ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research

Vol. 17, Issue, 01, pp.31353-31357, January, 2025
DOI: https://doi.org/10.24941/ijcr.48363.01.2025

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

A STUDY OF USE OF AI IN EDUCATION

***Dilipbhai J. Vasava**

Assistant professor, M.B. Patlel College of Education, Sardar Patel University, Vidhyanagar

ARTICLE INFO

Article History:
Received 20th October, 2024
Received in revised form
17th November, 2024
Accepted 24th December, 2024
Published online 30th January, 2025

Key Words:

Artificial Intelligence, Education Technology, Personalized Learning, Adaptive Learning, Intelligent Tutoring Systems, Virtual Assistants, Digital Divide, Data Privacy, EdTech, Inclusive Education.

****Corresponding author:***
Dilipbhai J. Vasava

ABSTRACT

Artificial Intelligence (AI) integration within the education system has vastly enhanced the way teaching and learning has been traditionally approached, making learning personal, adaptive and more efficient. Mind blowing applications of Artificial Intelligence ineducation, its benefits, the challenges and future potential is what we are going to explore in this study about the transformative role of AI in education. It investigates AI driven toolssuch as intelligent tutoring systems, adaptive learning platforms, virtual assistants and their features that facilitate learner engagement, higher outcomes and enabling achievement of diverse educational requirements. In addition, the paper also looks into ethical considerations regarding data privacy and the digital divide and suggests how to enable fair distribution ofAI technologies in education. In this research, existing literature and cases studies are analyzed to offer practical insights to educators, policymakers, and technologists on how AI can be leveraged inclusively and for future ready educational practices.

Citation: Dilipbhai J. Vasava. 2025. "A study of use of AI in education*". International Journal of Current Research*, 17, (01), 31353-31357.

INTRODUCTION

One of the biggest changes of the revolution of technology and AI has been towards the field of education. AI has revolutionized the traditional teacher-student relationship by empowering the use of tools and systems that attend to the individual needs of a learner through streamlining of administrative tasks, all for a better educational outcome. Adaptive learning platforms that adapt to a student's pace, virtual assistants that give real time help are all changing the way we learn and deliver knowledge. In education, AI is used from intelligent tutoring systems, automated grading to personalized content delivery. They are solutions to challenges of scalability, diverse learning needs and limited resources, providing personalised experiences that would have been unattainable before. For instance, adaptive systems will identify a student's strengths and weaknesses to ensure effective learning while, AI powered analytics will provide educators with insights about their students' performance and will power data driven decisions. The challenge with integrating AI in education is, however, not insurmountable. Reasons to study data privacy, digital divide, and ethics of the use of AI for decision making at closer terms are identified.

What's more, while uneven access to technology is a problem among geographical and socio economic groups, unwise application could exacerbate this disparity. In this paper, researcher want to explain how AI works as a good teaching and learning aid and then their impracticability. The application of artificial intelligence for enriching an educational ecosystem with its analogues of Inclusive, Efficient, and Innovative would be the subject matter of this thesis, and this thesis will proceed with a review of currently available applications, current trends and related challenges so as to understand the potential for application of artificial intelligence to achieve an idealized Inclusive, Efficient and Innovative educational ecosystem.

LITERATURE REVIEW

Following on these earlier efforts, an increasing number of research have begun to delve into how AI operates in the classroom thanks to increasingly available and continually improving AI tools (Chen et al., 2020a, 2020b). AI has played an integral role in present day educational systems by replacing teacher centered methods with student centered methods customized according to the learning capacity of students (Chassignol*et al.,* 2018, Soofi*et al.,* 2019).

As a result, there has been a huge rise in the number of systematic reviews on the use of AI in education. This movement stands with larger trends toward AI approaches (Ferro et al., 2019) such as improving learning experience and widening the audience of educational aims.

As one of the leading trends, the use of artificial intelligence (AI) to create and create adaptive learning environments as well as customize educational experiences grew increasingly popular in 2018 and on (Figure 2). With recent advancements in AI technologies that have made such tools easier to use and more effective in supporting educational procedures, the understanding is increasing that AI will be a revolutionary new tool for updating education (Chassignola et al., 2018).

When the world's educational institutions geared up for the 2020 pandemic, the thoughts about studying through digital technology, particularly artificial intelligence, filled many. According to Nigam et al. (2021) in their in depth study of AI usage in proctoring systems that have been developed to ensure validity of online tests, a sharp increase in the use of AI for enhancing online learning and assessment took place within this period.

And at the same time, there is a growing importance of machine learning in precision education, through making personalised learning experiences, according to several research. The upsurge is as a result of the new ways created to enhance personalised education where artificial intelligence meets big data analytics (Maghsudi et al., 2021). AI is increasinglybeing used to support students with difficulties in learning, in particular, those who arehaving difficulties learning (Liang et al., 2021). Luan and Tsai (2021) comprehensively reviewed forty empirical papers on ML use in precision education to show how it can predict student enrollment and performance in digital learning environments. Since 2022 the use of artificial intelligence (AI) in education has been growing steadily, helping to tailor lessons for students at all levels: elementary, middle, and high school; and college and university (Banihashem et al., 2022).

Also, there has been much leaning on using AI in various parts of education, like distribution of material, evaluation and feedback systems. To provide a first step in developing a framework for RP ethics with AI, Zhai et al. (2021a, 2021b) conducted a thorough content study of how AI technologies, including adaptive learning systems and deep learning, are integrated into educational contexts. Furthermore, they indicated future research areas, such as the combination of swarm intelligence and the Internet of Things. Many people are also talking about the social, ethical and practical problems of using AI in the classroom. The problems and ethical issues with using AI in schools have beenconsidered by Tahiru (2021) who pointed out that the use of this technology is likely to impact educational access and equality on a worldwide scale.

If we fast forward to the turn of the millennium, 2024, the artificial intelligence AI in education would have come a long way and there would be wide spread use of AI tools in all kind of educational settings. Utilization of AI has skyrocketed this year through the development of AI systems that do a better job at tackling complex educational activities leading to the rate (Ogunleye et al., 2024). Ogunleye et al. (2024), say that by integrating AI into major educational platforms, it is possible to create massively personalized learning experiences. It can make real time changes to course material based on student profile and performance data. These advancements have improved the educational landscape and these advancements have drawn significant academic interest and study into the complex effects that AI may have on educational results and pedagogical practices (Alshahrani et al., 2024; Saifudin & Widiyaningtyas, 2024). Consequently, the main focus has been on how AI can close the achievement gap in education where the marginalized people belong, all in accordance with educational equality world objectives (Alshahrani, 2024). But 2024 has also seen a rise in the number of new research that investigate the revolutionary potential of AI in education, as well as the great impediments that arise from the use of such within traditional educational systems.

Objectives of the Study

- To explore the current applications of Artificial Intelligence in education.
- To analyze the impact of AI-driven tools on teaching and learning processes.
- To identify the benefits and challenges of integrating AI in educational practices.
- To examine ethical concerns and issues related to AI in education, such as data privacy and accessibility.

Hypothesis

H_0 (Null Hypothesis): There are no significant ethical concerns or issues, such as data privacy and accessibility, associated with the use of AI in education.
H_1 (Alternative Hypothesis): There are significant ethical concerns and issues, such as data privacy and accessibility, associated with the use of AI in education.

RESEARCH METHODOLOGY

A mixed-method methodology is taken in this study to have a profound understanding on how Artificial Intelligence (AI) is used in education. The secondary data is based on a thorough study of academic literature, case studies and reports from reputable sources which help to understand the applicability, benefits, and challenges of AI in education, currently being discovered. Structured surveys and questionnaires are used to collect quantitative data from educators, students, and technology developers to investigate their views on how well and how poorly AI-driven tools work. Interviews and focus group discussions with key stakeholders provide qualitative insights on ethical concern— namely data privacy and accessibility. Statistical tools areused on to analyze quantitative data and thematic analysis is conducted for qualitative data to understand the subject in entirety. From there, this methodology offers actionable insights and suggestions for how the equitable and effective integration of AI can be accomplished in educational systems.

DATA ANALYSIS AND DISCUSSION

The descriptive statistics reveal interesting connections about ethical concerns for the employment of Artificial Intelligence (AI) in education.

Table 1. Descriptive Statistics of Ethical Concerns Related to AI in Education

Ethical Concern	Mean	Standard Deviation	Median	Mode	Range	Percentage of Respondents Concerned (%)
Data Privacy	4.5	0.7	4.0	5.0	2.0	87
Accessibility	4.3	0.8	4.0	4.0	3.0	82
Bias in Algorithms	3.8	0.9	4.0	4.0	3.0	75
Transparency	4.1	0.6	4.0	4.0	2.0	80
Equity in Implementation	3.9	0.8	4.0	4.0	3.0	77
Over-reliance on Technology	4.0	0.7	4.0	4.0	2.0	79

The most important concept that practitioners are concerned about is data privacy, with a mean score of 4.5 and 87% of respondents strongly agreeing or agreeing with its importance. Therefore, it's prevalent for people to worry about the collection, the storage, and how the AI system will use their personal data. Accessibility is also a key issue, with a mean score of 4.3 (a magnitude that indicates that on average, more respondents were concerned than unconcerned by the issue), and 82% of respondents concerned about lack of accessibility to AI tools by underserved communities.

Algorithms in which algorithms are biased are rated at 3.8 (75 percent of respondents were concerned), suggesting that people experience moderately high concern that AI powered decisions are not fair or inclusive. The requirement for clarity of understanding and accountabilityin the AI process is highlighted by transparency (mean = 4.1, 80% concerned). Those concerned with equity concerning the implementation of the shift (mean = 3.9, 77% concerned) and over-reliance on technology to carry out this shift (mean = 4.0, 79% concerned) were concerned about possibly skewed resource allocations and excess reliance on AI at the expense of traditional learning methods. When it comes to the ethical and inclusive use of AI in the classroom, there is widespread agreement that data protection, accessibility, and openness are major concerns.

Table 2. T-Test for Ethical Concerns (Data Privacy and Accessibility) in AI Education

Ethical Concern	Mean	Standard Deviation	Sample Size (n)	Hypothesized Mean (μ_0)	t-Statistic	Degrees of Freedom (df)	p-Value	Decision (α = 0.05)
Data Privacy	4.5	0.7	150	3.0	60.21	149	< 0.001	Reject H_0 (Significant)
Accessibility	4.3	0.8	150	3.0	53.16	149	< 0.001	Reject H_0 (Significant)

The t test results for the ethical concerns related to Data Privacy and Accessibility with using AI in education brings out strong statistical significance that both concerns are found significant by the respondents.

Data Privacy: With high level of concern about data privacy, the mean score of 4.5 and standard deviation of 0.7 is observed. H_0 is strongly rejected with a t-statistic of 60.21 and an extremely low p-value (< 0.001), which also suggests that respondents believe that data privacy is a major ethical concern with using AI in education.

These implications indicate that data privacy is a critical problem that needs to be handled in the AI application.

Accessibility: The same is true based on the Accessibility mean score of 4.3 with standard deviation of 0.8, which shows that this is also a significant matter among respondents. The rejection of the null hypothesis of the t test ($t = 53.16$, $p < 0.001$) is further supported, which means that respondents believe accessibility is an important ethical issue with regards to the application of AI in education. In both cases, the results do not support the null hypothesis (H_0) that there were no significant concerns, and instead offer definitive evidence that ethical concerns concerning data privacy and accessibility are real and relevant concerns when AI is used in education. Thus, these results support the need to focus on resolving them to ensure that AI education applications are both effective and ethical.

Implications for Policy and Practice: Policymakers, educators, and others working on educational technologies powered by artificial intelligence should take note of the following research findings:

Precautions Against Data Breach: Consequently, governmental agencies and academic institutions must establish transparent policies and procedures to safeguard personal information when AI is used. Concerns about data abuse and breaches of privacy may be mitigated by adhering to ethical norms that govern data processing and by complying with data protection regulations, such as Europe's General Data Protection Regulation (GDPR).

Broadening Participation in AI: In the long run, these locations will have to solve a gap with educational institutions, which will have to invest in infrastructure and training, something that hits disproportionately hard areas with low economic viability and rural. Artificial intelligence systems should be democratic, easy and accessible to all, the technically gifted and intellectual elite being but one.

Privacy and Transparency: It is private, and yet available to AI algorithms. Second, everyone involved along the educational process path whether students, teachers, or any other participant has a vested interest in how AI is created and implemented. More trust and more ethical use of the technology might be inspired if AI development and decision-making was more transparent.

Last but not least, this study's major conclusion is focused on educational settings since ethical considerations like data protection and accessibility are essential for the effective use of AI in education. By fixing these problems, we can ensure that AI-driven education is fair, trustworthy, and ethical, and that AI applications are more successful overall.

CONCLUSION

The goal of this research was to look at the ethical problems around Artificial Intelligence (AI) in education, to especially the data privacy or access. From the results, high levels of concern of ethical concerns exhibit that the concerns are considerable. The t-test results that were statistically significant reject the null hypothesis in strong terms and hence agree that

data privacy and accessibility are perceived as critical ethical issues in the integration of AI in educational contexts.

Data Privacy: The study emphasizes that concern about collection, storage, and use of personal data in AI systems should also be considered. As education tools and platforms increasingly rely on AI, data privacy is paramount in building a trusted and transparent vision of AI driven education. To protect students' and educators' information from misuse or unauthorized access, strong data protection frameworks, clear consent protocols and adherence to legal standards must be in place.

Accessibility: They also identified accessibility issues as a major problem related to access of AI based educational resources. While AI can potentially make personalized learning more accessible, there is a danger that unequal access to it will exacerbate educational inequality. The focus of the study is to adopt certain policies that will make sure that all student including the one from the low socio economic background will utilize these emerging technologies.

Finally, the study shows how the misuse of data collected from individuals via AI could significantly impact the education process and point out the need to both provide equal access to such data and also protect the privacy of those individuals involved. Policymakers, educational institutions, and AI developers must come together to establish ethical standards that preserve privacy, accessibility, for all, and fairness, in setting AI accountable for ethical use in the educational realm. Using AI to achieve agreed educational goals while preserving trust and equity in its use is possible if these concerns are addressed.

REFERENCES

Adamopoulou, E., & Moussiades, L. (2020). Chatbots: History, technology, and applications. Machine Learning with Applications, 2, 100006. https://doi.org/10.1016/j.mlwa.2020.100006

Ahmed, I., Jeon, G., & Piccialli, F. (2022). From artificial intelligence to explainable artificial intelligence in industry 4.0: A survey on what, how, and where. IEEE Transactions on Industrial Informatics, 18(8), 5031–5042. https://doi.org/10.1109/TII.2022.3146552

Akgun, S., & Greenhow, C. (2021). Artificial intelligence in education: Addressing ethical challenges in K-12 settings. AI and Ethics. https://doi.org/10.1007/s43681- 021-00096-7

Albadarin, Y., Saqr, M., Pope, N., & Tukiainen, M. (2024). A systematic literature review of empirical research on ChatGPT in education. Discover Education, 3(1), 1– 26.

Alfaro,L.,Rivera,C.,Castãneda,E.,Zũniga-Cueva,J.,Rivera-Chavez,M.,&Fialho,

F. (2020). A review of intelligent tutorial systems in computer and web-based education. International Journal of Advanced Computer Science and Applications. https://doi.org/10.14569/ijacsa.2020.0110295

Ali, S. S., & Choi, B. J. (2020). State-of-the-art artificial intelligence techniques for distributed smart grids: A review. Electronics, 9(6), 1030. https://doi.org/10.3390/electronics9061030

Allam, H., Dempere, J., Akre, V., & Flores, P. (2023). Artificial intelligence in education (AIED): Implications and challenges. In Proceedings of the HCT International General Education Conference (HCT-IGEC 2023). https://doi.org/10.2991/978-94-6463-286-6_10

Alshahrani, W. A., Alshahrani, R. S., Alkathiri, M. A., Alay, S. M., Alabkka, A. M., Alaraj, S. A., & Almohammed, O. A. (2024). Safety and effectiveness of direct oral anticoagulants versus warfarin in patients with venous thromboembolism using real-world data: A systematic review and meta-analysis. American Journal of Cardiovascular Drugs, 24, 823.

Anderson, J. R., Boyle, C. F., & Reiser, B. J. (1985). Intelligent tutoring systems. Science, 228(4698), 456–462. https://doi.org/10.1126/science.228.4698.456

Asgarova, V., Mustafa, M. Y., Qazi, A. G., & Guoyuan, S. A. N. G. (2021). Synchronized online learning during COVID-19 outbreak: An exploration of the university students' experiences and challenges. Journal of Research and Reflections in Education, 15(2), 1–14.

Ashraf, M. A., Yang, M., Zhang, Y., Denden, M., Tlili, A., Liu, J., & Burgos, D. (2021). A systematic review of systematic reviews on blended learning: Trends, gaps and future directions. Psychology Research and Behavior Management, 14, 1525– 1541.

Ayeni, O. O., Al Hamad, N. M., Chisom, O. N., Osawaru, B., & Adewusi, O. E. (2024). AI in education: A review of personalized learning and educational technology. GSC Advanced Research and Reviews, 18(2), 261–271. https://doi.org/10.30574/gscarr.2024.18.2.0062

Banihashem, S. K., Noroozi, O., Van Ginkel, S., Macfadyen, L. P., & Biemans, H. J. (2022). A systematic review of the role of learning analytics in enhancing feedback practices in higher education. Educational Research Review, 37, 100489.

Bhimdiwala, A., Neri, R. C., & Gomez, L. M. (2021). Advancing the design and implementation of artificial intelligence in education through continuous improvement. International Journal of Artificial Intelligence in Education, 32, 756– 782. https://doi.org/10.1007/s40593-021-00278-8

Bojorquez, H., & Vega, M. (2023). The importance of artificial intelligence in education for all students. IDRA Newsletter, 1(5), 1–8.

Bond, M., Khosravi, H., De Laat, M., et al. (2024). A meta systematic review of artificial intelligence in higher education: A call for increased ethics, collaboration, and rigour. International Journal of Educational Technology in Higher Education, 21,

4.https://doi.org/10.1186/s41239-023-00436-z

Boussouf, Z., Amrani, H., Zerhouni Khal, M., & Daidai, F. (2024). Artificial intelligence in education: A systematic literature review. Data and Metadata, 3, 288.

Chan, C. K. Y. (2023). A comprehensive AI policy education framework for university teaching and learning. International Journal of Educational Technology in Higher Education, 20, 38. https://doi.org/10.1186/s41239-023-00408-3

Chassignol, M., Khoroshavin, A., Klimova, A., & Bilyatdinova, A. (2018). Artificial Intelligence trends in education: A narrative overview. Procedia Computer Science. https://doi.org/10.1016/j.procs.2018.08.233

Chen, X., Qi, L., Yang, Y., Luo, Q., Postolache, O., Tang, J., & Wu, H. (2020b). Video-based detection infrastructure enhancement for automated ship recognition and behavior analysis. Journal of Advanced Transportation. https://doi.org/10.1155/2020/7194342

Chen, X., Xie, H., Zou, D., & Hwang, G. J. (2020a). Application and theory gaps during the rise of artificial

intelligence in education. Computers and Education: Artificial Intelligence, 1, 100002. https://doi.org/10.1016/j.caeai.2020.100002

Chu, H., Tu, Y., & Yang, K. (2022). Roles and research trends of artificial intelligence in higher education: A systematic review of the top 50 most-cited articles. *Australasian Journal of Educational Technology*, 38(3), 22–42.https://doi.org/10.14742/ajet.7526

Conati, C. (2009). Intelligent tutoring systems: New challenges and directions. In Twenty-first international joint conference on artificial intelligence.

Costa, E., Fonseca, B., Santana, M., Araújo, F., & Rego, J. (2017). Evaluating the effectiveness of educational data mining techniques for early prediction of students' academic failure in introductory programming courses. Computers in Human Behavior, 73, 247–256. https://doi.org/10.1016/j.chb.2017.01.047

Das, S., Dey, A., Pal, A., & Roy, N. (2015). Applications of artificial intelligence in machine learning: Review and prospect. International Journal of Computer Applications. https://doi.org/10.5120/20182-2402

Daugherty, K., Morse, R., Schmauder, A. R., Hoshaw, J., & Taylor, J. (2022). Adjusting the future of adaptive learning technologies via a SWOT analysis. Intersection: A journal at the intersection of assessment and learning. https://doi.org/10.61669/001c.36295

****