

From Innovation to Inclusion: Ethical and Cultural Dimensions of Emerging Technologies in Education

Shivendra Pratap Singh

Ph.D. Scholar, Department of Education (Central Institute of Education), University of Delhi, 33 Chhatra Marg, Delhi - 110007, India

Abstract:

The rapid amalgamation of future technologies, such as Generative AI tools, Machine learning, Intelligent tutoring systems (ITS), virtual reality (VR), augmented reality (AR), the Internet of Things (IoT), and Natural Language Processing (NLP), to revolutionize the field of education has opened up a Pandora's box of opportunities, along with ethical and cultural concerns. These technologies offer substantial benefits, such as improved, cost-efficient access to quality education, a flexible learning environment, personalized teaching and assessment, enhanced engagement, improved vigilance against academic misconduct, opportunities for local-global collaboration, and equitable accommodation of diverse learners. On the other hand, they raise serious ethical and cultural concerns, such as Privacy infringement, cyberbullying, algorithmic bias, the digital divide, academic misconduct, such as plagiarism, and, most importantly, erosion of teachers' agency in pedagogical processes. Putting all these dimensions into the Indian context, where cultural and linguistic diversity is the norm in schools. This paper theoretically examines the ethical and cultural implications of incorporating future technologies in education. It explores how technological solutions may benefit and/or marginalize learners from diverse cultural and linguistic groups. It also explores the issue of possible socio-ethical concerns related to the integration of emergent technologies in educational processes, such as the dehumanization of pedagogy, cultural homogenization, digital colonialism, and subjugation of minority language groups. The paper emphasizes the importance of critical examination before haphazard implementation, ultimately underscoring the need for culturally responsive, ethically grounded, and inclusive approaches to the implementation of future technologies in education.

Keywords: Emerging Technologies, Cultural Responsiveness, Ethical Implementation, Responsible Technology Use

1. Introduction

Technology has become a ubiquitous, fundamental part of our day-to-day lives, and the contemporary education system is not immune to its influence either. The meteoric rise of educational technology adoption has also caught the attention of students, teachers, researchers, and schools. Thus, there is growing scholarly attention to the merits and demerits of integration, as well as to the effectiveness of emerging technologies in education (Mena-Guacas et al., 2025). Stakeholders have recognized that technology is transforming the educational ethos, epistemological pathways, classroom culture, teacher-

student roles, and relationships in ways never before seen, driven by its perceived benefits, such as personalization, efficiency, and accessibility. Traditionally, teachers, along with books, held the central stage in the classroom and were considered the primary source of learning; however, their roles have undergone a drastic transformation. Technology has altered their role from primary content leader to organizer, counselor, motivator, and manager of learning activities (Imran et al., 2025). Now, they act as the facilitators of the learning process. Similarly, expectations from students have also changed. Students are no longer considered passive recipients; instead, they are expected to be active contributors in their own learning.

Emergent technologies such as Artificial Intelligence have taken us a step further in offering a more immersive and engaging learning experience for learners. NEP 2020 also recognizes the transformative power of disruptive technologies, such as artificial intelligence (AI), machine learning (ML), blockchains, virtual reality (VR), augmented reality (AR), smartboards, and educational software, in redefining learning, pedagogy, and classrooms. Furthermore, it specifically focuses on the disruptive potential of artificial intelligence in research, instructional material preparation, what students learn, and how they learn, while also concerning itself with technology-related issues such as privacy, equity, diversity, digital divide, data protection, device addiction, and much more (MHRD, Government of India, 2020). These developments have presented immense inherent potential to transform the field of education by providing individualized learning experiences, tailor-made creative content, improved engagement, equitable self-regulated assessment, timely personalized feedback, and much more. Nonetheless, technologies are not neutral but culturally embodied, value-laden entities that can expand or limit the scope of learning (Leahy et al., 2019). Thus, their use needs to be critically evaluated in the preparatory and active phases of execution. Educational technologies can introduce various substantial pedagogical, ethical, and cultural challenges. The major challenges include accessibility to resources, over-reliance on technology, digital divide, insufficient professional development of teachers, information and digital overload, cultural homogenization, cultural imperialism, westernization, and language barriers for minority language speakers. Apart from these cultural-pedagogical challenges, there are also ethical challenges, such as data privacy, plagiarism, data protection, surveillance, autonomy, accountability, and transparency, that are present. Therefore, it is crucial to analyze technology as an embedded force before haphazardly implementing it in the classroom. In this backdrop, this paper critically evaluates and provides an in-depth overview of the potential cultural, ethical, and pedagogical implications of emergent technologies in education, based on a non-systematic literature review.

2. Historical Background and Foundational Critique

Despite the expansion of education through various governmental and non-governmental initiatives over the last few decades, our education system still struggles with enrollment, retention, dropout rates, and the quality of education at all levels. In this context, for many, the rise of technology has been seen as a panacea, driving its adoption in the educational domain. The rise of emergent technologies such as artificial intelligence after the COVID-19 pandemic further fueled global momentum for their adoption and haphazard implementation in times of crisis. In Indian schools, it has become a marker of quality education and a marketing gimmick to attract students. The techno-utopian, solutionist approach adopted by these schools often fell short of providing real-life, sustainable solutions at a large scale due to the absence of appropriate infrastructure, professional development, reflective implementation, and other

socio-cultural-economic dimensions. Thus, these technologies often further create or magnify existing challenges for students and the education system.

3. Use of Emerging Technologies in Education

In the educational sector, Artificial Intelligence has evolved from performing basic computing tasks to advanced systems, such as chatbots, cobots, and robots, that may assist and replace regular teachers. In the process, it has affected not only teaching and learning but also management and administration. Furthermore, it has proven to improve teaching quality through effective pedagogical tools, more efficient administration, and enriched learning outcomes through customized content and personalized learning (Chen et al., 2020). As a result, Indian classrooms are becoming more technology-driven, and we are witnessing a shift from human-mediated to tech-oriented pedagogy. One of its most significant contributions lies in the domain of personalized learning. The ‘one-size-fits-all’ approach often used in Indian classroom practices disregards individual differences among learners and runs counter to the student-centered approach. Whereas personalized learning focuses on individual learners’ strengths, weaknesses, needs, interests, preferences, and styles, and on their previous knowledge, it modifies the pedagogical process accordingly. Artificial intelligence helps learners from diverse backgrounds in terms of age, educational level, and socio-economic background by providing flexibility and better learning opportunities and outcomes. Furthermore, it helps improve engagement, modify content and learning materials as needed, and provide timely feedback to create personalized learning pathways (Tapalova & Zhiyenbayeva, 2022). Artificial intelligence also supports assessment and feedback. AI-powered assessment tools improve the accuracy and efficiency of assessments, provide personalized feedback to students, and enable teachers to adapt their pedagogy to learners' needs (Owan et al., 2023). Integration of Artificial Intelligence into traditional teaching roles not only supports academic tasks but also reduces the administrative burden on teachers by assisting with routine tasks, such as admissions processes via chatbots, biometric attendance, grading, and lesson planning. Thus, giving them more time to focus on pedagogy, teaching-learning processes, and tasks that require personalized human involvement, making the class more interactive and interesting (Jiménez, 2024). Artificial intelligence also enhances accessibility and inclusion through translation services, text-to-speech software, and an adaptive interface for learners with disabilities. Translation software and language learning software, such as Duolingo, and language writing assistance software, such as Grammarly, help learners from diverse linguistic backgrounds and levels of linguistic competence learn and engage with various languages. Conversational AI tools, or GenAIbots, such as ChatGPT and Bing Chat, can improve cognitive development and promote comprehension, engagement, reflection, creativity, and problem-solving capabilities in learners and thus can act as ‘objects-to-think-with’ resources to transform education and create an inclusive learning environment (Vasconcelos and Santos, 2023). Intelligent tutoring systems (ITS) help in diagnosing areas for improvement, adjusting instruction accordingly, and providing customized feedback, bridging the gap between educators and students. It mimics a real-life teacher and provides personalized instruction, tracks progress, and promotes self-regulated learning. This provides a more accessible and flexible learning platform for students, enabling them to learn at their own pace and helping create a sustainable education system (Lin et al., 2023). Intelligent tutoring systems (ITS) also help curate content, such as online quizzes, study materials, and multimedia resources, in line with the topic and students' needs. AI-driven learning analytics help track learners' progress, identify at-risk students, and inform pedagogy and policy to improve learning outcomes (Alam, 2023). This system has dynamically revolutionized learning efficiency

by catering to students' individual needs. This not only overcomes the limitations of traditional learning systems but also enhances engagement, comprehension, and the overall learning experience (Lin et al., 2023). Virtual reality (VR), augmented reality (AR), mixed reality (MR), and extended reality (XR) offer an immersive, engaging, interactive, meaningful and personalised learning experience and provides an opportunity to incorporate innovative approaches through virtual tours, remote labs, and historical reenactments to promote effectiveness, comprehension and active learning (Prokopenko & Sapinski, 2024; Anwar et al., 2025).

4. Culture, Education, and Technology

In the digital age, the education system is being reimagined through the lens of technology to become more inclusive. Driven by rapid digitalization, government initiatives such as the Digital India mission, and global educational trends, technology has permeated all aspects of life, including socio-cultural, economic, political, and linguistic spheres. These aspects influence how education is viewed, why we should pursue it, and how it should be implemented in schools. Thus, the virtual space and real world are converging in modern classrooms. In the Indian context, education is seen as the medium to achieve socio-economic mobility, equality, and inclusion, and its ultimate purpose is to develop rational, compassionate, creative, and courageous individuals capable of action with well-founded ethical and moral values (MHRD, Government of India, 2020). To make this a reality, it requires a major educational shift in which education is not confined to the physical boundaries of schools but also moves beyond the constraints of caste, class, ability, and geography. Emergent technologies, along with online platforms and internet connectivity, have redefined education and made quality education accessible to a large portion of the country. However, the application and adoption of artificial intelligence is not universal or value-free but culturally and ethically rooted (Cummings-Koether et al., 2025). While on the one hand, technology increases efficiency, accessibility, and inclusion, on the other hand, if unchecked, it can also marginalize indigenous cultures, languages, and knowledge systems or further strengthen the dominant narrative, traditional hierarchies, and power relations. Thus, there is a crucial need to critically evaluate the epistemic and cultural costs of using technology in Indian classrooms.

4.1 The Cultural Lens: Epistemological and Pedagogical Impacts

Technology-oriented pedagogy reshapes classroom participation, engagement, attention, and learning environment, but it depends on the design, access, and application of the technological tools. Marginalised communities from around the world still don't have sufficient access, appropriate representation, and a voice in the data and the digital world. At the same time, emergent technologies, particularly machine learning tools, require immense amounts of data to function effectively. Machine learning tools learn from the data fed to them and, as a consequence, amplify the biases and reproduce socio-linguistic hierarchies and dominant narratives of the people they serve to maintain their power (Schneider, 2025). Therefore, marginalised cultures are inadequately represented, often muted in data, and certain voices (predominantly from developed countries) dominate the global narrative. As a consequence, these digital spaces, including emergent technologies, privilege Western norms, languages, values, and knowledge systems while sidelining local cultural expressions and increasing the risk of epistemic exclusion. This situation can lead to cultural imperialism in digital spaces, via biases embedded in data and algorithms. Ultimately, these biases are transmitted to the classroom when these technologies become part of the education system.

4.2 Language, Identity, and Communication

Emergent technologies both empower and challenge the survival of indigenous languages. On the one

hand, through various language applications, online dictionaries, social media platforms, content creation, and chatbots, the visibility, transmission, decolonization, and revitalization of indigenous languages have increased (Meighan, 2021). On the other hand, it has fueled the shift towards dominant languages, particularly English, in the absence of adequate data and language technology support for indigenous or minority languages. Large language models require massive amounts of data to produce appropriate output, but the overall sparsity of data in indigenous languages leads to poor-quality, faulty output (Moshagen et al., 2024). This further detaches people from their indigenous languages and culture. This pull factor associated with the English language, due to its relation with emergent technology, often uproots students from their indigenous language and culture. Thus, technology also perpetuates the dominance of the English language in the educational sector. Emergent technological advancements are often embedded in the Western context and the English language, reflecting a bias that favors Western cultural values (Johnson et al., 2022) and, by extension, encourages the adoption of Western cultural values over indigenous values. Language and culture have an inherent bidirectional relationship (Sapir, 1921). Thus, it also poses a risk of cultural homogenisation and the potential marginalisation of local languages. Sensitivity to these complexities is a prerequisite to making the classroom culturally, linguistically, and technologically inclusive. Therefore, the pedagogical approaches adopted in school should be aligned with the technological advancements and cultural heritage of students.

4.3 Equity, Inclusion, and Digital Divide

The myth of technology as a great equaliser often covertly amplifies sociocultural inequalities and discreetly transposes them to digital spaces. The digital divide makes it more difficult for people to access online resources and poses a risk of cultural homogenisation, in which dominant global cultures eclipse local cultural entities (Asaleh, 2024). In diverse classroom contexts, the digital invisibility of certain cultures, communities, and groups in data due to unequal access, digital illiteracy, language bias, and their lack of competence to use the technology creates new forms of marginalisation. The digital divide between communities manifests itself in various dimensions, such as broadband connectivity (material access), how individuals perceive and value technology (attitude), people's ability to use technology (skills), types of use (variations in how people use it), and differences in the benefits people derive (internet outcomes) (Van Deursen & Van Dijk, 2018). Apart from these, age, ethnicity, gender, and socioeconomic variables also contribute to the digital divide, further strengthening the hierarchical relationships and socio-digital inequalities (Dattoo & Kurio, 2021). Here, emergent technologies serve as tools for capital accumulation, narrative formation, surveillance, and manipulation of power through data and algorithms, benefiting those in power and large global corporations (Sadowski, 2019). Thus, it reinforces structured marginalisation of communities and, at its core, remains neither liberating nor inclusionary.

4.4 Socio-Emotional Impact and Education

While algorithms are trained on large amounts of data, they still lack the reasoning and emotional abilities of humans and often provide superficial solutions rather than genuine connections and empathetic support. Social-emotional intelligence is an integral part of classroom learning. It helps create a conducive environment for expressing, sharing, and developing individual identities. According to Santana-Monagas et al. (2025), the emotional tone of teacher communication, along with its content, plays a crucial role in shaping student responses, sparking motivation, or improving performance. But as the classroom becomes more virtual, particularly in distance education, the scope of social-emotional learning is narrowing, and classes might again become more behavioristic, laced with superficial connections and data-driven procedures. It has changed the traditional teacher-student relationship, where the teacher's influence was

not limited to a specific subject domain; they were also supposed to be the torchbearer and an extension of the home (Fitria, 2021).

4.5 Globalisation and Cultural Homogenisation

While some view technology as a companion that promotes cultural innovation (a utopian view), others hold a pessimistic outlook (a dystopian view) and believe it leads to dehumanization, loss of meaning, and spiritual decline (Shan, 2024). Nevertheless, Dynamic technological-cultural interaction has a paradoxical yet profound effect on society. On the one hand, it contributes to accelerated cultural exchange, the preservation of indigenous knowledge systems, the democratisation of cultural knowledge through online archives and repositories, and the transformation and expression of cultural identities through social media platforms. On the other hand, it poses risks such as reinforcing hegemonic narratives, widening the digital divide, cultural homogenisation, intersectional disparities in virtual spaces, and the commodification of culture (Alsaleh, 2024). Emergent technologies have created new avenues for cultural, linguistic, and artistic exchange at an unprecedented pace and scale, but have also promoted homogenization, standardization over multiculturalism, and uniformity over diversity and the inherent value of culture. Most technological platforms are developed in Western developed countries and are typically not culturally calibrated. Therefore, they often reflect Western norms, values, and epistemologies. Furthermore, while on the one hand, we are witnessing a deliberate resurgence of the Indian knowledge system, on the other hand, the rapid spread of Western technologies poses a risk of marginalizing indigenous languages, cultures, and knowledge systems. Furthermore, issues such as data ownership and representation of people from different cultures also need to be critically analyzed.

5. Ethical Issues

Emergent technologies such as Generative artificial intelligence, machine learning, virtual reality, and natural language processing (NLP) have huge potential to transform the educational landscape via their promise of personalised learning, improved accessibility, innovative assessment, creative content creation, and widespread intersectional inclusion. However, it also brings a variety of ethical concerns, issues, and challenges that necessitate critical reflection and timely action to mitigate the harm it may cause. These challenges include privacy, data ownership, fair cultural representation, cultural sensitivity, transparency, equity, accessibility, academic integrity, and more. In the absence of proper reflexivity and guidelines related to the storage, usage, and dissemination of data, AI technologies may further reinforce systemic inequalities, strengthen hierarchical relationships, and perpetuate and give birth to new forms of marginalisation.

5.1 Data Security, Privacy, and Ownership

Artificial intelligence tools in the educational domain thrive on the large amount of students' data gathered through search engines, chatbots, biometrics, social media platforms, websites, and mobile applications to recognise behavioral patterns, identify gaps, learning style preferences, track progress, and provide feedback to offer a personalized learning experience. However, this dependence on data also raises significant ethical and legal concerns, as the unethical access, acquisition, and use of such data by a third party pose serious risks to the privacy, autonomy, dignity, and agency of the individual (Huang, 2023). In many instances, users are not aware of sharing their personal information and the retention of data by these technological devices (Camilleri, 2023). According to Tucker (2019), there are three types of privacy concerns associated with the use of artificial intelligence. Firstly, once created, the data can persist indefinitely in the digital world. Secondly, the data can be repurposed an infinite number of times. Lastly,

it can cause privacy spillovers, affecting people who didn't consent to its creation. Thus, it can profoundly impact our lives for a long time. Artificial intelligence models trained on massive amounts of copyrighted material blur the line between inspiration and infringement. Thus, there is a crucial need to define who owns the data, how it can be used, and who has the right to use it. There is a crucial need for AI governance that emphasizes consent, clarifying ownership, and transparency. Emergent technologies are rapidly evolving and unpredictable. Thus, a 'wait and see' approach is not ideal for fast-paced technology; a proactive approach is required to minimise any potential risks/harms that may arise in the future (Munoko et al., 2020).

5.2 Equity, Inclusion, and Transparency

Emergent technologies are susceptible to incorporating or amplifying bias towards certain groups due to bias embedded in large public datasets, design, algorithms, processing, and deployment. Artificial intelligence tools used in the educational domain add further dimensions to this problem. For example, continuous surveillance by artificial intelligence-based learning systems to gather performance data and track learners' progress, performance, and preferences impinges on students' ability to exercise their autonomy (Akgun & Greenhow, 2021). In the same way, research conducted by Tao et al. (2024) found that cultural values embedded in large language models, such as OpenAI's GPTs, skewed towards those found in English-speaking, Protestant European societies. These biases are harder to detect and can further reinforce cultural stereotypes and systemic oppression, and may lead to cultural homogenisation and/or westernisation. Similarly, predictive analysis tools are used to identify at-risk students, predict their future performance, and help design targeted interventions based on various forms of students' behavioral data, including their demographic information (Umer et al., 2021). However, these models are also susceptible to bias towards certain groups, can reinforce existing inequalities, and unfairly label students. Therefore, there is a crucial need for predictive fairness and improved accuracy of machine learning tools for their widespread use in education without discriminating against any stakeholder, especially students and teachers, based on protected attributes such as age, gender, race, ethnicity, religion, and abilities (Li et al., 2023). As a solution, incorporating the insights of stakeholders, such as students, teachers, parents, and policymakers, can aid in the contextual interpretation of data, enhance algorithms, and inform effective design in educational settings. Furthermore, it can also help in mitigating the risk of unfairness and identifying instances where bias does not emerge from the algorithm itself, but from its application (Baker & Hawn, 2021).

5.3 Academic Integrity

The presence of a large amount of information through online repositories, digital libraries, archives, and websites has altered the way educational content is accessed in the last few decades. While Generative artificial intelligence tools help individuals (students and academics) to access relevant information, improve their writing, conduct data analysis, and minimise academic misconduct through plagiarism detection software, they also raise serious concerns related to academic integrity (Balalle & Pannilage, 2025). AI-generated content can mimic human language and writing styles, making it difficult to detect. Thus, it challenges our ability to distinguish between authentic human creativity and a product of machine learning capabilities (Kumar et al., 2024). The major challenge in academia includes the ability of generative artificial intelligence tools to write high-quality content in various writing styles, AI-powered ghostwriting, answering questions via chatbots, paraphrasing, and plagiarizing others' work without detection. The transformative use of emergent technologies is imminent in various academic tasks; thus, it is wise to equip the next generation of learners with relevant strategies that can help them to maximise

their potential and abilities to use artificial intelligence while maintaining academic integrity (Birks & Clare, 2023).

5.4 Students' Autonomy and Teachers' Agency

The relationship between teachers and students is undergoing a significant transformation as emergent technologies become increasingly pervasive in the educational domain and in real life. While emergent technologies offer immense opportunities to enhance both teachers' agency and students' autonomy, they also threaten to minimize it through algorithmic control, continuous surveillance, and digital oversight. Nowadays, Teachers are expected to be tech-savvy, digitally literate, constantly evolving, and adaptable to emerging technologies to provide better learning opportunities. This is not merely the adoption of tools, but a systemic overhaul of educational mindsets, practices, and relationships to meet the demands of 21st-century education (Demuner et al., 2024). In the era of large language models (LLMs), the agency of teachers and students is transforming, and effective technological integration in academia requires open dialogue and relational reflexivity between both parties. Furthermore, an effective institutional response requires not only technical expertise but also cultural understanding, along with relational reflexivity to reflect on and discuss how LLMs can be used in educational contexts (Kahn et al., 2025).

5.5 Over-Reliance on Emerging Technologies

Artificial intelligence tools assist students in various ways, such as summarizing content, checking grammar, brainstorming, conceptualizing ideas, incorporating diverse perspectives, establishing logical connections, and providing immediate feedback, etc. In this way, it saves an immense amount of time as well as the cognitive load of students and provides scope for engaging in meaningful, creative, and innovative thinking. But it also presents a possibility that students become habituated to taking the easiest route, and their motivation to deeply engage with the tasks declines over time. Therefore, it poses a risk that instead of thinking creatively or conceptualising innovative ideas, they become overreliant on technological tools. This overreliance on artificial intelligence tools affects learners' autonomy, cognitive abilities, creativity, critical thinking, decision-making, and analytical reasoning, thus calling for immediate action to prevent harm amongst users (Duhaylungsod & Chavez, 2023; Zhai et al., 2024).

6. Conclusion

Emergent technologies have revolutionized the field of education through their unlimited opportunities for personalized learning, inclusive pedagogy, diversified assessment, effective decision-making, and more. However, various cultural and ethical concerns need to be tackled before their widespread adoption in the education system. Otherwise, it can become a tool of marginalisation, cultural homogenisation, and technology-based systemic oppression. There is a crucial need for a multilayered effort from multiple stakeholders to balance technological innovation with ethical frameworks, culturally responsive policies, and participatory decision-making. Furthermore, equitable access, digital literacy, and AI governance are also needed for a culturally responsive, ethically rooted adoption of emergent technologies in education. Incorporating these strategies can help harness the true potential of emergent technologies without compromising the values of social justice, academic integrity, and inclusion.

References

1. Akgun, S., & Greenhow, C. (2021). Artificial intelligence in education: Addressing ethical challenges in K-12 settings. *AI And Ethics*, 2(3), 431–440. <https://doi.org/10.1007/s43681-021-00096-7>
2. Alam, A. (2023). Harnessing the Power of AI to Create Intelligent Tutoring Systems for Enhanced

- Classroom Experience and Improved Learning Outcomes. In *Lecture Notes on Data Engineering and Communications Technologies* (pp. 571–591). https://doi.org/10.1007/978-981-99-1767-9_42
3. Alsaleh, A. (2024). The impact of technological advancement on culture and society. *Scientific Reports*, 14. <https://doi.org/10.1038/s41598-024-83995-z>
 4. Anwar, M. S., Yang, J., Frnda, J., Choi, A., Baghaei, N., & Ali, M. (2025). Metaverse and XR for cultural heritage education: applications, standards, architecture, and technological insights for enhanced immersive experience. *Virtual Reality*, 29, 51. <https://doi.org/10.1007/s10055-025-01126-z>
 5. Baker, R. S., & Hawn, A. (2021). Algorithmic bias in education. *International Journal of Artificial Intelligence in Education*, 32, 1052–1092. <https://doi.org/10.1007/s40593-021-00285-9>
 6. Balalle, H., & Pannilage, S. (2025). Reassessing academic integrity in the age of AI: A systematic literature review on AI and academic integrity. *Social Sciences & Humanities Open*, 11. <https://doi.org/10.1016/j.ssaho.2025.101299>
 7. Birks, D., & Clare, J. (2023). Linking artificial intelligence facilitated academic misconduct to existing prevention frameworks. *International Journal for Educational Integrity*, 19. <https://doi.org/10.1007/s40979-023-00142-3>
 8. Camilleri, M. A. (2023). Artificial intelligence governance: Ethical considerations and implications for social responsibility. *Expert Systems*, 41(7). <https://doi.org/10.1111/exsy.13406>
 9. Chen, L., Chen, P., & Lin, Z. (2020). Artificial Intelligence in Education: A Review. *IEEE Access*, 8, 75264–75278. <https://doi.org/10.1109/ACCESS.2020.2988510>
 10. Cummings-Koether, M. J., Durner, F., Shyiramunda, T., & Huemmer, M. (2025). Cultural Dimensions of Artificial Intelligence Adoption: Empirical Insights for Wave 1 from a Multinational Longitudinal Pilot Study. *arXiv (Cornell University)*. <https://doi.org/10.48550/arxiv.2510.19743>
 11. Dattoo, A. K., & Kurio, F. (2021). Digital Divide and Social Inequalities: Sociological Perspectives on Technology and Education. In *Innovative Education Technologies for 21st Century* (pp. 191–198). <https://doi.org/10.1201/9781003143796-12>
 12. Demuner, J. A., Gondim, F. J., Klauch, J. J., De Quadros, S. C. L., Souza, A. F. M., & De Oliveira, M. S. (2024). Digital culture in education: Opportunities and challenges. *Aracê*, 6(3), 4987–5000. <https://doi.org/10.56238/arev6n3-044>
 13. Duhaylungsod, A. V., & Chavez, J. V. (2023). ChatGPT and other AI Users: Innovative and Creative Utilitarian Value and Mindset Shift. *Journal of Namibian Studies*, 33. <https://doi.org/10.59670/jns.v33i.2791>
 14. Fitria, T. N. (2021). Artificial Intelligence (AI) In Education: Using AI Tools for Teaching and Learning Process. In *Proceeding Seminar Nasional & Call For Papers*. https://www.researchgate.net/publication/357447234_Artificial_Intelligence_AI_In_Education_Using_AI_Tools_for_Teaching_and_Learning_Process
 15. Huang, L. (2023). Ethics of Artificial Intelligence in Education: Student Privacy and Data Protection. *Science Insights Education Frontiers*, 16(2), 2577–2587. <https://doi.org/10.15354/sief.23.re202>
 16. Imran, M., Almusharraf, N., & Abbasova, M. Y. (2025). Digital learning transformation: A study of teachers' post-Covid-19 experiences. *Social Sciences & Humanities Open*, 11. <https://doi.org/10.1016/j.ssaho.2024.101228>
 17. Jiménez, A. F. (2024). Integration of AI helping teachers in traditional teaching roles. *European Public & Social Innovation Review*, 9, 1–17. <https://doi.org/10.31637/epsir-2024-664>

18. Johnson, R. L., Pistilli, G., Menéndez-González, N., Duran, L. D. D., Panai, E., Kalpokiene, J., & Bertulfo, D. J. (2022). The Ghost in the Machine has an American accent: value conflict in GPT-3. arXiv (Cornell University). <https://doi.org/10.48550/arxiv.2203.07785>
19. Kahn, P., Carrigan, M., Smith, P., Murtagh, L., Liu, R., & Song, F. (2025). Teacher agency and generative artificial intelligence: teaching in higher education as a responsive, cultural activity. Learning, Media and Technology. <https://doi.org/10.1080/17439884.2025.2575993>
20. Kumar, A., Kumar, A., Bhoyar, S., & Mishra, A. K. (2024). Does ChatGPT foster academic misconduct in the future? Public Administration and Policy, 27(2), 140–153. <https://doi.org/10.1108/pap-05-2023-0061>
21. Leahy, S. M., Holland, C., & Ward, F. (2019). The digital frontier: Envisioning future technologies impact on the classroom. Futures, 113. <https://doi.org/10.1016/j.futures.2019.04.009>
22. Li, L., Sha, L., Li, Y., Raković, M., Rong, J., Joksimovic, S., Selwyn, N., Gašević, D., & Chen, G. (2023). Moral Machines or Tyranny of the Majority? A Systematic Review on Predictive Bias in Education. In LAK2023: LAK23: 13th International Learning Analytics and Knowledge Conference (pp. 499–508). <https://doi.org/10.1145/3576050.3576119>
23. Lin, C., Huang, A. Y. Q., & Lu, O. H. T. (2023). Artificial intelligence in intelligent tutoring systems toward sustainable education: a systematic review. Smart Learning Environments, 10. <https://doi.org/10.1186/s40561-023-00260-y>
24. Meighan, P. J. (2021). Decolonizing the digital landscape: the role of technology in Indigenous language revitalization. AlterNative: An International Journal of Indigenous Peoples, 17(3), 397–405. <https://doi.org/10.1177/11771801211037672>
25. Mena-Guacas, A. F., López-Catalán, L., Bernal-Bravo, C., & Ballesteros-Regaña, C. (2025). Educational Transformation Through Emerging Technologies: Critical Review of Scientific Impact on Learning. Education Sciences, 15(3). <https://doi.org/10.3390/educsci15030368>
26. MHRD, Government of India. (2020). National Education Policy 2020. https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf
27. Moshagen, S. N., Antonsen, L., Wiecheteck, L., & Trosterud, T. (2024). Indigenous language technology in the age of machine learning. Acta Borealia, 41(2), 102–116. <https://doi.org/10.1080/08003831.2024.2410124>
28. Munoko, I., Brown-Liburd, H. L., & Vasarhelyi, M. (2020). The Ethical Implications of Using Artificial Intelligence in Auditing. Journal of Business Ethics, 167, 209–234. <https://doi.org/10.1007/s10551-019-04407-1>
29. Owan, V. J., Abang, K. B., Idika, D. O., Etta, E. O., & Bassey, B. A. (2023). Exploring the potential of artificial intelligence tools in educational measurement and assessment. EURASIA Journal of Mathematics, Science and Technology Education, 19(8). <https://doi.org/10.29333/ejmste/13428>
30. Prokopenko, O., & Sapinski, A. (2024). Using Virtual Reality in Education: Ethical and Social Dimensions. E-Learning Innovations Journal, 2(1), 41–62. <https://doi.org/10.57125/ELIJ.2024.03.25.03>
31. Sadowski, J. (2019). When data is capital: Datafication, accumulation, and extraction. Big Data & Society, 6(1). <https://doi.org/10.1177/2053951718820549>
32. Santana-Monagas, E., Falcon, S., & Leon, J. (2025). Emotions in teacher engaging messages: Their interplay with student outcomes. Teaching and Teacher Education, 166. <https://doi.org/10.1016/j.tate.2025.105195>

33. Sapir, E. (1921). Language: An introduction to the study of speech.
34. Schneider, B. (2025). Multilingualism and AI: The Regimentation of Language in the age of Digital Capitalism. *Signs and Society*, 10(3), 362–387. <https://doi.org/10.1086/721757>
35. Shan, S. (2024). The “Boundary” of Technology, Culture, and Digitalization. *Emerging Media*, 2(1), 34–54. <https://doi.org/10.1177/27523543241250133>
36. Tao, Y., Viberg, O., Baker, R. S., & Kizilcec, R. F. (2024). Cultural bias and cultural alignment of large language models. *PNAS Nexus*, 3(9). <https://doi.org/10.1093/pnasnexus/pgae346>
37. Tapalova, O., & Zhiyenbayeva, N. (2022). Artificial Intelligence in Education: AIED for Personalised Learning Pathways. *Electronic Journal of e-Learning*, 639–653. <https://eric.ed.gov/?id=EJ1373006>
38. Tucker, C. (2019). Privacy, Algorithms, and Artificial Intelligence. In *The Economics of Artificial Intelligence: An Agenda*. University of Chicago Press. <https://www.nber.org/books-and-chapters/economics-artificial-intelligence-agenda/privacy-algorithms-and-artificial-intelligence>
39. Umer, R., Susnjak, T., Mathrani, A., & Suriadi, L. (2021). Current stance on predictive analytics in higher education: opportunities, challenges and future directions. *Interactive Learning Environments*, 31(6), 3503–3528. <https://doi.org/10.1080/10494820.2021.1933542>
40. Van Deursen, A. J., & Van Dijk, J. A. (2018). The first-level digital divide shifts from inequalities in physical access to inequalities in material access. *New Media & Society*, 21(2), 354–375. <https://doi.org/10.1177/1461444818797>
41. Vasconcelos, M. A. R., & Santos, R. P. D. (2023). Enhancing STEM learning with ChatGPT and Bing Chat as objects to think with: A case study. *EURASIA Journal of Mathematics, Science and Technology Education*, 19(7). <https://doi.org/10.29333/ejmste/13313>
42. Zhai, C., Wibowo, S., & Li, L. D. (2024). The effects of over-reliance on AI dialogue systems on students’ cognitive abilities: a systematic review. *Smart Learning Environments*, 11. <https://doi.org/10.1186/s40561-024-00316-7>