Investigating the Effectiveness and Ethical Considerations of AI Integration in Future Learning Systems

Emmanuel Tawanda Nhamo[1, a *]

[1] Xi'an Technological University, Xi'an, Shaanxi, China

[a]ntawandae@gmail.com

Abstract. This research aimed to investigate the effectiveness and ethical considerations of Artificial Intelligence, "AI" integrations in the future learning systems since it is believed to be the alternative intervention to all questions which surpass human intelligence or understanding. In coherence with a descriptive literature review which targeted the uses of AI and the implications it poses to the educational system; the study utilized a mixed research methodology. This included both quantitative and qualitative approaches through the use of validated interview questionnaires and one on one interviews with participants being of equilibrium in all genders. Data collection was done online from a diverse group of expatriate participants in higher education institutions across China including students and facilitators. It was found that over 84.06 % of students pursuing in higher education use AI as it imposes more positive outcomes than negative yielding greater outcomes. AI contributed highly to more educational successes than failures having 15.94% having had no benefits of it in their learning experience. However, the true success of an educational tool is not in the immediate positive impact but the long-term impact which calls for an analysis of the ethical considerations concerning academic integrity, data privacy, and equitable access to AI technologies with approximately 59% of the participants worrying about the privacy and security of their personal data while using AI. This highlighted mistrust between user and service provider which is alarming and escalates the urgent need for ethical considerations and privacy policy establishment that promote responsible AI integration for a brighter future. Moreover, the research highlights that according to statistics 44.93% of participants have sorely admitted to the temptation to cheat in academic assessments using AI which arouses worry as unskilled work forces may be groomed who may or may not be able to reach industrial standards leading to higher consequences. This calls for the need of nurturing a culture of innovation and critical thinking in response to the opportunities and challenges presented by AI in education. The introduction gives more detail on the effects of AI and its ethics in the educational system.

Keywords: Artificial Intelligence (AI); Ethical Considerations; Effectiveness; Academic Integrity; Higher Education; AI-driven chatbots; Ethical AI development.

1. Introduction

Throughout history, technology has been the pivot and transformed the educational sector to what it is today beginning in the 15th century, with the invention of the printing press which led to the distribution of millions of books around the world, and this took humanity a step closer to global literacy. Afterward, there were film projectors, and in the 20th century, digital technologies and connected devices. Each of these milestones enabled "easier access to knowledge" and contributed to the widespread of literacy. These changes have, in a way, contributed to creating the necessary preconditions for a new approach to education characterized by "interactive multimedia resources, online learning platforms, and mobile devices bypassing geographical boundaries" so that educational materials could be accessed instantly across the globe in real time.

As of 2024, the educational field totally relies on modern technology with a few exceptions of third world countries that are still lagging behind in technology. In the recent years, we have witnessed the rapid introduction and adoption of a more powerful technology, Artificial Intelligence (AI) which is equipped with technological advancements that offer personalized learning experiences tailored to individual requirements to promote deeper understanding and knowledge

acquisition, and intelligent tutoring systems that offer real-time assistance through challenging concepts.

This new technology has proven that's its not only beneficial to students but also to educators, offering remarkable opportunities to enhance instructional practices, automate administrative tasks, and make data-informed decisions. AI analytics provide insights into student performance trends, enabling educators to personalize instruction, identify at-risk students, and optimize learning outcomes. Furthermore, AI-driven professional development resources support educators in continuously refining their teaching strategies and adapting to evolving educational trends.

While we have seen the high level of promise AI carries for the educational sector, there are significant ethical concerns and challenges regarding data privacy, equity, and the role of educators in the learning process that require that have also been raised. To get the best out of this novel technology while mitigating drawbacks, we need to focus on protecting privacy of users and collected data, promote equal access of AI to everyone and also promote the ethical use of AI.

This paper aims to explore the effectiveness and ethical implications of AI integration in the future of learning. Through a comprehensive investigation, the paper seeks to shed light on the opportunities and challenges of AI-driven education and provide insights to inform future research, policy, and practice. In order to guide the research, we pose the following research questions:

Question1: How do AI technologies impact student learning outcomes and educational experiences? Question2: What ethical considerations arise from the integration of AI in educational settings? Question3: How can these considerations be addressed to ensure the smooth integration of AI into higher education without endangering the future?

These questions will serve as a framework for examining the diverse perspectives of AI integration in education and identifying strategies for maximizing its benefits while mitigating potential risks.

2. Literature Review

Artificial Intelligence refers to the area of computers that mimic human cognitive processes, such as learning, reasoning, solving problems, and decision-making. The potential benefits and the challenges AI poses in educational institutions have of late gained much focus by researchers, educationists, and policymakers. This literature review attempts to compile current research. It explores various dimensions of AI integration into education regarding its effectiveness, ethical considerations, and implications for teaching and learning practices.

2.1 Effectiveness of AI Integration. Several studies have shown how AI-enhanced educational technologies can achieve increased learning outcomes. For instance, Wayne Holmes, et al [1] believe that AI-driven assessment systems would be able to offer timely feedback to students, precise in content sufficiently for corrections on the work of students to be made early enough to help readjust their grasp of topics in time. AI chatbots are also starting to support students with 24/7 on-the-spot help in their studies by breaking down any subject complex explanation, or answering questions. From the survey by Lourdes Guardia, et al [2] the use of AI in schools and any other institution significantly cuts down time used in administrative work as these systems drastically raise effectiveness and proper use of available resources in carrying out routine tasks.

2.2 Ethical Considerations. Despite the promise of AI in education, ethical considerations loom large in discussions surrounding its implementation. A blog by Kelly Nat [3] provides an overview of current ethical implications, including accuracy, misinformation, plagiarism, and the "black box" effect. He also discussed some potential benefits that AI brings to academia. Chaudhry et al [4] proposed that the goal of AI in Education is not to promote AI but rather to support education hence awareness of ethics should be advocated from the pipeline development of AI-driven systems to avoid drawbacks such as discrimination against certain groups due to data deficiencies and stigmatization resulting from relying on machine learning models that utilize the one-size-fit-all approach to learners from different demographics. His argument is based on the fact that AI systems are only unbiased as the data they're trained on therefore unbiased data should be used to train AI systems. This is also supported by Dastin J [5] in his book the ethics of data and analytics, he

reiterates that Al learns from historical data, but we still have to see if the historical data is not biased. Kooli C [6] suggests implementing anti-cheating measures to address concerns related to academic integrity and the misuse of AI-driven resources in assessments, reinforcing the importance of ethical conduct among students.

2.3 Implications for Teaching and Learning. The integration of AI in education has profound implications for teaching practices and instructional design. Bobby Hristova's [7] recent newspaper article highlights some schools' vigilance against the usage of AI programs such as ChatGPT by students and staff to conduct work. Kumar D, et al [8] argued that traditional educational models utilize the one-size-fits-all approach whereas AI enabled systems offer individually targeted instruction and personalized feedback and also save time for educators by providing objective and consistent grading, while minimizing potential biases based. While most researcher agree on the positive impact of AI in education, Frieder S, et al [9] argues that despite numerous favorable portrayals in the media regarding the exam-solving capabilities of GPT-4 and ChatGPT, potentially influenced by selection bias, their overall mathematical performance is notably inferior to that of a graduate student hence it shouldn't be relied upon as the sole teaching medium. This aligns with Kooli C's [6] emphasis on viewing AI systems and chatbots as aids rather than substitutes for human expertise and creativity.

while AI integration in education offers promising benefits, it is crucial to address ethical considerations and recognize AI as a supportive tool in the teaching and learning process. Continued research and thoughtful implementation are essential to harnessing the full potential of AI in education while mitigating risks and upholding ethical standards.

3. Methodology

3.1 Ethical Considerations. To fully investigate the effectiveness of AI in future learning systems and explore the associated ethical considerations, this study employed a mixed-methods approach. An explanatory and Interpretivist in nature research, with a combination of qualitative and quantitative methods allowed for a comprehensive understanding of the research topic, and the research questions while capturing both subjective and objective experiences and outcomes.

3.2 Participants. Participants were recruited from higher education institutions in China, including universities and colleges. The sample included expats with diverse educational backgrounds, including undergraduates, graduate and doctoral students, as well as educators(facilitators). Efforts were made to ensure representation across genders and academic disciplines to capture a broad spectrum of perspectives.

3.3 Data Collection. Data was collected through an online survey distributed to the participants via WeChat and other various online platforms. The survey consisted of both close-ended and open-ended questions, allowing for the collection of quantitative data as well as qualitative insights into the participants' experiences and perceptions of AI integration in higher education and the ethical considerations to be addressed.

3.4 Instruments. The survey instrument was developed based on review of relevant and recent literature from experts in the field of AI and AI in education. The questionnaires included sections addressing participants' demographics, usage of AI technologies in education, perceived effectiveness of the said AI-driven tools as well as ethical concerns and any suggestion for improvement for a safe digital and AI-driven educational environment and society. To enhance the validity and reliability of the findings, measures such as pilot testing of the survey instrument, ensuring clarity of questions, and employing established data analysis techniques were employed.

3.5 Data Analysis. Descriptive statistics were employed when dealing with quantitative data from the questionnaire responses to examine frequencies and percentages. Qualitative responses from open-ended questions were analyzed thematically using thematic analysis in which the questionnaire responses are grouped into themes, and sub-themes to identify patterns and insights related to the ethical considerations and perceptions of AI integration in higher education.

3.6 Ethical Considerations. Participants were made to understand that participation in the study was completely optional, their responses would be confidential, and all would be used only for this purpose. Anonymity was also kept, since the survey did not collect any personal information of the participants by which someone could identify them. This also meant that it would be virtually impossible for them to withdraw from the study after submitting the survey, thereby securing the integrity of the collected data and ensuring anonymity.

3.7 Limitations. This study is not without limitations, the sample is only of expatriates in China which might not be sizeable enough to generalize to the global higher education context. Moreover, response biases may be introduced by the reliance on self-report data. Future research should try to offer participants a greater level of diversity and also use longitudinal methods to make observations about change over time.

4. Results

4.1 Effectiveness of AI Integration in Education. The first research question explores how AI technologies impact student learning outcomes and educational experiences. In today's digital world, where what was once considered impossible has become possible, the educational field remains a pivotal player in shaping the future generations. Numerous AI-driven technologies mimicking human-like interactions have been introduced, profoundly impacting the educational landscape.

The study surveyed a diverse group of participants to explore the effectiveness of AI technologies in higher education. Responses were collected from individuals with varying educational backgrounds, including Bachelor's, Master's, and Ph.D. degrees, as well as current participants in the higher-level educational setup, either as students or educators (facilitators). The gender distribution among participants was roughly balanced, with both male and female respondents represented.

It was unsurprising that almost all participants had used AI technologies at some point in pursuit of their higher education, with over 97% expressing a 3.91/5 overall satisfaction level with the positive impact and effectiveness of AI-driven learning tools in supporting their learning outcomes. Additionally, most participants reported gaining a better understanding of course material through AI-driven tools than traditional methods.

The survey also revealed that while many people do not use AI as a daily tool yet, its occasional use suggests ample time to address ethical considerations before it becomes a prevalent educational tool like computers. Regarding the impact of AI-driven tools on academic performance, a majority (43.48%) believed that AI significantly improved their academic performance, while others had different beliefs as illustrated on the fig below:

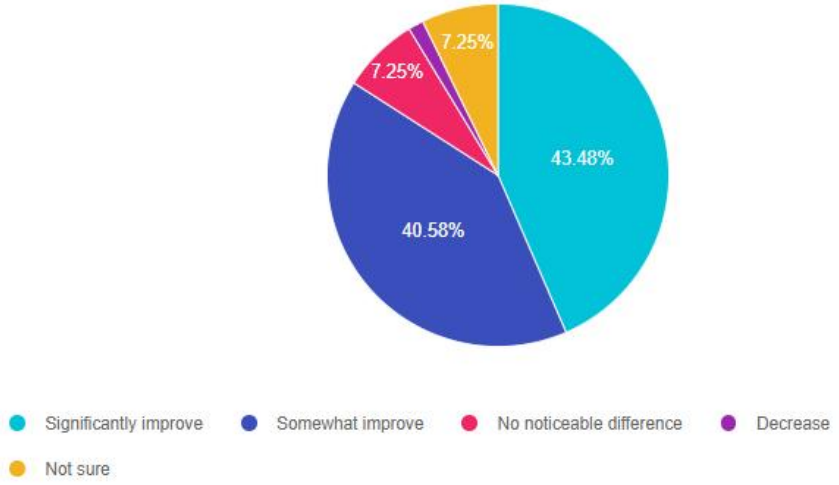

Figure 1. Impact of AI in enhancing academic performance in higher education

While the survey primarily focused on both students and educators, the limited number of educator participants may affect the reliability of the results. However, those who participated

agreed that AI driven tools had a positive impact in various aspects of education such as automating administrative tasks, providing personalized feedback to students, and facilitating differentiated instruction. One associate professor noted AI's ability to simulate some real-world scenarios in the classroom, enhancing theoretical concepts with practical application. Another participant highlighted AI's capacity to analyze vast amounts of educational data to identify patterns and trends in different areas of expertise, but cautioned against over reliance emphasizing the importance of coming up with strategies to foster innovative thinking in academia amidst the revolution of AI.

Overall, AI integration in education has made access to educational resources easier and provided personalized learning experiences. [10] . However, the true measure of success lies in assessing accessibility, inclusivity, long-term impact, and the social and ethical implications of AI in education, which will be further explored in the following section.

4.2 Ethical considerations of AI in Higher education. The second research question investigates the ethical considerations arising from AI integration in educational settings and how they can be addressed to ensure equitable access and protect student privacy. Ashish K. Saxena et al. [11] established the Ethical Observatory for AI in education, outlining a model for responsible technology integration in educational settings with a focus on ethical considerations amidst AI's rapid progress.

The major concern highlighted in the survey was the participants' significant worry with over 59% regarding the privacy and security of their personal data when using AI-driven learning platforms. Additionally, some participants expressed concerns about instances where these systems resulted in unfair treatment or discrimination based on the collected data. One participant's remarks underscored these worries, stating, "I worry about who has my data and what if my data is being misused." These concerns have profound potential consequences, impacting both user trust in AI technologies and exacerbating educational inequities. An educator participant highlighted the troubling trend of AI contributing to existing educational disparities, particularly among marginalized groups, rather than alleviating them. He argued that performance of an individual at a single point in time cannot show trends, improvements, lack of effort or an ability as this would only promote a fixed mindset over growth mindset and AI should do better in that regard. This marks the urgent need for ethical considerations and policy measures to ensure that AI-driven education promotes equity and safeguards user privacy and fairness.

Another ethical consideration raised was the temptation to use AI to cheat or circumvent academic rules, with 53.42% of participants admitting to feeling tempted. Factors influencing this temptation included assignment difficulty necessitated by language barriers between facilitators and students (51.28%), as well as time constraints (25.64%) among other factors as illustrated in the figure below:

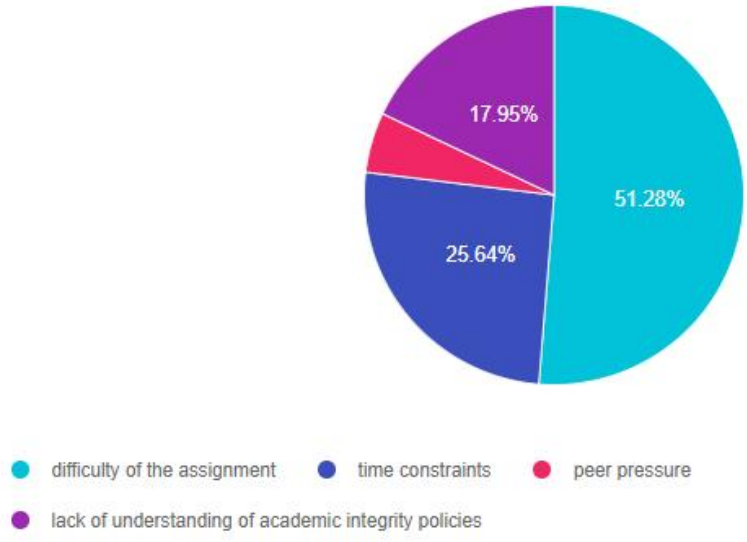

Figure 2. Factors influencing the temptation to use AI in circumventing academic rules

However, the majority of participants (85.71%) reported not acting upon this temptation, suggesting commendable integrity and ethical behavior among students. These temptations have been heightened by the emergence of language-based AI systems known as transformers. These systems, comprise of deep neural networks, designed to process and generate sequences of data, such as text, in a manner similar to human cognition [6]. The rise of such AI technologies like ChatGPT introduces new ethical dilemmas and underscores the importance of promoting academic integrity and ethical conduct in the use of AI-driven tools in education.

A number of students raised concerns about the possibility of their peers using these language-based AI transformers to achieve similar or even superior grades with less effort while some pointed out AI should be accepted as a legitimate aid tool just like the world accepted the use of calculators in mathematics. Participants had varied beliefs as shown in the figure below:

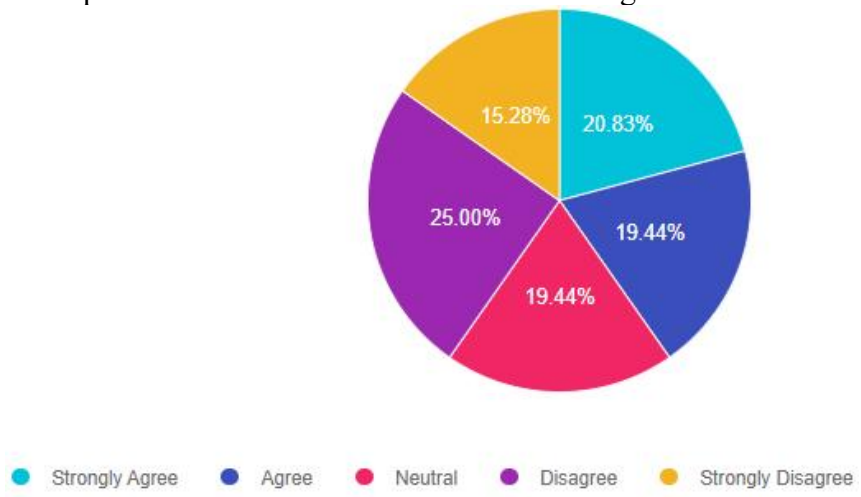

Figure 3. Should students get equal grades despite using AI tools to complete the assignment?

This difference in outcomes, where varied levels of effort produce same results or even better due to AI assistance, not only undermines the fairness and integrity of the educational process but also raises a significant question: what is the purpose of education? Is it not to achieve self-actualization rather than to simply pass exams? And will students that rely so much on AI develop deep understanding and critical skills to be adequately equipped to meet industry standards and expectations once they enter the workforce. There is a genuine worry that a reliance on AI-driven shortcuts during education may hinder the development of critical thinking skills, problem-solving abilities, and practical knowledge essential for professional success.

Moreover, it poses serious ethical questions regarding a workforce that may lack the necessary skills and competencies to value to their chosen fields of work. In this context, the ethical dilemma extends beyond cheating and plagiarism to advance one's academic work to the broader debate around the role of AI in education. It prompts reflection on the responsibility of educational institutions, policymakers, and society as a whole to ensure that AI-driven educational tools are deployed do not promote shortcuts and undermine long-term preparedness but rather promote meaningful learning, skill development, and ethical professional conduct.

To conclude the survey, an overall look on the general perceptions of AI Integration and its Future Implications was carried out and the results are discussed in the following section.

4.3 General perceptions of AI Integration and its Future Implications. In general, participants showed optimism that AI can and will help shape the future of higher education. The findings of the study highlighted all the capabilities of integrating AI in higher education though some issues concerning ethical concerns were raised which are alarming and require immediate intervention. AI driven technologies continue to evolve and shape society however it is important not to only consider its immediate benefits but also consider its long-term consequences on education and society. This leads to the third research question which aimed to examine how the ethical concerns can be addressed in order to facilitate AI integration into higher education.

The study found out that most participant's concerns were on the equitable access to AI tools as well as the ethical concerns for both its users and AI system developers. To address these concerns, in my own opinion educational institutions need to invest in infrastructure and support services that can ensure a more justifiable approach to AI especially for stigmatized communities. In addition, educators, policy makers and AI developers should work in collaboration to balance innovation with ethical obligations. This can be attained by passing policy frameworks that focus on protecting students' privacy and also maintaining existing dignified educational practices in higher learning institutions.

Another participant highlighted how crucial it is to recognize pre-existing cultural approaches and the diversity of learners who use AI technologies suggesting that AI developers should consider local cultures, languages and norms. It is therefore important to make sure that AI educational systems are culturally diverse and respectful of the user's identity and their community values. This can also be achieved by ensuring that AI systems do not promote unacceptable practices that may cause biased behaviors in individuals or communities as the goal is to educate not to cause harm through indoctrination. To this extend, I believe educational institutions, students, ethicists, and community representatives should be involved in regular educational AI systems audits to identify and mitigate any biases related to that particular community

It is also important to make sure that these AI systems are developed using accurate and up-to-date data which reflects the current realities of the society, a notable example of the effects of biased AI systems is that of the 2015 Amazon AI powered recruitment system , which utilized algorithms trained on historical data, and at one point, the algorithm was proposing a higher proportion of men for job positions because historically, the tech sector has been male-dominated leading to more men being recruited. The recruitment system algorithm was trained to recruit in this manner and it executed that biased recruitment. To prevent such issues, it is essential to involve local educators, linguists, and cultural experts in the development process and rigorously testing the AI models for biases.

Furthermore, it is also important to address that while educators have been coming up with tools to detect AI generated content to maintain integrity in the education sector, students keep coming with ways to circumvent these measures. This ongoing battle between detection and evasion tactics results in detection tools being biased in some instances leading to unfair or uncalled for accusations even penalizing students wrongly. This calls for a systematic approach to academic integrity in which educational institutions integrate ethics education into the curriculum in which students are taught the ethical use of AI and the importance of upholding educational integrity.

As a student myself, I believe that AI has the power to transform the most struggling learners to be capable of unimaginable things while also capable of diminishing great minds if misused thus promoting a culture of analytical and innovative thinking as well as digital literacy into the youth from early childhood development amidst the rise of AI is vital in preparing them for the challenges and opportunities associated with the use of AI in education. This can be achieved by tasking educators with a pivotal responsibility to help students address ethical dilemmas, ensure responsible use of AI in learning environments and cultivate the skills required to thrive in an AI-driven world.

Finally, the integration of AI in education has the potential to revolutionize outcomes. However, its success is dependent on our ability to think about its implications and take steps to make things right. With the adoption of responsible AI approaches and the construction of an ethical environment, we can fully utilize AI to improve learning outcomes, strengthen equity, and equip the people of the future with the capacity and innovation to succeed in an ever-changing technological future.

References

[1] W. P.-P. K. H. K. e. a. Holmes: International Journal of Artificial Intelligence in Education , (2022) No.32.

[2] D. C. T. A. a. M. M. L. Guàrdia: The International Review of Research in open and distributed learnng, Vol. 22 (2021) No. 2, p. 166-184.
[3] Information on https://blog.mdpi.com/2024/02/01/ethical-considerations-artificial-intelligence/#:~:text=Therefore%2C%20researchers%20using%20AI%20to,procedures%20being%20susceptible%20to%20bias.. [Accessed 29 04 2024].
[4] M. K. E. Chaudhry: "Artificial Intelligence in Education (AIEd): a high-level academic and industry note 2021," Vol. 2 (2022) p. 157-165.
[5] J. Dastin: *Ethics of Data and Analytics* (Auerbach Publications eBooks, Wales, 2022).
[6] C. Kooli: "Chatbots in Education and Research: A Critical Examination of Ethical Implications and Solutions", Vol. 15 (2023) No. 7.
[7] Information on https://www.cbc.ca/news/canada/hamilton/chatgpt-school-cheating-1.6734580. [Accessed 29 04 2024].
[8] H. A. M. K. I. F. K. M. B. A. S. Kumar D: "Exploring the Transformative Role of Artificial Intelligence and Metaverse in Education: A Comprehensive Review," *Metaverse Basic and Applied Research,* 2023.
[9] P. L. G. R. S. T. L. T. P. P. B. J. Frieder S: Advances in Neural Information Processing Systems, Vol. 13 (2024) No. 36.
[10] V. Granito: "The Intersection of OER and AI: The Role of Artificial Intelligence Tools in Developing Ancillaries," in *OpenCon2024*, OHIO, 2024.
[11] V. G. D. M. R. A. J. M. R. S. D. S. D. Ashish K Saxena: Sage Science Review of Educational Technology, Vol. 6 (2023) No. 1, p. 88-100.