Risk Control

Artificial Intelligence in Higher Education

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Introduction

Artificial Intelligence (AI) is revolutionising various sectors, and higher education is no exception. The integration of AI technologies into higher education systems presents both promising opportunities and significant risks. This guidance document explores the multifaceted impacts of AI in higher education, delving into the potential benefits, associated risks, and strategies for mitigating these risks.

Understanding AI in Higher Education

AI is making significant strides in higher education, transforming various aspects of teaching, learning and administrative processes. Here are some examples of how Higher Education Institutions are using AI (but not limited to):

- Rapid Data Analysis
- Virtual Chatbots and Assistants
- Plagiarism and Fraud Detection
- Personalised Learning Experiences
- Assessment Methods

AI is not just a tool for learning, it's becoming an integral part of the learning process itself. As AI continues to evolve, it is expected to bring about even more significant changes in higher education.

Rapid Data Analysis

AI algorithms can analyse vast datasets to identify patterns and predict student performance, enabling early intervention strategies to support students and improve performance and retention rates.

AI can assist researchers in analysing large datasets, identify patterns, and make predictions. This can accelerate scientific discoveries and innovations. Higher Education Institutions are developing AI solutions that benefit society, such as healthcare diagnostics, climate modelling, and social impact projects.

Virtual Chatbots and Assistants

AI-powered virtual assistants provide on-demand support to students and staff answering questions, providing guidance, and facilitating administrative processes, thereby enhancing the overall efficiency of the institutions.

Plagiarism and Fraud Detection

Detecting academic misconduct, including plagiarism and fraud, is a critical challenge for Higher Education Institutions. While traditional text-based detection tools have been effective, they may not catch more sophisticated forms of cheating, such as contract cheating and collusion. These advanced techniques can be harder to detect and prove, often relying on a "balance of probabilities" rather than solid evidence[1].

Students may use AI tools to generate content, including essays, reports, and surveys. If students misuse these tools by submitting work without proper attribution or originality, it may undermine academic integrity. Students may also inadvertently use copyrighted material without proper citation, leading to legal and ethical issues.

AI can enhance educational experiences. Students should use AI tools judiciously, maintaining academic integrity, and critically evaluate the content they produce. Higher Education Institutions should provide guidance on responsible AI use to mitigate these risks.

These challenges may require Higher Education Institutions to explore the use of digital forensic techniques, which draw inspiration from enforcement agency practices.

Upholding academic integrity requires Higher Education Institutions to stay ahead of increasingly sophisticated cheating enabled by AI.

Personalised Learning Experiences

AI-powered learning platforms can analyse student data to tailor learning experiences according to individual needs, preferences, and learning styles. This personalisation enhances student engagement and can improve learning outcomes. AI algorithms can dynamically adjust course materials and assessments based on students' performance, fostering adaptive learning environments that cater to diverse learning paces and abilities.

Language barriers can be overcome using AI-powered translation tools, making content accessible to a wide audience.

Assessment Methods

AI driven tools automate administrative tasks, such as grading, scheduling, and content delivery, allowing institutions to focus more on personalised instruction, mentoring, and research.

AI driven adaptive tests adjust the difficulty level based on student's performance. If a student answers correctly, the next question becomes more challenging, however, incorrect answers lead to easier questions. Adaptive testing enables personalised assessment experiences for students.

AI supports ongoing assessment by providing real-time insights into student progress, allowing institutions to adjust teaching strategies based on this information.

Growth of AI in Higher Education

AI related publications have seen explosive growth in the last decade, from 88,000 in 2010 to over 240,000 by 2022 across research papers, books, articles, and conferences[2]. AI generated content is no longer a novelty, and tools like ChatGPT, Claude, and Gemini are already capable of writing novels, marketing materials, technical documents and scientific papers[3]. The market for AI technologies is vast and is expected to grow significantly[4].

AI has become an integral part of higher education, transforming teaching, assessment, and student experience. Its continued development promises exciting opportunities for enhancing learning experiences and outcomes.

Subjects Benefiting from AI

Higher Education Institutions often use AI-powered technology that has transformed various aspects of teaching, learning and administration. Some subject areas utilise AI tools to enhance leaning such as (but not limited to):

- **Medical**: AI can be applied to medical training, such as simulating patient cases, diagnosing diseases, and recommending treatments. It can help medical students and professionals to stay up to date with the latest research and practices.
- **Engineering:** AI tools can enhance engineering courses by providing simulations, modelling, and problem-solving exercises. They can enable students to gain practical experience and develop critical skills.
- **Mathematics:** AI can create personalised math exercises, offer step-by-step solutions, and adapt difficulty levels.
- **Image analytics:** In subjects like art, history or biology, AI can analyse images, identify patterns, and assist researchers in these studies.

AI Opportunities

AI technologies can bring benefits to Higher Education Institutions and students, such as fostering critical thinking. Critical thinking involves assessing, integrating, and examining information to make informed choices. AI technology help connect ideas, merging them to create stronger concepts and generating a wide range of ideas quickly. For example, an AI-generated prompt could ask students to explore the potential applications and implications of genetic engineering across various fields, such as agriculture, medicine, and environmental conservation. By using AI, students can connect concepts, evaluate possibilities, and reason through complexities. AI can foster critical thinking by connecting ideas, personalising learning, providing data-driven insights, and creating interactive experiences. As institutions embrace AI, they empower students to think critically, adapt to technological advancements, and thrive in a dynamic environment.

New Skills for the AI Era

In this new era of AI, institutions need to acquire specific skills to enhance their teaching effectiveness and adapt to the changing landscape.

- **AI Literacy** – Institutions should understand the basics of AI, including its applications, limitations, and ethical implications. This will enable them to integrate AI tools effectively into teaching methods and guide students in using AI responsibly[5].
- **Data Literacy** – Institutions need to be able to interpret and use data effectively. Understanding data analytics, visualisations and statistical concepts will help them make informed decisions about student performance, curriculum design, and personalised learning.
- **Adaptive Teaching** – AI-powered adaptive learning personalises content delivery. Higher Education Institutions can utilise these tools to address individual students' needs and adjust teaching methods accordingly[6].
- **Collaboration** – Higher Education Institutions could view AI as a collaborator rather than a replacement, learning how to work alongside AI tools enhances productivity and creativity in teaching activities[7].

AI cannot replace human connection. Institutions should continue developing strong relationships with students as this remains essential. Institutions may need to blend technical, ethical, and interpersonal skills to receive the greatest benefits from the AI era. By embracing AI while maintaining human interactions, Higher Education Institutions can create meaningful learning experiences for their students[8].

Risks with AI in Higher Education

There are significant opportunities that AI can bring to Higher Education. However, these opportunities can introduce risks that require management strategies to ensure that Higher Education Institutions receive the benefits and rewards and not unwanted impacts.

Ethical Use of AI

AI use in higher education raises ethical questions regarding algorithmic transparency, accountability, and the ethical use of student data. Institutions must establish clear policies,

ethical guidelines, codes of conduct, and governance frameworks to ensure responsible AI development. Any governance frameworks for the ethical use of AI will be an ongoing process, and institutions should adapt these based on evolving technologies and societal needs. Developing clear management arrangements for AI use within the institution should address bias, discrimination, and any ethical considerations.

The collection and analysis of sensitive student data raises concerns about privacy breaches, data misuse, and unauthorised access. Having robust mechanisms and data protection measures in place will ensure compliance with relevant legislation, including the UK General Data Protection Regulation (GDPR)[9].

AI algorithms may perpetuate or exacerbate biases present in existing systems, leading to unfair treatment, discrimination, and disparities in educational outcomes. Addressing algorithmic bias requires ongoing monitoring, transparency, and bias mitigation techniques and be implemented robustly within High Education Institutions.

Reducing the risk of bias and discrimination in AI is crucial for ensuring fairness and equality. Ensuring that data used for AI models includes a wide range of examples from different backgrounds, ethnicities, genders, and socioeconomic statuses. Historical data can contain biases; if data reflects existing inequalities AI models may perpetuate any pre-existing biases.

Ensuring that continuous monitoring of AI systems for bias during development and implementation is essential. Implementing tools that detect and quantify bias in model predictions will assist in addressing any disparities found. Institutions should explore fairness-aware algorithms that account for bias and aim to minimise it.

Transparency and explainability should be considered when using AI within institutions. Choosing AI models that provide explanations for their decisions will help to identify biases. Whilst AI models are being developed, records should be kept of how they are built, including feature selection, hyperparameter tuning and evaluation undertaken.

Institutions should conduct regular audits of AI systems to identify and rectify biases that emerge. Encouraging feedback from users and stakeholders could improve AI systems.

Risk of Job Displacement

The automation of routine tasks through AI may disrupt traditional academic roles, leading to job displacement among academic and administrative staff. There is a growing concern about the widening skills gap between AI-related professions and others, necessitating proactive measures for upskilling and reskilling staff.

According to the World Economic Forum's 'Future of Jobs' Report 2023, certain clerical or secretarial roles are at risk of declining due to AI[10]. Roles for AI and machine learning specialists, data analysts and scientists, and digital transformation specialists are expected to grow rapidly.

Higher Education Institutions should proactively address the impact of AI on jobs by emphasising skill development, promoting gender equality, and preparing for change in working environments.

Other Potential Risks

Excessive dependence on AI technologies may marginalise traditional teaching methods, diminish human interaction, and hinder critical thinking among students. It is crucial to strike a balance between technology-driven education and human-centred pedagogical approaches[11].

Students may misuse AI tools to solve problems or even take quizzes leading to academic dishonesty. Institutions must strike a balance between AI assistance and maintaining academic integrity. Institutions should cautiously integrate AI, ensuring it enhances human capabilities rather than replacing essential skills.

Risk Mitigation

Higher Education Institutions should prioritise transparent development and implementation of AI algorithms, providing clear explanations of how AI systems operate, their underlying assumptions and potential biases.

Establishing robust data governance frameworks ensures the ethical collection, storage, and use of student data, with emphasis on informed consent, data anonymisation and adherence to privacy laws.

Implementing bias detection tools and algorithms can help identify and mitigate biases in AI systems, fostering fairness, equity, and inclusivity in learning outcomes.

Regular monitoring and evaluation of AI applications enables institutions to assess their effectiveness, identify emerging risks, and make necessary adjustments to ensure alignment with institutional goals and values.

While embracing AI technology, Higher Education Institutions should maintain a human-centred approach to learning, emphasising the importance of interpersonal connections, mentorship, and critical thinking alongside the technological advancements.

Conclusion

The use of AI in Higher Education Institutions presents a transformative potential to enhance learning experiences, improve teaching efficiency, and foster innovation. This usage entails significant risks, including data privacy concerns, algorithmic bias, and ethical problems. Institutions that adopt proactive risk mitigation strategies, such as transparent AI development, robust governance, bias detection, and a human-centred approach, can harness the benefits of AI while safeguarding staff and students against potential pitfalls. Responsible AI development in Higher Education requires a balanced approach that prioritises student and staff well-being, academic integrity, and societal values.

Higher Education Institutions that resist AI may become irrelevant or even obsolete. Embracing AI will enable institutions to stay relevant and adaptable to the changing educational environments[12].

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