Ethical Considerations in Implementing AI Technologies in Higher Education

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Introduction

Over the last few years, artificial intelligence (AI) has become a dominant topic of conversation in the media and business world. Higher education institutions are learning to embrace the role of AI, specifically in online learning environments. As higher education institutions rely heavily on technology, leaders cannot avoid addressing concerns presented by AI. More specifically, online higher education institutions must consider the benefits and challenges presented to educators and learners. The purpose of this paper is to examine the implications of artificial intelligence in online higher education institutions and explore solutions for agile and adaptive policies to navigate the evolving AI landscape in Higher Education. By exploring the benefits of implementing AI technologies, ethical considerations and implications, and the impact on academic integrity, leaders will have a holistic perspective on leveraging AI in an online learning environment at higher education institutions.

Overview of Artificial Intelligence

In the 1950s, John McCarthy first coined the term "Artificial Intelligence." While the field of AI originates from computer science and engineering, it is strongly influenced by other disciplines such as philosophy, neuroscience, and economics. Due to the interdisciplinary nature of AI, there is little agreement among AI researchers on a common definition and understanding of AI.[1] Today, there are thousands of Artificial Intelligence tools employed across multiple industries. Furthermore, there are many branches of AI, some more familiar than others. A few of the more notable types of artificial intelligence include generative AI, machine learning, narrow AI, and natural language processing. Generative artificial intelligence (generative AI) is a type of AI that can create new content and ideas, including conversations, stories, images, videos, and music. Two popular AI products that use generative AI are ChatGPT and Microsoft Copilot. Another facet of artificial intelligence is machine learning, which is the science of developing algorithms and statistical models that computer systems use to perform complex tasks without explicit instructions. Real-world examples of machine learning include facial recognition, voice-to-text, predictive analytics, and email automation. Narrow AI, also known as Weak AI, involves machines that can perform only a narrowly defined set of specific tasks. The machine does

[1] Max Tegmark, *Life 3.0: Being human in the age of artificial intelligence*. (London: Penguin Books, 2018)

not possess any thinking ability, it just performs a set of pre-defined functions. Many AI-based systems today currently fall under the category of Narrow AI. Popular Narrow AI products include Alexa, Siri, and self-driving cars. Lastly, Natural Language Processing (NLP) is another branch of AI and refers to the science of drawing insights from natural human language to communicate with machines and grow businesses. Currently, companies use NLP to gain insight from customer reviews and improve user experiences.[2] Prior to the global release of ChatGPT 3.5 in November 2022, AI technology did not appear helpful to nontechnical individuals as many were unaware of the power of a human-like interaction. [3] As a result, individuals began exploring other AI tools and products to enhance their personal and professional lives. While generative AI tools can be misused, educators need to understand the threats posed by AI, as well as their potential. AI spans various industries and domains, and the rise of its use is paramount in the field of education.

AI in Education (AIED)

The impact of AI on education has been the subject of research over the last 30 years. Zawacki-Richter[4] published a study asserting that learning institutions and governments show more interest in adopting AI in education. There has also been an increase in research on AI applications in higher education. [5] The usage of AI in online education is inevitable, but the rapid development and evolution of AI tools can become overwhelming for both educators and students. As administrators, educators, and students become familiar with AI tools, there is a need to understand the balance of the benefits and challenges posed by AI products. There are several roles of AI in education, that is, serving as an

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[2] Zulaikha Lateef, "Types of Artificial Intelligence You Should Know." Last modified February 1, 2024, https://www.edureka.co/blog/types-of-artificial-intelligence/#Branches%20Of%20Artificial%20Intelligence.

[3]Project Management Institute, "Leading AI-driven Business Transformation: Are You In?" Last Modified October 2023, https://www.pmi.org/learning/thought%20leadership/ai-impact/leading-ai-driven%20business-transformation.

[4] Olaf Zawacki-Richter, et al. "Systematic review of research on artificial intelligence applications in higher education – where are the educators?" *International Journal of Educational Technology in Higher Education* 16:39 (2019): 1-27. https://doi.org/10.1186/s41239-019-0171-0.

[5] Sheshadri Chatterjee and Kalyan Kumar Bhattacharjee, "Adoption of artificial intelligence in higher education: a quantitative analysis using structural equation modelling." *Education and Information Technologies* 25 (2020): 3443 - 3463. https://doi.org/10.1007/s10639-020-10159-7

intelligent tutor, intelligent tutee, learning tool/partner, or policy-making advisor, as shown in Fig. 1. [6] Intelligent tutor is considered the largest category of AIED applications. This category consists of intelligent tutoring systems, adaptive/personalized learning systems, and recommendation systems. Next, studies in the category of intelligent tutee are rarely seen because most AI-based educational systems generally focus on helping learners rather than providing opportunities to encourage learners to serve as tutor or advisor. The intelligent learning tool or partner focuses on student-centered learning. The device can help learners collect and analyze data in efficient and effective ways, enabling them to focus on critical points or higher-order thinking (e.g., inference and prediction), rather than low-level tasks (e.g., editing and calculation). Lastly, AI techniques have been employed to inform and guide the development of policy or laws in recent years. Therefore, it is possible and feasible to develop a policy-making advisor for policy building in education. With the help of AI technologies, policymakers can more precisely understand the trends and problems in educational settings from both macro and micro perspectives, which can help build and evaluate effective educational policies. These four areas provide a foundation for the future development of AI tools in education.

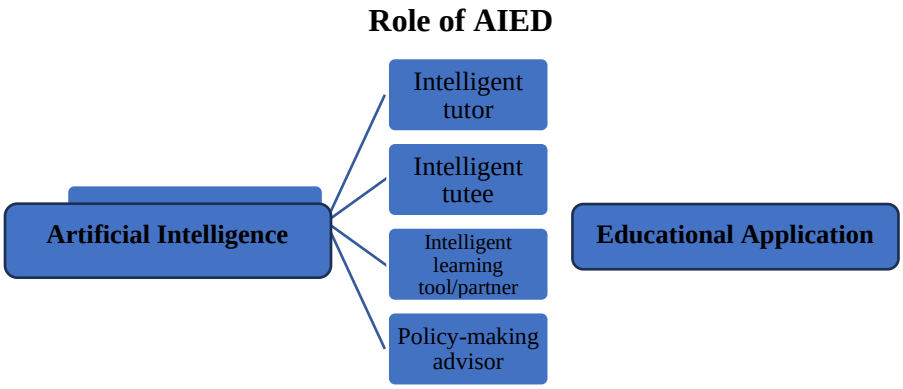

Fig. 1 Framework for the roles of AIED.

[6] Gwo-Jen Hwang, Haoran Xie, Benjamin W. Wah, Dragan Gašević, "Vision, challenges, roles and research issues of Artificial Intelligence in Education" *Computers and Education: Artificial Intelligence,* 1, 2020, 3, https://doi.org/10.1016/j.caeai.2020.100001.

AI Applications in Higher Education

AI-based services at the institutional and administrative levels are utilized by departments such as admissions, counseling, and library services. Other areas in college operations that utilize AI technologies include student support and enrollment management. At the teaching and learning levels, AI services provide academic support in the form of assessments, feedback, and tutoring. As previously mentioned, Intelligent tutoring systems (ITS) are the most widely used tool and can function in various capacities such as teaching course content, diagnosing student strengths or gaps in knowledge, and facilitating collaboration between learners. Interestingly, ITS outperforms other instruction methods such as traditional classroom instruction, reading digital text, or homework assignments. ITS has enormous potential, especially in large-scale distance teaching institutions, which run modules with thousands of students, where human one-to-one tutoring is impossible.[7] Furthermore, there are practical applications of AI in higher education including writing detection tools.

The introduction of generative AI platforms has increased the need for higher education institutions to invest in plagiarism tools. A critical skill developed in college is writing. Writing detection tools first appeared 5 years ago and are now in demand so instructors can verify the originality of writing submissions. In addition to academic integrity violations, this also leads to an impact on AI use policies that must be enforced at the classroom level. Currently, there are 12 distinct AI-based writing detection systems, shown in Fig. 2. [8]

It is imperative for educators to understand the purpose of AI tools and offer professional development opportunities for educators to garner a deeper understanding of how to integrate these tools. Before adopting new AI tools at the classroom level, it is critical to understand the current use and potential benefits

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[7] Olaf Zawacki-Richter, et al. "Systematic review of research on artificial intelligence applications in higher education – where are the educators?" *International Journal of Educational Technology in Higher Education* 16:39 (2019): 18-20. https://doi.org/10.1186/s41239-019-0171-0.

[8] Turnitin, LLC., "Updating your academic integrity policy in the age of AI." Last modified October 2023. https://www.turnitin.com/papers/academic-integrity-in-the-age-of-ai-updating-your-academic-integrity-policy.

and risks associated.[9] The AI-based writing detection systems are grouped by function and described below.

Style Analysis develops algorithms that analyze writing style, including vocabulary usage, sentence structure, and tone, to identify patterns consistent with a particular author's style or genre.

Plagiarism Detection trains AI models to compare texts and detect instances of plagiarism by analyzing similarities and differences in content, structure, and wording.

Grammar and Syntax Checking uses natural language processing (NLP) techniques to build AI systems capable of detecting grammatical errors, syntax inconsistencies, and writing conventions violations.

Content Evaluation develops AI tools to evaluate the quality and reliability of content by assessing factors such as credibility of sources, coherence of arguments, and accuracy of information.

Emotion Analysis implements sentiment analysis algorithms to detect emotional cues in writing, helping to assess the emotional impact of a piece of text or identify deceptive or manipulative language.

Language Proficiency Assessments create AI systems that evaluate language proficiency levels by analyzing writing samples and assessing factors such as vocabulary complexity, grammatical accuracy, and fluency.

Contextual Understanding trains AI models to understand context and semantics in writing, enabling them to detect nuances, sarcasm, irony, and other rhetorical devices that may influence the meaning of a text.

Plausibility Assessments develop algorithms to assess the plausibility of claims or statements made in writing by cross-referencing information with external sources or databases.

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[9] Haddani Outman et al..“Proceedings of the E-Learning and Smart Engineering Systems,” *Atlantis Highlights in Social Sciences, Education and Humanities* 14, (2023) 270 https://doi.org/10.2991/978-94-6463-360-3_27.

Bias Detection builds AI systems capable of detecting biases in writing, including political, cultural, gender, or racial biases, by analyzing language patterns and ideological framing.

Multimodal Analysis combines text analysis with other modalities such as image or audio to create more comprehensive AI systems capable of detecting writing patterns across different mediums.

Language Translation and Comparison utilizes AI-powered translation tools to translate texts into multiple languages and compare them to identify potential discrepancies, inconsistencies, or alterations

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Genre Classification trains AI models to classify texts into different genres or categories based on thematic elements, writing style, and narrative structure, enabling more targeted analysis and detection.

These tools serve as a foundation for developing robust AI systems for writing detection across various applications and domains. However, it is important to note the perceived benefits of these tools can influence the adoption and integration within the online learning environment.

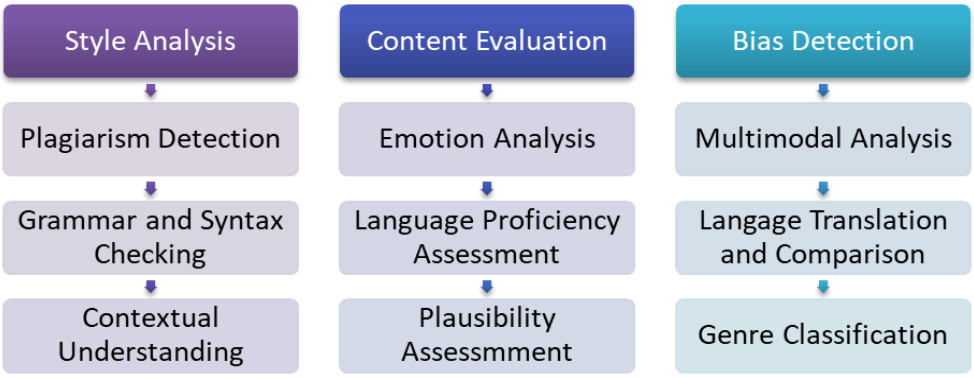

Fig. 2 Distinct AI-based writing detection systems

These examples reinforce the inherent challenge of embracing AI as many tools augment and support learners and students. Educators must understand the benefits of AI tools, and the risks associated with AI, and institutions have an opportunity to offer professional development to administrators and educators to garner a deeper understanding of how to integrate these tools into the classroom.

Challenges and Opportunities of AI

The explosive use of AI over the last few years has not gone unnoticed; however, many educators are unaware of the scope, and what it consists of. With the introduction of new technology, new possibilities will inevitably be met with limitations. AI presents challenges and opportunities in the learning environment. The following study identifies dominant challenges and opportunities.[10]

Opportunities of AI

Differentiated and Individualized Learning

One priority for educators has been adjusting learning based on an individual student's particular needs. Companies are currently developing intelligent instruction design and digital platforms that use AI to provide learning, testing, and feedback to students from pre-K to college level, identifying gaps in their knowledge and directing them to new challenges when appropriate.[11] As AI becomes more sophisticated, the notion a machine can read the expression on a student's face that indicates they are struggling to grasp a subject and will modify a lesson in response is within the realm of possibility. The idea of customizing the curriculum for every student's individual needs is not viable today, but it will be for AI-powered systems.

Universal Access to All Students

Artificial intelligence tools can make global classrooms available to all, including those who speak different languages or who might have visual or hearing impairments. For example, presentation translator is a free plug-in for PowerPoint

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[10] Susan Akinwalere and Ventsislav Ivanov, "Artificial Intelligence in Higher Education: Challenges and Opportunities," *Border Crossing* 12, no. 1 (2022): 6-7. doi: https://doi.org/10.33182/bc.v12i1.2015.

[11] Francesc Pedro et.al "Artificial Intelligence in Education: Challenges and Opportunities for Sustainable Development." *United Nations Educational, Scientific and Cultural Organization* (2019). https://unesdoc.unesco.org/ark:/48223/pf0000366994

that creates subtitles in real time for what the teacher is saying. Online higher education institutions already reach students globally, allowing AI to play a pivotal role in enhancing the learning experience for global students.

Automate Administrative Tasks

An educator spends a tremendous amount of time grading and offering substantive feedback to students. This is an opportunity for AI to improve the efficiency of these tasks, while simultaneously offering recommendations to address learning gaps. While machines can grade multiple-choice tests, they are very close to being able to assess written responses as well. As AI steps in to automate administrative tasks, it allows educators more time to spend on meaningful engagements with students. As previously mentioned, there is also potential for AI to develop more efficient enrollment and admissions processes.

Challenges of AI

Comprehensiveness

A natural challenge of big data is the level of comprehensiveness the data may include. For instance, there has been much discussion about this recently in terms of facial recognition. AI research looking at the use of facial recognition by companies such as Google, IBM, and Microsoft have shown that these tools have been developed using proprietary data or internal data based on employees.[12] Therefore, facial recognition tools are more accurate for certain ethnicities. This in turn leads to challenges concerning AI bias and possible discrimination.

Adverse outcomes

The use of artificial intelligence in higher education involves individuals and despite the intentions of AI users, there will be negative unintended consequences. Avoiding these adverse outcomes presents a challenge to higher education institutions. First, the data the tools draw upon can vary in terms of the age of the data, the quality of the data, or drawing from a population that may not

[12]Marcelo Perera and Diego Aboal (2020). "The Impact of a Mathematics Computer Assisted Learning Platform on Students' Mathematics Test Scores." Last modified March 2019. https://www.semanticscholar.org/paper/The-impact-of-a-mathematics-computer-assisted-on-Perera-Aboal/ae058393d4f9da5fa415acde66fed4a31271a08e

align with the student population.[13] AI systems tested on undergraduate students may not reflect the same accuracy for students at the graduate level. Similarly, an AI system based on Millennial students may not have the same efficacy for Generation X users.

Ethical Considerations

In 2021, the United Nations Educational, Scientific and Cultural Organization (UNESCO) produced the first-ever global standard on AI ethics – the 'Recommendation on the Ethics of Artificial Intelligence.'[14] This framework was adopted by all 193 Member States. The ten core principles of the ethics of AI are depicted in Fig. 3.[15]

Proportionality and Do No Harm	Safety and Security
Right to Privacy and Data Protection	Multi-stakeholder and Adaptive Governance & Collaboration
Responsibility & Accountability	Transparency and Explainability
Human Oversight & Determination	Sustainability
Awareness & Literacy	Fairness and Non-Discrimination

Fig. 3 Ten Core Principles on AI Ethics

These principles are applicable to the development of policies and guidelines spanning every industry, including higher education institutions. First, the use of AI systems must not extend beyond what is necessary to achieve a legitimate aim. Organizations can perform risk assessments to prevent potential harm, which may result from use. Additionally, unwanted harm (safety risks) and vulnerabilities to attack (security risks) should be addressed prior to implementation. Also, to

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[13] Susan Akinwalere and Ventsislav Ivanov, "Artificial Intelligence in Higher Education: Challenges and Opportunities," *Border Crossing* 12, no. 1 (2022): 9. doi: https://doi.org/10.33182/bc.v12i1.2015

[14] UNESCO, "Ethics of Artificial Intelligence", Accessed February 19, 2024. http://www.unesco.org/en/artificial-intelligence/recommendation-ethics#:~:text=The%20use%20of%20AI%20systems,may%20result%20from%20such%20uses.&text=Unwanted%20harms%20(safety%20risks)%20as,and%20addressed%20by%20AI%20actors.

[15] Ibid

promote and protect user privacy, adequate data frameworks should be established. Furthermore, AI systems should be auditable and traceable. It is essential to ensure AI systems do not displace human responsibility and accountability. Also, public understanding of AI and data should be promoted through open and accessible education, digital skills, AI ethics training, and information literacy. Lastly, AI should promote social justice, fairness, and non-discrimination while taking an inclusive approach to ensure AI's benefits are accessible to all. The principles serve as a strong foundation for policymaking at the university level. In reviewing ethical considerations within higher education. various themes emerged such as data privacy, algorithmic bias, and academic integrity.

Data Privacy

From a data privacy perspective, protecting student data is considered an ethical challenge. Inappropriate access to student data could leave institutions vulnerable to other privacy breaches. This digital revolution in education, particularly the use of AI and learning analytics in the field of education, entails a massive amount of personal data generated, captured, and analyzed to optimize learning experiences. When AIED tools are used to engage users, users are assumed to give consent, by which they would agree on terms of the use of technology and how their data is collected, managed, and processed. Additionally, one of the main functions of educational learning systems is to collect data on users, from which predictions about the learning behaviors and performance of users will be made. AIED should be designed and implemented in a manner that ensures the solution is robust enough to safeguard and protect data effectively from cybercrimes, data breaches, and corruption threats, ensuring the privacy and security of sensitive information. It is inevitable to not envision a scenario when data is manipulated or corrupted by another party, or even worse, by cybercriminals.

Algorithmic Bias

One major theme within the use of AI centers around algorithmic bias. AI algorithms make personalized recommendations and decisions, potentially resulting in discriminatory or biased results. A systematic review on online distance learning projected a high reliance on artificial intelligence technologies

and algorithmic future scenarios.[16] Data transparency is essential to reducing bias in the data generated. It is important to note that data transparency lies in where it is collected, what it shows, what happens to it, and how it is used. AI algorithms should be explainable and justified for specific educational purposes.[17]

Academic Integrity

The increased use of AI technology has resulted in a need to analyze current academic integrity policy gaps that were not addressed previously when AI resources were not as readily available. In addition to policy updates, institutions will need to explore streamlined processes to enforce AI use at the classroom level. A few recommendations are included to support this endeavor on the administrative level. First, instructors need proper education and training on identifying AI usage. Second, developing responsible use of AI guidelines and requiring courses for instructors can reinforce the institution's position on AI usage in the online learning environment. The organization Turnitin provides a set of resources to assist in developing policies. One recommendation is to implement an AI vocabulary glossary to integrate into the academic integrity policy as needed.[18]

Policy Impact on AI Adoption

The rapid advancement and adoption of AI in higher education presents a new dimension of concern at the administrative level. The UNESCO global standard on the Ethics of AI provides extensive policy action areas, allowing leaders an opportunity to translate core values and principles into action concerning data governance, education and research, social well-being, among many other spheres. Currently, universities are implementing specific AI usage policies at the university level, instructor level, and student level. One important element for higher education leaders to consider is the continued need for professional

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[16] Murat Dogan, Tulay, Dogan, and Aras Bozkurt, "The Use of Artificial Intelligence (AI) in Online Learning and Distance Education Processes: A Systematic Review of Empirical Studies." *Applied Sciences* 13 (2023): 1-12. https://doi.org/10.3390/app13053056

[17] Andy Nguyen et al., "Ethical principles for artificial intelligence in education," Education and Information Technologies (2023): 28:4221–4241.doi.org/10.1007/s10639*-022-11316-

[18] Turnitin. "Updating your academic integrity policy in the age of AI." Last Modified October 2023.https://www.turnitin.com/papers/academic-integrity-in-the-age-of-ai-updating-your-academic-integrity-policy.

development. Both instructors and administrators need an environment to collaborate on best practices for AI use in the virtual learning environment. The consensus assessment of policies and guidelines would inform comprehensive and integrated instructions for different stakeholders in adopting AIED. This contributes to establishing a common ground and solid foundation for further development and implementation of AIED. As researchers and practitioners continue to explore AI in higher education, it will be critical to employ bidirectional communication with administrators and educators to enhance AI experiences and balance the narrative between the benefits and challenges in AI usage.

Conclusion

Overall, this paper contributes to the ongoing discussion surrounding the benefits of AI in the higher educational context. Additionally, specific AI applications and tools are explored, as well as challenges, opportunities, and ethical considerations, including algorithmic bias, data privacy, and academic integrity. A set of actionable recommendations can support higher education leaders as strategic discussions occur surrounding the usage of AI, the integration of AI tools in the online learning environment, and the long-term impact at the university level, classroom level, and individual level.

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