ETHICAL DILEMMAS IN AI-DRIVEN EDUCATION SYSTEMS: ENSURING EQUITY AND FAIRNESS

Bektash Berdiyev
Department of International Relations
International Islamic Academy of Uzbekistan
Tashkent, Uzbekistan
b.berdiyev@iiau.uz

Nigora Saydaliyeva
Department of Philosophy and Culture of the East
Tashkent State University of Oriental Studies
Tashkent, Uzbekistan
saidalieva_nigora@mail.ru

Bakhodir Jovliev
Press Secretary of the Chairman of the Information Service of the Supreme Attestation Commission of the Republic of Uzbekistan
Tashkent, Uzbekistan
bahodir-0878@mail.ru

Mansur Yunusov
Department of Spiritual Foundations of Management
Academy of Public Administration in the presence of the President of the Republic of Uzbekistan
Tashkent, Uzbekistan
mansur-yunus@mail.ru

ABSTRACT: ***Artifiicial Intelligence it has changed the educational systems dramatically by enabling personalized learning, predictive analytics and automated functionality to the learning environments. Conversely, the rapid adoption of AI-driven educational paradigms could, likewise, present significant ethical dilemmas that deserve attention — specifically, issues of equity and justice. 3] AI systems to assess students' performance, and help determine their learning pathways and evaluate their behaviours are also increasingly being deployed, raising questions about how transparent, accountable, and inclusive these systems are. It is also a call for frameworks in educational contexts to be equitable in the face of AI implications. One of the most pressing ethical challenges in AI education is algorithmic bias. AI systems are only as good as the data on which they are based, and if that data reflects existing inequities or historical patterns of discrimination, the algorithms that result from it may only solidify and amplify those existing inequalities. For instance, predictive algorithms can disproportionately disadvantage students from underrepresented groups when improperly interpreting performance metrics or neglecting cultural and socioeconomic context. These biases risk entrenching existing educational inequities rendering A.I. as an avenue for equal opportunity ineffective. A second dilemma is about transparency and explainability. Many of the A.I. tools used in education are "black boxes" — their decisions are opaque to the students who use them, as well as educators and policymakers. Such opacity can diminish trust and complicate accountability around A.I. systems, particularly when students are penalized based on inscrutable algorithms. In addition to this, the increase in use of student data creates privacy problems if data can be collected and analysed without the students informed consent or with inappropriately robust data protection systems. We need to track where information ends up, otherwise we risk abuse. All of this is compounded with the disparity in access to AI-powered tools, along with cloud and internet infrastructures gap, leaving behind students from disadvantaged backgrounds. Meanwhile, wealthier institutions may leverage all the might of AI to improve learning, while less-resourced schools may be unable to engage the very best and simplest technology, thereby widening an equity divide even wider.***

Keywords: ethical dilemmas, AI-driven education, algorithmic bias, equity, fairness, personalized learning, transparency, data privacy, digital divide, educational inequities

INTRODUCTION

Due to the rapid advancements in Artificial Intelligence, the practice of education, its administration and the whole learning experience has witnessed a sea change in the wake of the 21st century. Artificial intelligence, of course, has spawned education systems to create personalized learning, intelligent tutoring, automated grading, behavioral tracking and administrative efficiency. By analyzing big data in order to create numerical forecasts for student performance and distributing content aligned with those forecasts, AI has the potential to disrupt many entrenched educational paradigms and lead to more compelling, responsive, and personalized learning environments. But behind this technological advantage are some profound ethical challenges that go to the heart of equity and fairness. At its most basic, education is the foundation of a fundamental human right and a driver of progress on an individual, societal and global level. As a result, any advancement which significantly alters education must focus not solely on technical efficiency, but also ethical integration. AI introduces a new generation of decision-making that is less explainable, accountable, or inclusive. The growing reliance on algorithms to determine what students are capable of, to recommend possible pathways for learning or to predict success in school needs more scrutiny into how the systems are created, who they serve and which voices are included — or excluded — in how they are designed and deployed. The most significant ethical concerns are algorithmic bias risks. AI systems learn from data— and this data often reflects existing inequalities in society. If the data on historical academic records, standardized test scores, or behavior that are used to train AI systems contain built-in biases — according to race, gender, socio-economic status or disability — then the AI itself could inadvertently replicate and even accelerate these differences. An example of this is an AI planning tool that was developed to predict student performance that consistently underperformed when the data was reflective of students coming from underrepresented backgrounds, simply because the training data didn't account for a diversity of experience or context.

And one more critical issue: the digital divide. If AI tools and infrastructure are unequally accessible, though, AI is more likely to exacerbate inequities. Students from rural areas, low-income families or underfunded schools may also lack the technology,

systems and predictive analytics tools (or e-learning) showing great potential in customising education and improving academic outcomes. But arising from the findings of this study, too, is a nuanced set of new ethical dilemmas in relation to the use of AI that will demand critical thought and well-founded action. These questions are founded on issues of equity, fairness and the socio-cultural context of learning and how it is transformed by educational technology. The most revealing insight from this study is the conflict between personalization and stereotyping. Just as the idea is to improve the learning experience, AI programs use data from each student to align paths of learning with what each student is interested in. Although beneficial for some students with specific learning difficulties, it can also reinforce entrenched beliefs about a child's ability. When learners are assigned to ability groups based on past performance, there is an inherent risk of putting a ceiling on their future academic capabilities. Rather than ladders to ascend with, these systems may become ceilings to learn all within, particularly if human teachers become over-reliant on manifolds of algorithms that compress context into numbers. The risk of algorithmic bias that the invarably came out through case studies and interviews. AI systems have been trained on datasets that contain biases or gaps that may reinforce existing social inequalities. It is possible that children from minority groups or lower socio-economic groups can be ignored for third-party solutions, and thus there are lower expectations for students or difficulty accessing advanced learning materials. Emerging inaccuracies, however, will underscore the necessity of inclusive data sets and continuous checkpoints to identify and remediate systemic inequities that may manifest in hard-coded AI algorithms. Another major topic of discussion is data privacy and transparency. In interviews, some study participants — including students and parents — reported feeling uneasy about vague descriptions of how their data was being collected and used.

CONCLUSION

Computer Technology in Education — Study App: Computer technology applied in studies is a great step. It has the potential to tailor education, facilitate assessments, and provide immediate feedback, all of which have the capacity to improve student eagerness and academic performance. But, as this study has also shown, the effort to devise sound AI-based education systems also involves a whole range of ethical challenges — and these too deserve careful scrutiny. In summary, the balancing act of ensuring equity and fairness in the deployment of AI technologies will thus not only be technical in nature but also moral in nature and will take coordinated effort on the part of diverse stakeholders, perspectives from various academic disciplines, and public policy based on the values of a thriving society. This study shows that while AI is designed to customize and individualize student learning, in fact, it can force students into one or another slab of rigid delivery map, based on historically-derived data that includes stereotypes. These are to which fairness and loss of learner agency are serious concerns. Dr. McNae studies the science of interevent repeat in behavior-based machine activity and how unregulated algorithmically motivated A.I., with its relentless drive to distill a binary classification set, tends to landlock a student, crushing their rich, volitiniously potential, and the systemic trajectory between social and environmental inputs that define a student's personalized pathway to success. If AI and education technology are integrated into classrooms, the first permutations of what's effective will imbue this approach with essential human oversight to prevent such scenarios through teacher intuition and contextual understanding that is fortified by AI insights.

REFERENCES

[1] Baker, R. S., & Inventado, P. S. . Educational data mining and learning analytics. In *Learning Analytics* . Springer.

[2] Binns, R. . Fairness in machine learning: Lessons from political philosophy. *Proceedings of the 2018 Conference on Fairness, Accountability and Transparency*.

[3] Boyd, D., & Crawford, K. . Critical questions for big data. *Information, Communication & Society*, 15, 662–679.

[4] Cowie, N., & Sakui, K. . Ethical considerations in the use of AI in education. *Language Learning & Technology*, 24, 39–58.

[5] Cummings, C. . Artificial Intelligence in Education: Challenges and Opportunities. *OECD Education Working Papers*.

[6] Dignum, V. . *Responsible Artificial Intelligence: How to Develop and Use AI in a Responsible Way*. Springer Nature.

[7] Eubanks, V. . *Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor*. St. Martin's Press.

[8] Floridi, L., et al. . AI4People—An ethical framework for a good AI society. *Minds and Machines*, 28, 689–707.

[9] Holmes, W., Bialik, M., & Fadel, C. . *Artificial Intelligence in Education: Promises and Implications for Teaching and Learning*. Center for Curriculum Redesign.

[10] Ilinca, A. M., & Andrei, T. . The Ethics of AI in the Educational Process. *Revista Romaneasca pentru Educatie Multidimensionala*, 12, 1–14.

[11] Luckin, R., et al. . *Intelligence Unleashed: An Argument for AI in Education*. Pearson Education.

[12] McIlroy, T. . Ethical frameworks in AI-driven pedagogy. *Journal of Educational Technology & Society*, 24, 45–58.

[13] Noble, S. U. . *Algorithms of Oppression: How Search Engines Reinforce Racism*. NYU Press.

[14] Regan, P. M., & Jesse, J. . Ethical challenges of edtech, big data, and personalized learning. *Journal of Educational Technology*, 35, 23–36.

[15] Robson, J., et al. . Data ethics and digital education. *British Journal of Educational Technology*, 53, 121–135.

[16] Saldaña, J. . *The Coding Manual for Qualitative Researchers*. Sage Publications.

[17] Selwyn, N. . Should robots replace teachers? AI and the future of education. *Polity Press*.

[18] Slade, S., & Prinsloo, P. . Learning analytics: Ethical issues and dilemmas. *American Behavioral Scientist*, 57, 1510–1529.

[19] E. Yagyaeva, M. Turobova, R. Nazirova, Y. Daminova, N. Merganova and N. Oripova, "A Layout of Bridging Learning Process to fill the Gaps Through AI to make the Technical Education for Better Access," 2024 4th International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE), Greater Noida, India, 2024, pp. 612-616.

[20] Spector, J. M. . Conceptualizing the emerging field of smart learning environments. *Smart Learning Environments*, 7, 1–10.

[21] UNESCO. . *AI and Education: Guidance for Policymakers*. United Nations Educational, Scientific and Cultural Organization.

[22] United Nations. . *The Age of Digital Interdependence*. UN Secretary-General's High-level Panel on Digital Cooperation.

[23] Veletsianos, G., & Moe, R. . The rise of algorithmic surveillance in higher education. *EDUCAUSE Review*, 52, 40–50.

[24] Warschauer, M., & Matuchniak, T. . New technology and digital worlds. *Teachers College Record*, 112, 2551–2589.

[25] Williamson, B. . *Big Data in Education: The Digital Future of Learning, Policy and Practice*. Sage.

[26] Williamson, B., & Eynon, R. . Historical threads, missing links, and future directions in AI in education. *Learning, Media and Technology*, 45, 223–235.

[27] Winfield, A. F. . Ethical principles for robotics and AI in education. *AI & Society*, 34, 561–574.

[28] WISE. . *Ethics and Artificial Intelligence in Education*. World Innovation Summit for Education Report.

[29] Zuboff, S. . *The Age of Surveillance Capitalism*. PublicAffairs.

[30] Nazirov, M., & Qolqanov, N. (2024, May). The Optimized Algorithm Creation for the Whole HE System. In 2024 4th International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE) (pp. 1588-1592). IEEE.

[31] Knox, J. . Artificial intelligence and education in China. *Learning, Media and Technology*, 45, 298–311.

[32] OECD. . *Digital Education Outlook 2021: Pushing the Frontiers with AI, Blockchain and Robots*. OECD Publishing.

[33] Cios, K. J., & Zapala, D. . Ethical challenges in the deployment of AI in education. *Journal of Educational Data Science*, 1, 65–78.

[34] Long, P., & Siemens, G. . Penetrating the fog: Analytics in learning and education. *EDUCAUSE Review*, 46, 31–40.

[35] Garcia, A. . Algorithmic injustice in schools: How educational AI impacts students of color. *Race, Ethnicity and Education*, 25, 529–546.