!* https://www.staffs.ac.uk/news/2019/01/introducing-beacon-a-digital-friend-to-staffordshire-university-students

[12]   Brasca, C., Kaithwal, N., Krishnan, C., Lam, M., Law, J., & Marya, V. (2022, April 7). Using machine learning to improve student success in higher education. *McKinsey & Company*. https://www.mckinsey.com/industries/education/our-insights/using-machine-learning-to-improve-student-success-in-higher-education

[13]   Baker, T., Smith, L., & Anissa, N. (2019). Educ-AI-tion rebooted? Exploring the future of artificial intelligence in schools and colleges. *Retrieved May*, *12*, 2020.

[14]   Allam, H., Dempere, J., Akre, V., & Flores, P. (2023). Artificial Intelligence in Education (AIED): Implications and Challenges. In *Proceedings of the International Conference on Artificial Intelligence in Education*. Atlantis Press, 126-140. https://doi.org/10.2991/978-94-6463-286-6_10

[15]   Khan, S. (2023, June 30). *The Ethical Imperative: Addressing bias and Discrimination in AI-Driven education*. https://sss.org.pk/index.php/sss/article/view/23

[16]   Wang, X., Li, L., Tan, S. C., Yang, L., & Lei, J. (2023). Preparing for AI-enhanced education: Conceptualizing and empirically examining teachers' AI readiness. *Computers in Human Behavior, 146*, 107798. https://doi.org/10.1016/j.chb.2023.107798

[17]   Luckin, R., Cukurova, M., Kent, C., & Du Boulay, B. (2022). Empowering educators to be AI-ready. *Computers and Education. Artificial Intelligence*, *3*, 100076. https://doi.org/10.1016/j.caeai.2022.100076

[18]   Sánchez-Reina, J. R., Theophilou, E., & Hernández-Leo, D. (2024). Exploring undergraduates' attitudes towards ChatGPT: Is AI resistance constraining the acceptance of chatbot technology? *TechRxiv*. https://doi.org/10.36227/techrxiv.171173454.45591400/v1

[19]   Alkaissi, H., & McFarlane, S. I. (2023). Artificial Hallucinations in ChatGPT: Implications in Scientific Writing. *Cureus, 15*(2), e35179. https://doi.org/10.7759/cureus.35179

[20]   Young, J. (2024, January 22). Some experts skeptical of AI tutors, recalling IBM's "Watson." *GovTech*. Retrieved from https://www.govtech.com/education/higher-ed/some-experts-skeptical-of-ai-tutors-recalling-ibms-watson

[21]   Aly, H., Byrne, K. A., & Knijnenburg, B. (2024). Perceived Trustworthiness of Human vs. AI Instructors in Digital Privacy Education for Older Adults. In *Companion Proceedings of the 29th International Conference on Intelligent User Interfaces (IUI '24 Companion)*. Association for Computing Machinery, New York, NY, USA, 107–112. https://doi.org/10.1145/3640544.3645238

[22]   Schroeder, R. (2023, October 26). Aligning the curriculum to reality in AI-accelerated times. *Inside Higher Ed | Higher Education News, Events and Jobs.* https://www.insidehighered.com/opinion/blogs/online-trending-now/2023/10/26/aligning-curriculum-reality-ai-accelerated-times

[23]   Artificial intelligence: advice for students | *Tertiary Education Quality and Standards Agency.* (2023, April 4). https://www.teqsa.gov.au/students/artificial-intelligence-advice-students

[24]   NAIN publishes new GenAI Guidelines for Educators. (n.d.). *Quality and Qualifications Ireland.* https://www.qqi.ie/news/nain-publishes-new-genai-guidelines-for-educators

[25]   *LibGuides: What is Artificial Intelligence (AI) and How Should I Approach It?: What Are Other Schools Doing About AI?* (n.d.). https://southgatech.libguides.com/c.php?g=1372619&p=10145575

[26]   UNESCO. (2023). *Guidance for generative AI in education and research** (F. Miao & W. Holmes, Authors; S. Giannini, Foreword). UNESCO. https://doi.org/10.54675/EWZM9535

[27]   Chan, C. K. (2023). A comprehensive AI Policy education framework for university teaching and learning. *ResearchGate*. https://www.researchgate.net/publication/370442603_A_Comprehensive_AI_Policy_Education_Framework_for_University_Teaching_and_Learning

[28]   Institute for Ethical AI in Education. (2020). Interim Report: *Towards a Shared Vision of Ethical AI in Education. University of Buckingham.* https://www.buckingham.ac.uk/wp-content/uploads/2020/02/The-Institute-for-Ethical-AI-in-Educations-Interim-Report-Towards-a-Shared-Vision-of-Ethical-AI-in-Education.pdf

[29]   European Commission, Directorate-General for Education, Youth, Sport and Culture. (2022). *Ethical guidelines on the use of artificial intelligence (AI) and data in teaching and learning for educators.* Publications Office of the European Union. https://data.europa.eu/doi/10.2766/153756

[30]   Mastering AI policies: *A framework for institutional alignment*. Anthology. (2023). https://www.anthology.com/sites/default/files/2023-11/Mastering%20AI%20Policies-A%20Framework%20for%20Institutional%20Alignment-v4_11-23.pdf

About the author:

Haifa Al Ashkar

Haifa Al Ashkar is a third-year student pursuing a Bachelor of Engineering in Computer and Communications Engineering at the American University of Beirut. Her passion lies in software development, with a specific interest in web and game development. Through various trainings, she has cultivated expertise, which she has applied to diverse projects, including the development of websites and applications. Her academic journey is fueled by a commitment to continuous growth and excellence in the dynamic field of software development.