International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 05 | May - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

Impact of AI on Higher Education

Ishaan Varam, Shorya Man

Guide: Dr. Shabnam Gulati

Department of Management, Mittal School of Business, Lovely Professional University

ABSTRACT

The impact of Artificial Intelligence (AI) on higher education is a topic of increasing significance in today's rapidly evolving technological landscape. AI, characterized by machines mimicking human cognitive functions such as learning, reasoning, and problem-solving, has the potential to revolutionize various aspects of higher education, from teaching and learning methodologies to administrative processes and student support services. This aims to provide a comprehensive overview of the key areas where AI is transforming higher education and the implications of these transformations.

One of the primary areas where AI is making significant strides is in personalized learning. AI-powered learning systems can analyse vast amounts of data on student behaviour, performance, and preferences to tailor educational content and delivery methods to individual needs. This personalization enhances student engagement, motivation, and outcomes by providing customized learning experiences that address each student's strengths, weaknesses, and learning styles.

AI is reshaping the role of educators by augmenting their capabilities and effectiveness. Intelligent tutoring systems, chatbots, and virtual assistants can assist educators in tasks such as grading assignments, providing instant feedback to students, and managing administrative tasks. This frees up educators' time to focus more on designing innovative curricula, engaging with students on higher-order learning activities, and fostering critical thinking and problem-solving skills.

AI is revolutionizing research and knowledge discovery in higher education. AI algorithms can analyse vast amounts of scholarly publications, data sets, and research trends to identify patterns, correlations, and new research avenues. This accelerates the pace of discovery, facilitates interdisciplinary collaboration, and enhances the quality and relevance of research outputs.

In the realm of administrative processes, AI-driven systems are streamlining operations, improving efficiency, and reducing costs for higher education institutions. Chatbots and virtual assistants are handling inquiries from students and staff, automating routine tasks such as scheduling, registration, and admissions, and providing real-time support services.

The adoption of AI in higher education also presents challenges and considerations. Privacy and data security concerns arise due to the collection and analysis of sensitive student information. Ethical considerations, such as bias in AI algorithms and decision-making processes, require careful attention to ensure fairness and equity in educational outcomes.

Moreover, there is a need for upskilling educators and students to effectively leverage AI tools and technologies. Training programs on AI literacy, data analytics, and digital skills are essential to equip the higher education community with the knowledge and competencies needed for the AI-driven future.

The impact of AI on higher education is multifaceted, with significant potential to enhance learning experiences, advance research capabilities, and improve administrative efficiency. However, it also necessitates careful consideration of ethical, privacy, and skill development issues to harness its full benefits responsibly. Embracing AI as a transformative force in higher education requires collaborative efforts from educators, policymakers, technologists, and stakeholders to ensure an inclusive and sustainable AI-powered educational ecosystem.

INTRODUCTION

The future of higher education is inextricably linked to the development of new technologies and computing power of new intelligent machines. AI-based applications have become an integral part of our daily life, making it clear that technology is becoming increasingly important (Rodríguez-Hernández et al., 2021). An increasing number of educational applications for artificial intelligence have emerged in the last few years. Due to advancements in artificial intelligence, there are new possibilities and challenges for teaching and learning in higher education that have the potential to fundamentally alter the governance and internal architecture of higher education institutions. The importance of artificial intelligence (AI) and adaptive learning technology systems (ALTS) in education cannot be overstated (Holmes et al., 2021a; Pardamean et al., 2022). Many people have misunderstood or are afraid of AI's power, which will require a fundamental shift in the definition of expertise and the nature of future technological advancements. To address the question of what constitutes an "intelligent" system created by a human, Alan Turing put forth a solution in the 1950s (Gomede et al., 2018). If a listener cannot tell whether they are hearing a human conversation or one with a machine, then we can say that we have an intelligent system, or artificial intelligence, thanks to Turing's imitation game. McCarthy provided one of the earliest and most influential definitions of artificial intelligence in 1956: "The study (of artificial intelligence) is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it, he said (Popenici & Kerr, 2017; Seo et al., 2021). The ability of computing systems to engage in human (processes) like learning, adaptation, synthesis, self-correction, and data use for intricate computation duties can be defined as AI Higher education's services are already being profoundly altered by the rapid advancement of artificial intelligence.

AI IN CURRENT EDUCATION

The term AI conjures up images of supercomputers, machines with enormous processing power and the ability to adapt to their environment through the use of sensors and other features (Cox, 2021; Popenici & Kerr, 2017). These features give supercomputers human-like cognition and functionality, which in turn enhances their human interactions. In films, artificial intelligence has been used in a variety of ways, including smart buildings, where it can control the temperature, air quality, and music in a space based on its occupants' moods. An increasing number of educational applications of the traditional definition of artificial intelligence as a supercomputer has expanded to include embedded computer systems. Examples include robots that can help students learn from the earliest stages of education, such as in early childhood education, by incorporating AI, computers, and other supporting equipment (Bates etal., 2020; Niemi & Liu, 2021). As Timms claims, children are taught routine tasks using cobots, including punctuation and pronunciation and adapting to the abilities of the students, with the help of robots working in tandem with teachers or cobots. As various studies have demonstrated, web-based and online education have evolved from simply providing materials online or on the web for students to download, study, and complete assignments in order to pass, to intelligent and adaptive web-based systems that learn from instructor and learner behaviour and adjust accordingly to enhance the learning experience. Artificial intelligence is being used in education to assist with

administration, instruction, and learning. The scope of this study will be to analyse and understand artificial intelligence in education by focusing on these three areas (Muñoz-merino, 2011)

LITERATURE REVIEW

Currently, AI has become a vital part of the virtual world. Unquestionably, AI plays an important role in general education and higher education (Edtech, 2020). For example, the efficient uses of filtering emails, advertising, applications, YouTube, and virtual assistants such as Google, digital libraries, Google Scholar, and other digital research engines in any higher institution worldwide (García-Vélez et al., 2021). However, AIoth is weak and robust, according to Ma & Siau (2018). In other words, Ma and Siau (2018) label AI as fragile when it is limited to small, restricted, and structured tasks such as collecting data. The latter researesearchersAI as sharp and robust when performing most or all cognitive tasks are typically human (Beight & Reddell, 2005). Although AI plays a vital role currently, the researchers mentioned above consider AI a threat to human civilisation and support their argument with what experts in the field think about AI, such as Bill Gates, Elon Musk and Stephen Hawking (Ma & Siau, 2018). Undeniably, what is mentioned above about AI is vital. Still, at the same time, it is questionable for any critical-thinking reader as any further investigation remains possible, and the truth is never absolute. So, how would AI impact the learning and teaching processes?

AI impact on the learning and teaching process

Dealing with the impact of AI on learning and teaching in higher education, it is evident that AI will impact higher education in many ways and mainly in two focal areas: enrollment and curriculum (Taneri, 2020). For instance, Ma and Siau (2018) maintain that AI will speed consistency and accuracy in curriculum and registration. Furthermore, according to Ma and Siau (2018), human sciences and liberal arts majors will become more popular because these areas of study are less vulnerable to the field of AI than other areas, such as accounting and finance (Ma & Siau, 2018). Although this study is essential for a load of information on the influence of AI on higher education, it can be criticised for not tackling the issue genuinely, as the impact is much more profound. Indeed, focusing on the learning and teaching process, no one would doubt that AI is replacing the lecturer or tutor in many ways, such as blended learning and e-learning. The presence of an e-learning lecturer is limited as the learner interacts with a virtual classroom, whether on Blackboard, Moodle, Turnitin or any other platform (Jlu & Laurie A, 2018). Equally, Professor Roland T Chin from Hong Kong Baptist University (2018) believes that AI is meant to revolutionise how we learn, teach, work, live, make decisions, and be ready for the AI era. Therefore, AI is not only about its superficial effect, but about radical changes in the teaching and learning process in depth (Chin, 2018). What reinforces this idea conditionally is the argument from Princeton's Head of Computer Science, Jennifer Rexford. She surmises that AI is efficient in learning andteaching if others learn: "Learning how people learn will hopefully help us and others think more broadly about retraining down the road" (Rexford, 2018). Hence, according to Jennifer, the efficiency of AI is provisional, as understanding learning styles is the only key to success. Alike, Jabar and Yousif (2011) argue that the learning process in this world is becoming more interactive and engaging, according to recent researchers, because elearning provides the learner with artistic and pedagogical features as well as incorporates and deals with countless types of content which react effectively to the students' needs (Jabar and Yousif, 2011).

The absence of striking examples of how AI impacts the learner's daily life can be a limitation of the approach of Jabar and Yousif, highlighted below in the Education and Unit Study. For example, AI provides deep learning and teaching processes to get higher performance from both the tutor and the tutee. For example, adopting hypermedia for a writing class facilitates mistakes and reduces time consumption. For example, before discovering AI, it took ages for a teacher to assess and grade papers and check for plagiarism. Thanks to AI, checking for academic integrity

and language issues takes minutes or less. Indeed, using artificial intelligence, a lecturer submits the work to Turnitin, Grammarly, or other software. In minimal time, it can provide constructive feedback based on the results generated by the software used. Although AI is perfect in covering language and academic integrity issues, semantic, pragmatic, and cognitive levels, in many cases, require the intervention of the human mind to perform the last touch (Mellul, 2018). Nevertheless, AI offers various learners links about the topics required by the subject matter and eases and inspires both learner and tutor by addressing different learning styles such as autonomous learning, visual learning, e-learning, audio-visual learning, and deep learning. Equally, AI enables the tutor to select and apply the learning method taxonomy that the learner needs and highlights the areas of improvement to be focused on (Jabar and Yousif, 2011). Meanwhile, AI reinforces independent learning as the learner becomes autonomous and free to access input anytime and anywhere. Finally, according to Richer (1985), AI positively influences education by providing intelligent computer-assisted instruction that facilitates learning intuition and provides expert systems to diagnose and assess learning outcomes (Richer, 1985). It is undoubtedly clear that AI adds a lot to the learning and teaching process, so what about assessments and grading?

Impact of AI on the assessment and classification process

AI does not impact only the learning and teaching process but also the assessing and grading process. For instance, AI checks assignments and research projects through software such as Turnitin against billions of resources in no time. Consequently, similarities are easily generated to judge whether the learner plagiarised. Similarly, online rubrics and grading forms are added to assignments with criteria and scales, and final grades are automatically added to the submitted work without any hassle (Mahana et al., 2012). Furthermore, AI offers interactive ways of providing constructive feedback to the learner, easy access in a relaxed manner anytime and anywhere, with more privacy and autonomy. Additionally, the instructor can write or record feedback to facilitate and improve learning from errors. Also, referring to a study by Stanford University, AI is applied to evaluate students' responses and create a computer model that endorses rules inferred from the tutor's grading decisions. What is specific about AI is that it improves learning instead of making a final authoritative decision. In addition, it reflects more transparency, trust, and quality control (Stanford University, 2019). In the same context, Tovia Smith, in her article "More states opting to Robo-Grade' Student Essays by computer," argues that rob-graders (robots used for grading students' papers) are increasingly used to grade students' essays mainly in Utah, Ohio and soon Massachusetts to follow (Brad Rose Consulting, 2019). Similarly, a research professor at Colorado University named Peter Foltz says they have AI techniques that can judge up to 100 features and that grading essay is highly accurate (Brad Rose Consulting, 2019). In short, artificial intelligence is playing a more prominent role in the evaluation and classification of higher education in the United States of America. Though the above studies are valuable from different perspectives in addressing the role of AI in grading and assessing the learner and facilitating the role of the instructor, a critical thinker would not fail to pose the following questions: What about bias in marking reports? Who would guarantee that AI is fair and objective? What about the human side of the learning process and assessment? Will AI consider the psychology of learner grading or assessing a paper?

AI Impact on Future Careers of Graduates

AI affects the world of education, but it also seems restricted to this area and follows the learner even after graduation. For instance, according to Wang and Siau (2017), AI will impact the future job market of required skillsets. It will replace many other studies that involve routine tasks and structures that are easy to automate instead of unstructured disciplines that require complex cognitive interference (Wang & Siau, 2017). AI or computer assessment is not limited to grading papers but can be the gateway to a future career. For instance, a human may not read CVs but be screened by an algorithm specialised in candidate shortlisting. As an example, in an article by the Economist entitled "How algorithms may decide your career: getting a job means getting past the computer", it is reported that the largest

firms are now using computer programs or algorithms to select candidates with an applicant tracking system (ATS) which can reject up to 75% of candidates. The above policy pushed applicants to use keywords to maximise screening interests (Brad Rose Consulting, 2019). Vodafone and Intel are not satisfied with shortlisting CVs but instead use a computer-driven visual interviews service called "HireVue" to further select candidates. In this process, AI analyses facial expressions and language patterns and decides to pass or fail the applicant (Brad Rose Consulting, 2019). According to a study by Frey & Osborne (2013), the number of jobs at risk that will be computerised and include advances in robotics and machine learning is roughly 47% of US total employment (Frey & Osborne, 2013). Likewise, Dizikes (2020) refers to research conducted by Daron Acemoglu and Pascual Resrego from MIT University that each added robot replaces 5.6 workers, almost equal to six people (Dizikes, 2020). Similarly, similar research conducted by Ma & Siau (2018) of Oxford University argues that within the next 20 years, around 47% of jobs in the United States of America and almost 54% in Europe are at risk due to AI (Ma & Siau, 2018). Additionally, the latter researchers at Oxford University forecast that AI will write high-school essays by 2026, write best-selling books by 2049, translate languages by 2024 and perform surgeries by 2053. Chin (2018) from Hong Kong University argues that there are overlooked AI examples or less obvious ones such such as translation machines that enable you to speak to anyone with any language instantaneously. Chin (2018) added that JPMorgan Chase and Co use a learning machine that deals with loan agreement processes and saves 360 000 hours of work by accountants and lawyers (Chin, 2018). Although all the values stated above about how AI is creeping into the career world, Ma and Siau (2018) criticise these aspects arguing that when it comes to soft skills such as empathy, communication, collaboration, innovation, critical thinking, problem solving, and leadership, AI is not as robust as human cognitive ability (Ma & Siau, 2018). Both researchers reinforce their views by suggesting that higher institutions should provide soft and hard skills such as maths, IT, and engineering while training students. They think AI may not be capable of affording these skills for future business careers (Ma & Siau, 2018). Although computer-driven screening is believed to avoid biases in the traditional recruitment process, AI is not bias-free. That algorithm can favour candidates with time and money to continually re-tool their resumes (Brad Rose Consulting, 2019). To end the conflict with a culminating result, Chin (2018) argues that citizens of the new world order require new skills.

These skills should include interpersonal skills such as adaptability, critical thinking, conflict resolution capabilities, and other cognitive skills. Steve Jobs thinks, 'It is technology married with the liberal arts, married with the humanities that yields us the results that make our heart sing' (Henn et al., 2005). How would higher education impact AI? Undoubtedly, the world is getting more innovative, and AI has rehabilitated our world by putting natural languages and data by enabling Siri, Netflix, Facebook, Google, Alexa, Amazon, and many other platforms as part of our daily life (Oblinger, 2018). However, the question arises: How will higher education affect AI? This research paper will address these issues from the two focal points of ethics and cognition as answers to these issues.

Cognitive and ethical impacts of higher education on AI

Dealing with ethics in AI is a lecturer in learning science and innovation at the Institute of Educational Technology in the UK. Holmes (2018), discussing the impact of AI on education, raised the importance of adopting ethics in AI education. The same lecturer argues that whether we like it or not, AI is being deployed in higher institutions worldwide and significantly impacts the future of higher education. Similarly, he adds that by 2024 the global AIED market will be worth 4.5 billion pounds. Companies such as Google, Facebook, and Amazon invest millions of dollars in developing AI in education (Drabwell, 2018). However, Holmes (2018) believes that 'adaptive' or 'personalised' ethical learning systems are not entirely taken into account. He also stressed that there is a 'moral vacuum' without guidelines, policies, regulations, or research done to stress the specific ethical issues raised by AI in education (Holmes, 2018). The question is not a question of data for him, but instead is an issue of morality and that is why he asks: "How can we be sure that the data are accurate, who owns and controls the data, and how is student privacy maintained?" According to Holmes (2018), AIED ethics should not be reduced to questioning data and controlling

the potential of bias that is incorporated in AIED computational approaches, algorithms, and the decisions taken by the AI's deep neural networks that are not quickly inspected and that he describes as "known unknowns" (Holmes, 2018)." Whether anyone likes it or not, AI has quietly entered the university campus, but little attention has been paid to ethics. To give just one example, what happens if a student is subjected to a limited set of algorithms that impact negatively and incorrectly on their assessments?" What is inferred from this study is that higher education should give more importance to the ethical part while teaching AI. To address the ethical issue of AI, and as an example, Open University in the UK conducted workshops involving researchers around the world on AIED in 2018 at the AI in Education International Conference. Participants considered the importance of doing empirical work to address systematic biases in learning machine models and create impenetrable algorithm black boxes and AI ethics-driven courses. Therefore, Open University started using "Chatbots", an internet-based program designed to simulate conversation with users.

Communicates through text messages through websites, applications, or instant messengers to support students and staff (Drabwell, 2018). Likewise, higher education institutions should think of security and privacy issues. When it comes to AI, these burning issues, despite the rosy promises of AI humans, have to address this ethical issue, with intelligent systems monitoring our faces 24 hours a day with only a few elements of our private life remaining untouched. Are there legal frameworks, policies, or ethical codes to control the brutality of AI? Moreover, we should consider robot cops and their ability to kill and hold them without human ethics. AI raises many social issues that are more complex than technological ones, such as ethics, privacy, and inequality, which entails that we need STEM and technology graduates and graduates who are deeply grounded in humanities and arts. With liberal arts education, intellectual and ethical growth will be an opportunity that integrates compassion, civicminded citizens, responsibility, and ethics.

Cognitive impact of higher education on AI

Thinking cognitively, AI has made it a present-day reality that imitates humans in many functions such as language translation, medical diagnostics, and decision making. If humans interact, analyse, deduce, think logically, and reason contextually, AI performs these actions artificially based on powerful computers, high-speed internet connections, algorithms and extensive real-time data (Chin, 2018). However, unlike humans' AI performs fixed and domain-specific tasks with unmatched learning speed, extensive data, excellent efficiency and unlimited computing capacity. On the contrary, humans learn flexibly, pose, and solve issues creatively, think critically, and innovate adaptively (Chin, 2018). Despite the above facts about humans, AI, deep learning, and ample data supply, AI has surpassed average human performance in manufacturing automation and face recognition. For example, it is expected to perform enormous tasks (Chin, 2018). Professor Ronald T Chin relates a story of two robots trained to communicate at a sophisticated level. They were found later speaking to each other in a language they had developed, which spooked the scientist and caused him to shut down the project. Therefore, AI may not be as cooperative as expected (Chin, 2018). Here lies the question, what have higher education institutions done to monitor and control the cognitive wilderness of AI? The issue is not creating a sophisticated language that humans would not grasp, but more than that. Even more astonishing is that their idea of embedding AI in human intelligence is forthcoming. Scientists think of hardwiring human brains to implant a neuro-electronic chip into human heads, enabling communication via voice or texts through the cloud to brain signals that connect the internet (Chin, 2018).

Recently in 2017 and in many TV talk shows around the world, a humanoid robot named Sophia developed in Hong Kong dazzled audiences by officially joining a recent United Nations Summit as a list to address issues of inequality and said: "The future is already here. It is not very evenly distributed. If we are smarter and focused on win-win results, AI could help to efficiently distribute the existing resources of the world, such as food and energy" (Guardian News, 2017). Again, where is the role of the higher institution in creating a boundary for empowering the AI with

highly sophisticated cognitive skills that transgress the human mind and frees itself from the human aspect as the robot killer and robot cop and perhaps much more? Against this tremendous growth in the AI world, one should not forget that progress has been made by improving people and not improving machines, as the science fiction author Tchaikovsky (2018) argues. In short, this statement empowers humans over AI because any cognitive intelligence AI owns, first of all, is inherited or programmed by a human mind that can ultimately control this potential (Chin, 2018).

RESEARCH GAP

Here are some research gaps related to the impact of AI on higher education that you could explore in your research paper:

1. **Ethical Implications**: Investigate the ethical considerations and implications of using AI in higher education, such as data privacy, algorithm biases, and the ethical use of student data.
2. **Pedagogical Transformation**: Explore how AI can transform teaching and learning processes in higher education, including personalized learning experiences, adaptive assessments, and AI-driven content creation.
3. **Faculty Training and Support**: Examine the challenges and opportunities in training faculty members to effectively integrate AI technologies into their teaching practices, including issues related to skills development and resistance to change.
4. **Student Engagement and Experience**: Study the impact of AI on student engagement, satisfaction, and learning outcomes, considering factors like AI-based tutoring systems, virtual assistants, and interactive learning platforms.
5. **AI Governance and Policies**: Analyses the existing governance frameworks and policies governing the use of AI in higher education institutions, and propose recommendations for addressing regulatory gaps and ensuring responsible AI deployment.
6. **Impact on Workforce and Job Market**: Explore the potential effects of AI adoption in higher education on the workforce, job market dynamics, and the skills needed for future careers, including discussions on upskilling and reskilling initiatives.
7. **Equity and Inclusivity**: Investigate how AI can contribute to addressing equity and inclusivity challenges in higher education, such as reducing disparities in access to education, supporting diverse learning needs, and promoting inclusive teaching practices.

These gaps can serve as a starting point for further research and exploration into the multifaceted impact of AI on higher education.

RESEARCH METHODOLOGY

The integration of Artificial Intelligence (AI) technologies in higher education has garnered significant attention due to its potential to revolutionize teaching, learning, and administrative processes. This research aims to investigate the impact of AI on higher education institutions (HEIs) and their stakeholders, focusing on the challenges, opportunities, and implications of AI adoption.

Research Design: This study adopts a mixed methods approach to gather comprehensive insights into the AI impact on higher education. The research design includes both quantitative and qualitative methods to triangulate findings and enhance the validity and reliability of the results.

Sampling: The sampling frame comprises HEIs across diverse geographical locations, including universities, colleges, and technical institutions. A stratified random sampling technique will be employed to ensure representation from different types of institutions, sizes, and academic disciplines. Additionally, key stakeholders such as faculty members, students, administrators, and AI experts will be included in the study.

Data Collection:

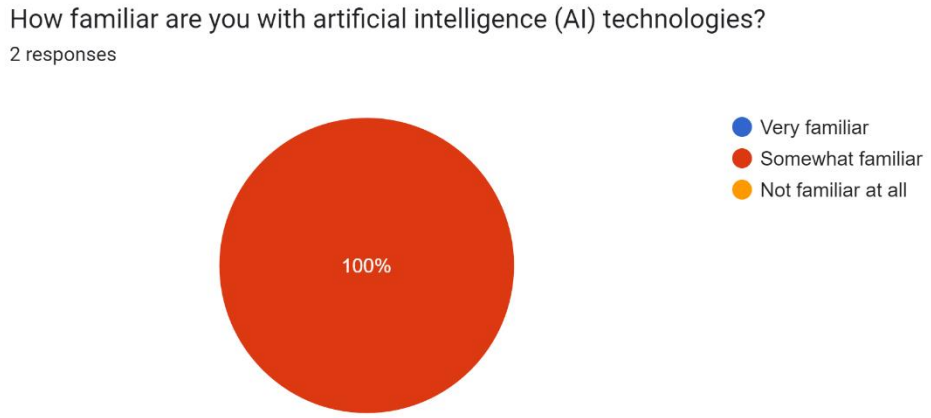
1. Survey Questionnaire: A structured survey questionnaire will be developed to collect quantitative data from stakeholders. The questionnaire will include Likert-scale questions to assess perceptions, attitudes, and experiences regarding AI adoption in higher education. It will also inquire about the perceived benefits, challenges, and readiness of HEIs in integrating AI technologies.
2. Interviews: Semi-structured interviews will be conducted with key informants, including HEI administrators, faculty members, AI experts, and students. The interviews will explore in-depth insights, experiences, and opinions on AI's impact on teaching, learning, research, and administrative processes in higher education.
3. Document Analysis: A comprehensive review of academic literature, reports, policy documents, and case studies related to AI in higher education will be conducted. This document analysis will provide contextual background and theoretical frameworks for interpreting the research findings.

Data Analysis: Quantitative data from the survey will be analyzed using statistical tools such as descriptive statistics, correlation analysis, and regression analysis to identify patterns, trends, and relationships among variables. Qualitative data from interviews and document analysis will be subjected to thematic analysis to identify emerging themes, patterns, and narratives related to AI's impact on higher education.

Ethical Considerations: Ethical guidelines will be strictly adhered to throughout the research process. Informed consent will be obtained from participants, and their confidentiality and anonymity will be maintained. The research will also consider the ethical implications of AI technologies in higher education, including issues of bias, privacy, and equity.

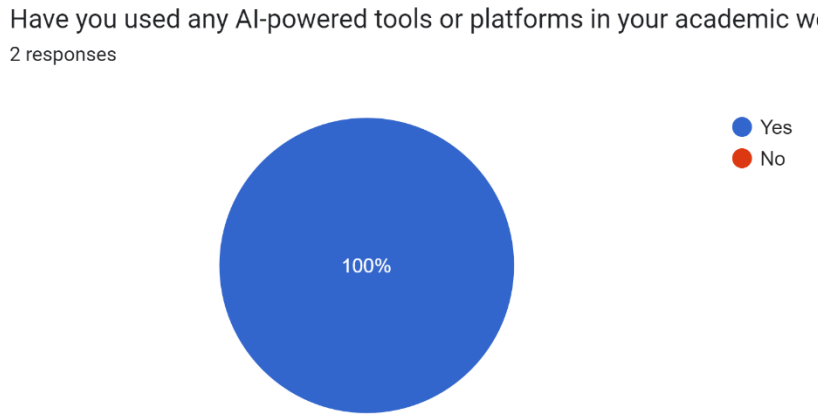
DATA ANALYSIS

1.



This question aims to gauge respondents' levels of knowledge and experience with AI, providing insights into the general awareness and understanding of AI technologies among the survey participants

2.

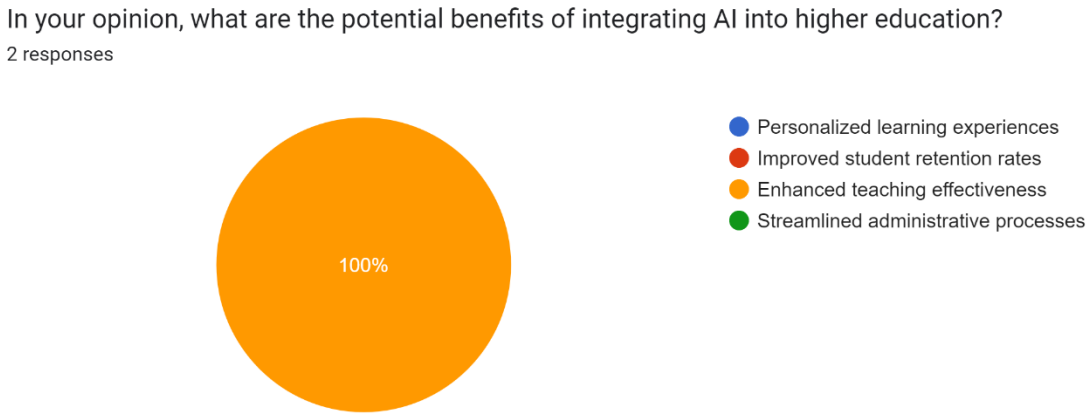


This survey question aims to gather information about the respondents' use of AI technology in their academic endeavors. The responses to this question can provide insights into the prevalence and adoption of AI tools in various academic disciplines. Key points to consider in analyzing the responses include:

1. **Adoption Rate:** The percentage of respondents who have used AI tools or platforms can indicate the level of adoption and acceptance of AI technology in academia.
2. **Types of Tools:** Understanding the specific AI-powered tools or platforms used by respondents can reveal the diversity of applications within academic work, such as research, data analysis, natural language processing, and machine learning.

3. **Benefits and Challenges:** Follow-up questions can delve into the benefits experienced or challenges faced by users of AI tools in academia. This can include improved efficiency, enhanced research capabilities, data security concerns, ethical considerations, and accessibility issues.
4. **Future Trends:** Insights from this survey question can also inform future trends in academic technology adoption, highlighting areas where AI integration is growing and where further development or support may be needed

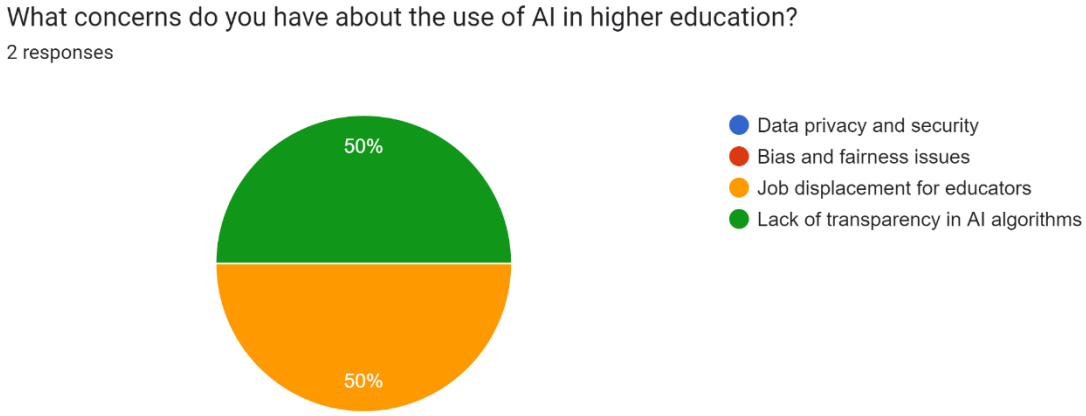
3.



1. **Personalized Learning:** AI can analyz student data to personalize learning experiences, adapting content and pacing to individual needs, thus improving student engagement and learning outcomes.
2. **Efficiency and Automation:** AI can automate administrative tasks like grading, scheduling, and course planning, freeing up educators' time for more interactive and meaningful interactions with students.
3. **Data-Driven Decision Making:** AI analytics can provide insights into student performance, dropout prediction, and course effectiveness, enabling institutions to make data-driven decisions for continuous improvement.
4. **Accessibility:** AI-powered tools can enhance accessibility by providing real-time language translation, text-to-speech, and other assistive technologies, ensuring inclusivity for diverse learners.
5. **Research and Innovation:** AI can accelerate research processes, facilitate data analysis, and support innovative teaching methods, contributing to advancements in knowledge and pedagogy.

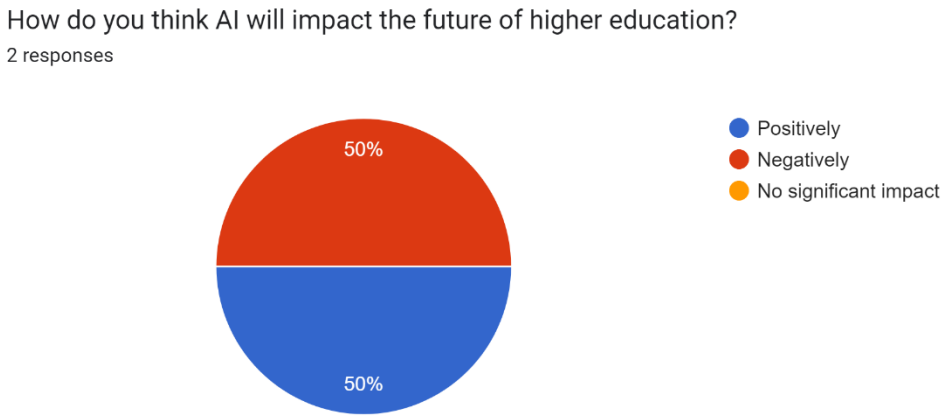
This survey question could be assessing respondents' perceptions of these potential benefits, their level of awareness or experience with AI in education, and their expectations regarding the impact of AI on higher education. Analyz responses could provide insights into the readiness of stakeholders (educators, students, administrators) for AI integration and highlight areas for further exploration or support in implementing AI initiatives in higher education.

4.



1. **Ethical Concerns:** AI systems might make biased decisions or perpetuate existing biases in education, leading to unfair outcomes for students.
2. **Job Displacement:** There may be concerns about AI replacing certain roles traditionally performed by humans, such as teaching assistants or administrative staff.
3. **Data Privacy and Security:** AI systems rely on vast amounts of data, raising concerns about data privacy and the security of sensitive information.
4. **Lack of Human Interaction:** Over-reliance on AI could reduce opportunities for meaningful human interaction, which is crucial for learning and development.
5. **Transparency and Accountability:** Understanding how AI systems make decisions (transparency) and ensuring accountability for those decisions are ongoing challenges.
6. **Accessibility:** Ensuring that AI technologies are accessible to all students, including those with disabilities, is another important concern.

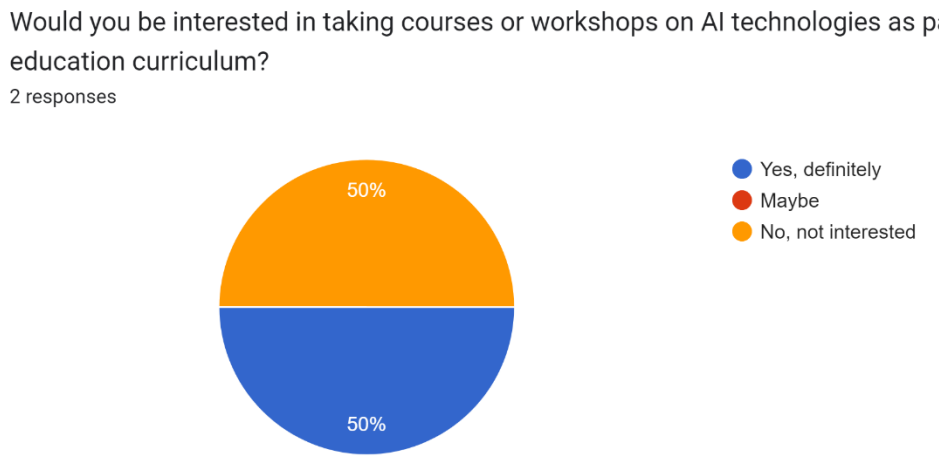
5.



1. **Personalized Learning:** AI can analyz students' learning patterns and preferences to tailor educational content and pace, enhancing learning outcomes.
2. **Efficient Administrative Tasks:** AI-driven systems can automate administrative tasks like grading, scheduling, and data analysis, freeing up time for educators to focus on teaching and research.
3. **Adaptive Assessments:** AI-powered assessments can provide real-time feedback and adapt to students' skill levels, enabling more accurate and effective evaluation of learning progress.
4. **Enhanced Research:** AI tools such as natural language processing (NLP) and machine learning (ML) algorithms can assist researchers in data analysis, literature reviews, and generating insights from vast amounts of information.
5. **Accessibility:** AI-enabled platforms can improve accessibility for students with disabilities through features like speech recognition, text-to-speech, and adaptive learning interfaces.

However, challenges such as data privacy concerns, ethical considerations in AI usage, and the need for upskilling educators to leverage AI effectively must be addressed for AI's full potential to be realized in higher education.

6.



I would be interested in taking courses or workshops on AI technologies as part of my higher education curriculum. Analyz this survey question can reveal several insights:

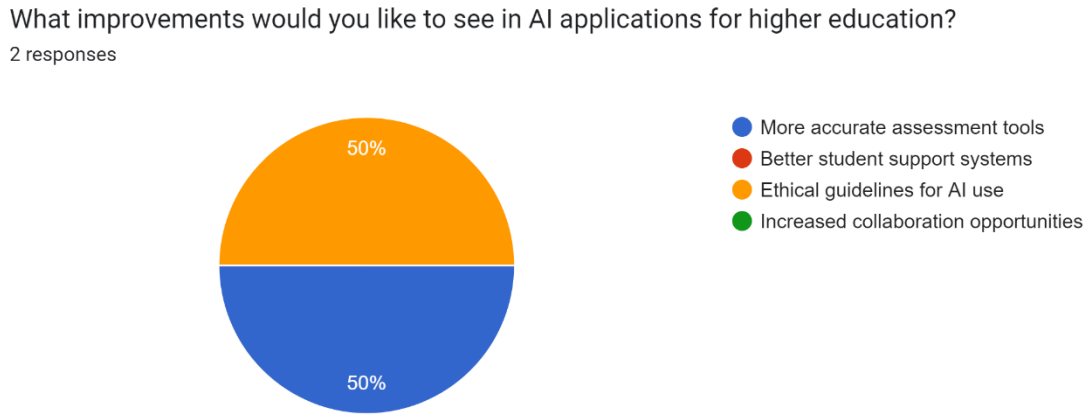
1. **Interest in AI Education:** The question directly assesses the respondent's interest in AI technologies, indicating a potential demand for AI-related courses and workshops.
2. **Relevance of AI in Education:** By including AI technologies in the curriculum, educational institutions can align with the current trends and prepare students for the evolving job market, where AI skills are increasingly in demand.
3. **Skill Development:** Offering courses or workshops on AI can help students develop valuable skills in areas such as machine learning, data analysis, and AI application development, enhancing their competitiveness in the workforce.

4. **Innovation and Future-readiness:** Incorporating AI education reflects a commitment to innovation and staying updated with technological advancements, positioning the institution and its graduates as forward-thinking and future-ready.

5. **Diversity of Learning Preferences:** Some students may prefer traditional courses, while others might favour workshops or hands-on projects. Offering a mix of formats can cater to diverse learning preferences and maximize engagement.

Overall, the survey question suggests that integrating AI technologies into higher education can be beneficial in meeting student interests, addressing industry demands, and fostering innovation and skill development.

7.



Improvements in AI applications for higher education can greatly enhance the learning experience and overall effectiveness of educational institutions. Here's a small analysis on this survey question:

1. **Personalized Learning:** AI can be utilized to create personalized learning experiences tailored to individual student's needs, preferences, and learning styles. This can lead to improved engagement, retention, and academic performance.

2. **Adaptive Assessment:** AI-powered assessment tools can provide real-time feedback to students and instructors, allowing for continuous improvement and targeted interventions where needed. This can help in identifying areas of strength and weakness more effectively.

3. **Efficient Administrative Processes:** AI can streamline administrative tasks such as course scheduling, grading, and resource allocation, freeing up time for educators to focus more on teaching and student support.

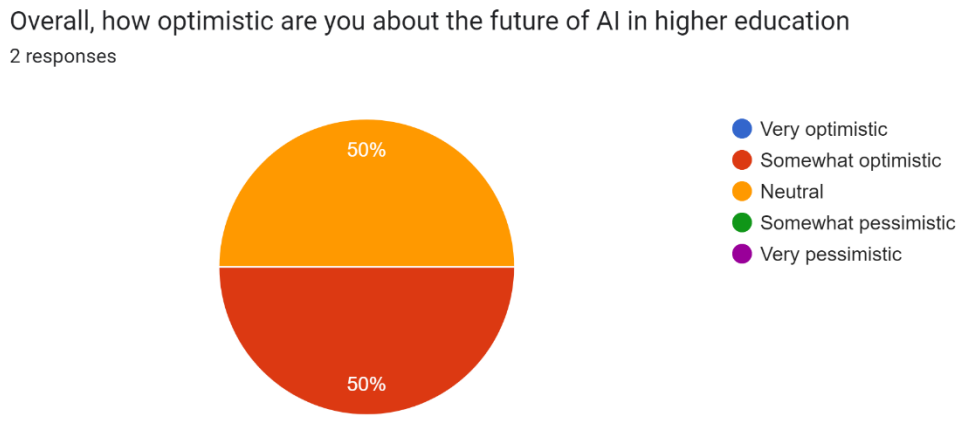
4. **Data Analytics for Decision-Making:** AI-driven data analytics can provide insights into student performance trends, learning outcomes, and areas for curriculum enhancement. This data-driven approach can lead to informed decision-making and continuous improvement of educational programs.

5. **Enhanced Accessibility:** AI applications can improve accessibility for students with disabilities by providing tools such as text-to-speech, voice recognition, and personalized learning interfaces.

6. **Ethical AI Usage:** Ensuring ethical use of AI in higher education is crucial, including transparency in algorithms, data privacy protection, and addressing bias in AI systems to ensure fair and equitable outcomes for all students.

These improvements can contribute significantly to creating a more inclusive, engaging, and effective learning environment in higher education institutions.

8.



The survey question "Overall, how optimistic are you about the future of AI in higher education?" aims to gauge respondents' attitudes towards the potential impact of AI in the higher education sector. Here's a small analysis of this question:

1. **Positive Responses:** Positive responses, indicating optimism about the future of AI in higher education, may suggest that respondents believe AI can enhance teaching and learning experiences, improve administrative processes, and contribute to personalized education.
2. **Neutral Responses:** Neutral responses may indicate a cautious or uncertain stance. Respondents might acknowledge the potential of AI but may have reservations or lack specific insights into its future implications.
3. **Negative Responses:** Negative responses may reflect concerns about the use of AI in higher education. This could stem from fears of job displacement, ethical considerations, biases in AI algorithms, or uncertainties about the overall impact on education quality.

Analyz the distribution of responses across these categories can provide insights into the prevailing sentiments and concerns regarding AI's role in shaping the future of higher education.

RESEARCH OBJECTIVE

1. Assess the current adoption and utilization of AI technologies in higher education institutions, including the types of AI applications being used, their effectiveness, and the challenges faced in implementation.
2. Investigate the impact of AI on teaching and learning processes in higher education, examining how AI-powered tools and platforms influence student engagement, personalized learning experiences, and academic outcomes.
3. Analyz the implications of AI on the workforce and job market in higher education, exploring the roles of AI in administrative tasks, curriculum development, student support services, and the potential for job displacement or creation among educators and staff.

DISCUSSION

1 AI impact on the learning and teaching process

The impact of AI on higher education is made clear as 79% of the participants think “Yes” compared to 19% who think “Maybe” and only 2 % who contradict the idea by saying “No”. These results support what was discussed earlier in the literature review (Rexford, 2018) in reinforcing the idea that AI will significantly impact the future of higher education (Tuomi et al., 2018). Likewise, regarding the efficiency of AI in learning and teaching, a big part of the participants believe that AI is more efficient than humans: 43 % strongly agree, and 15% agree with this idea, in contrast with 7% who strongly disagree, 10% who disagree, and 25 % are neutral. Again the results agree strongly with Brad Rose's thoughts (Brad Rose Consulting, 2019) and discussed earlier in Mahana, Johns and Apte (2012).

2 Impact of AI on the assessment and classification process

Similarly, regarding AI's efficiency, accuracy, and objectivity in assessing learners, results reveal that the majority agree with this point, as 25% strongly agree and 50% agree, compared to 10% strongly disagree, 4% disagree, and 1 % who are neutral. The findings agree with Brad Rose's (2019) perceptions about AI's efficiency in grading and accuracy (Brad Rose Consulting, 2019). The results agree with what Brad Rose Consulting (2019) believes and Chin (2018) believes.

3 AI Impact on Future Careers of Graduates

The last point concerns the impact of AI on students’ future careers. The findings say that those who think it will negatively impact future careers of students are as follows: 54 % believe it will positively impact them. In comparison, 43% believe positively and negatively, and 3% think that AI will negatively impact future careers. Therefore, the findings agree again with what was discussed in the literature review by Global Business Outlook (2018) and Chin (2018). Additionally, regarding the recruitment process using AI, the findings reveal that the majority of the majority of the majority of the majority of the most substantial prefer a manual method with a percentage of 54%, compared to a minority choosing an artificially intelligent approach with a percentage of 3%, and this is an example that justify their choice: “I prefer to be assessed by a human because a human can understand what you mean more than a robot. For example, in exams, students can write an answer that makes sense but is not available in the book so that the robot can mark that as a wrong answer, but the human will mark it as a right answer. ' The latter results contradict what was discussed in the literature review, as researchers think that automation will be used in interviewing and shortlisting candidates (Wang & Siau, 2017) and (Global Business Outlook, 2018).

Similarly, 77% of participants prefer a human to 23 % who fancy robots being interviewed by robots or humans. This finding is not reflected deeply in Frey and Osborne's (2013 think) and is used nowadays by Vodafone and other organisations, as mentioned earlier in the literature review. Finally, concerning the necessity to learn new skills to meet the requirements of the AI era, the findings reveal that 83% of the participants think 'Yes'. In comparison, 15% assume “Maybe”, and only 2% feel “No.” Therefore, the results agree strongly with what was discussed in the literature review that higher education institutions should prepare learners for the new world order of AI (Frey and Osborne, 2013).

4. Cognitive and ethical impacts of higher education on AI

Regarding the impact of higher education on AI ethically, humanly and cognitively, 49% of the participants think higher education should impact the human, cognitive and ethical aspects. However, 21% of the contributors believe in the human element compared to 18% who favour cognitive abilities as a second priority, and only 12% thought ethically. The findings reveal a significant concern with all aspects together, which is in harmony with what was raised earlier in the literature review in that AI should go hand in hand with ethics, as Chin (2018) (Chin, 2018) argues when he talked about liberal arts, humanity and AI combination. Not only Chin (2018) raised this point but also Guardian News (2017) and the example of human-robot talking about equality in the world, as well as Holmes (2018) as he focused a lot on putting ethical rules for AI.

CONCLUSION

The rise of AI makes it impossible to ignore a serious debate about its future role of teaching and learning in higher education and what type of choices universities will make in regard to this issue. The fast pace of technology innovation and the associated job displacement, acknowledged widely by experts in the field (source), implies that teaching in higher education requires a reconsideration of teachers’ role and pedagogies. The current use of technological solutions such as ‘learning management systems or IT solutions to detect plagiarism already raise the question of who sets the agenda for teaching and learning: corporate ventures or institutions of higher education? The rise of techlords and the quasi-monopoly of few tech giants also come with questions regarding the importance of privacy and the possibility of a dystopian future. These issues deserve a special attention as universities should include this set of risks when thinking about a sustainable future.

Moreover, many sets of tasks that are currently placed at the core of teaching practice in higher education will be replaced by AI software based on complex algorithms designed by programmers that can transmit their own biases or agendas in operating systems. An ongoing critique and inquiry in proposed solutions stay critical to guarantee that universities remain institutions able to maintain civilization, promote, and develop knowledge and wisdom.

In effect, now is the time for universities to rethink their function and pedagogical models and their future relation with AI solutions and their owners. Furthermore, institutions of higher education see ahead the vast register of possibilities and challenges opened by the opportunity to embrace AI in teaching and learning. These solutions present new openings for education for all, while fostering lifelong learning in a strengthened model that can preserve the integrity of core values and the purpose of higher education.

We consider that there is a need for research on the ethical implications of the current control on developments of AI and the possibility to wither the richness of human knowledge and perspectives with the monopoly of few entities. We also believe that it is important to focus further research on the new roles of teachers on new learning pathways for higher degree students, with a new set of graduate attributes, with a focus on imagination, creativity, and innovation; the set of abilities and skills that can hardly be ever replicated by machines.

Reference

RodríguezHernández,C.F.,Musso,M.,Kyndt,E.,&Cascallar,E.(2021).Artificialneuralnetworksinacademicperformanceprediction:Systematicimplementationandpredictorevaluation.ComputersandEducation:ArtificialIntelligence,2.

Gomede,E.,Gaffo,F.H.,Briganó,G.U.,deBarros,R.M.,&Mendes,L.d.S.(2018).Applicationofcomputationalintelligencetoimproveeducationinsmartcities.Sensors(Switzerland),18(1),1–26.https://doi.org/10.3390/s18010267

Popenici, S.A.D., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. Research and Practice in Technology Enhanced Learning, 12(1).https://doi.org/10.1186/s41039-017-0062-8