AI AND EDUCATION: EMPOWERING LEARNERS WHILE SUSTAINING HUMAN-CENTERED VALUES

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Abstract: This article explores the intricate relationship between artificial intelligence (AI) and education. It examines AI's potential to personalize learning, enhance inclusivity, and improve educational quality, while also addressing ethical and social challenges associated with technology integration. The analysis considers pathways for advancing education while preserving human dignity, drawing on UNESCO's ethical guidelines for AI and the United Nations Sustainable Development Goals (SDGs). Recommendations are proposed for the effective and ethical adoption of AI in education to empower learners and promote equitable access to knowledge.

Keywords: Artificial intelligence, education, ethical principles, personalized learning, inclusivity, UNESCO, Sustainable Development Goals.

Аннотация: Мазкур мақолада сунъий интеллект (СИ) ва таълим ўртасидаги ўзаро муносабатларнинг ўзига хос жиҳатлари тадқиқ қилинган. СИ технологияларининг таълим жараёнини персоналлаштириш, инклюзивликни таъминлаш ва сифатни оширишга қаратилган имкониятлари билан бир қаторда, ахлоқий ва ижтимоий муаммоларни келтириб чиқарадиган хавф-хатарлари ҳам кўриб чиқилган. ЮНЕСКОнинг СИ ахлоқи бўйича тавсиялари ва БМТнинг Барқарор ривожланиш мақсадлари доирасида таълимни инсон қадр-қимматини сақлаган ҳолда ривожлантириш йўллари таҳлил қилинган. Шунга кўра, мақолада таълимдаги СИдан самарали ва этик жиҳатдан тўғри фойдаланишга доир тавсиялар келтирилган.

Калит сўзлар: Сунъий интеллект, таълим, ахлоқий тамойиллар, персоналлаштирилган таълим, инклюзивлик, ЮНЕСКО, Барқарор ривожланиш мақсадлари.

Аннотация: В этой статье исследуется взаимосвязь между искусственным интеллектом (ИИ) и образованием. В ней рассматривается потенциал ИИ для персонализации обучения, расширения инклюзивности и повышения качества образования, а также этические и социальные проблемы, связанные с интеграцией технологий. В анализе рассматриваются пути развития образования при сохранении человеческого достоинства, опираясь на этические принципы ЮНЕСКО в области ИИ и Цели устойчивого развития ООН (ЦУР).

Предлагаются рекомендации по эффективному и этичному внедрению ИИ в образование для расширения возможностей учащихся и обеспечения справедливого доступа к знаниям.

Ключевые слова: Искусственный интеллект, образование, этические принципы, персонализированное обучение, инклюзивность, ЮНЕСКО, Цели устойчивого развития.

Introduction

Education is the cornerstone of human development and societal progress, enabling people to realise their full potential and make a positive contribution to society. Education, as enshrined in numerous United Nations (UN) declarations and frameworks, is a fundamental human right and a powerful driver for sustainable development. It plays a decisive role in nurturing responsible global citizens capable of understanding and addressing major societal challenges, from poverty and inequality to environmental sustainability.

Every year, **24 January** is celebrated as the **International Day of Education**, highlighting the importance of education in transforming lives and societies. In 2025, this crucial day is celebrated under the theme '*AI and education: Preserving human agency in a world of automation*[1], highlighting how rapid advances in artificial intelligence (AI) intersect with educational goals and methodologies.

Artificial intelligence technologies have made significant strides in recent years, penetrating virtually every aspect of modern life - social networking algorithms, virtual assistants, self-driving cars and advanced medical diagnostics. According to various reports from the United Nations (UN) and the United Nations Educational, Scientific and Cultural Organisation (UNESCO), this growth will accelerate further, opening up new opportunities to improve teaching and learning outcomes[2]. However, it also raises serious concerns about ethics, equity, privacy and the preservation of human capabilities in the face of increasingly autonomous systems. The challenge is therefore to ensure that AI tools are used in ways that enhance, rather than undermine, human potential, creativity and social well-being.

This article explores the intricate relationship between AI and education by examining the role of technology in creating inclusive and high-quality learning environments while preserving fundamental human values. Drawing on Goal 4 of the UN Sustainable Development Goals (SDG 4), which promotes inclusive and equitable

[1] United Nations, *International Day of Education*. Available at: <https://www.un.org/en/observances/education-day> accessed 10 January 2025.

[2] United Nations (2020). *The Impact of Rapid Technological Change on Sustainable Development*. Available at: < https://unctad.org/publication/impact-rapid-technological-change-sustainable-development> accessed 13 January 2025.

quality education and provides lifelong learning opportunities for all[3], this analysis clarifies how AI can be integrated into educational systems in ways that empower learners, protect human potential, and support UNESCO's ethical and human rights guidelines[4].

Setting the Stage: The UN's Vision for Education in the Digital Age

The UN's 2030 Agenda for Sustainable Development affirms the essential role of education in shaping a world free of poverty, inequality, and environmental degradation[5]. Among the 17 Sustainable Development Goals, **SDG 4** is prominent, bringing together global stakeholders - governments, civil society, business and local communities to ensure that '*no one is left behind'*. Education is not just about acquiring knowledge; it also contributes to the skills, values and attitudes needed for learners to become active and socially responsible citizens.

In the digital age, this challenge is even more pressing. Technological advances, including the development of artificial intelligence, are reshaping workplaces and societies, opening up new opportunities but also creating potentially life-changing challenges[6]. UNESCO estimates that the skill sets required for future jobs and indeed for everyday life are changing radically, placing new demands on educational institutions to develop students' analytical thinking, digital literacy, adaptability and ethical judgement.

UNESCO, a specialised agency of the United Nations, is at the forefront of international efforts to improve education systems worldwide. Through its various initiatives from the *Future of Education*[7] Initiative to *the Beijing Consensus on Artificial Intelligence and Education*, UNESCO emphasises the urgent need to use technological innovation to expand the reach and quality of learning while preserving the dignity and rights of learners and educators[8].

A key message echoing through UNESCO's resources is the importance of inclusivity, especially regarding marginalized and underserved communities. If not managed carefully, AI technologies risk exacerbating existing inequalities by reinforcing biases found in data sets, diverting resources disproportionately, or creating costly tools that remain inaccessible to disadvantaged populations.

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[3] United Nations (2015*). Transforming Our World: The 2030 Agenda for Sustainable Development*. Available at: < https://sdgs.un.org/2030agenda> accessed 10 January 2025.

[4] UNESCO (2021). *Recommendation on the Ethics of Artificial Intelligence*. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000381137> accessed 12 January 2025.

[5] Ibid., *2030 Agenda for Sustainable Development* (see Footnote 3).

[6] UNESCO (2021). *Artificial Intelligence in Education: Challenges and Opportunities for Sustainable Development*. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000366994 accessed 13 January 2025.

[7] UNESCO. *Futures of Education*. Reimagining how knowledge and learning can shape the future of humanity and the planet. Available at: <https://www.unesco.org/en/futures-education> accessed 15 January 2025.

8 UNESCO (2019). *Beijing Consensus on Artificial Intelligence and Education*. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000368303> accessed 15 January 2025.

At the same time, AI can be a valuable lever for democratizing education: open educational resources can be personalized and disseminated at scale, learners in remote areas can benefit from virtual tutoring, and real-time analytics can guide teachers to better support struggling students.

Hence, when UNESCO advocates for *"leaving no one behind"* in education, it implies that the integration of AI needs to be done systematically and ethically, reinforcing rather than weakening the universal nature of education as a public good.

The Potential of AI in Transforming Education

One of the most frequently lauded benefits of AI in education is its capacity to enable personalized learning experiences[9]. Instead of a one-size-fits-all approach, AI-driven platforms can adapt pedagogical content and pace according to students' individual learning styles, strengths, and areas for improvement. For instance, adaptive learning systems can analyze a learner's performance on certain tasks in real time, instantly recommending additional reading, practice questions, or interactive modules designed to remediate gaps in understanding.

Such personalization enhances engagement by tailoring the curriculum to students' interests and abilities. In traditional classroom settings especially those with large student numbers teachers may find it challenging to give each student the level of individualized attention they need. AI can lessen that burden, allowing teachers to focus on higher-order tasks, such as facilitating critical discussions, mentoring, or providing emotional support.

However, personalized learning is not without its complexities. It relies heavily on collecting and analyzing vast quantities of student data everything from their academic records to their keystrokes on digital platforms. This data-intensive approach raises ethical concerns about privacy, data protection, and the potential for algorithmic profiling. Thus, any adoption of AI for personalized learning must be carefully designed and regulated to protect learners from unfair or intrusive surveillance, in line with UNESCO's *Recommendation on the Ethics of Artificial Intelligence*, adopted in 2021[10].

AI, when used thoughtfully, can enhance teachers' capacities. Intelligent tutoring systems, for example, can handle repetitive or routine tasks such as grading objective exercises freeing up more time for teachers to focus on individualized student feedback, collaborative projects, and the development of students' socio-emotional skills[11].

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[9] UNESCO (2020). *Global education monitoring report, 2024/5, Leadership in education: lead for learning*. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000391406> accessed 16 January 2025.

[10] *Recommendation on the Ethics of Artificial Intelligence*. (see Footnote 4).

[11] UNESCO (2020). *International Task Force on Teachers for Education 2030*. Available at: <https://teachertaskforce.org/> accessed 16 January 2025.

Moreover, AI tools can offer real-time analytics that help educators identify where students are struggling and quickly intervene with targeted support. These insights can further guide professional development efforts, highlighting areas where teachers themselves may need additional training or resources to better meet their students' needs[12].

However, it is imperative to underscore that AI should not be seen as a replacement for teachers. The teaching profession is rooted in human empathy, creativity, and the ability to inspire students through meaningful interactions qualities that machines, however intelligent, cannot replicate. The UNESCO report on *Teacher Policy Development*[13] emphasizes that technology should complement, rather than substitute, qualified and well-supported educators.

Another major potential of AI in education revolves around accessibility. AI-driven technologies speech recognition software, text-to-speech programs, and real-time translation services hold promise for learners with disabilities or those who speak minority languages[14]. With the assistance of AI, such students can engage more deeply and confidently with course materials, bridging linguistic and physical barriers that might otherwise hinder their educational progress.

For example, UNESCO's *Global Education Monitoring Report* highlights the transformative power of assistive technologies for students with visual or hearing impairments, significantly enhancing their ability to participate in mainstream classroom environments[15]. Furthermore, in remote or conflict-afflicted regions, AI-enabled distance learning can act as a lifeline for learners whose access to traditional schooling is disrupted. In such contexts, AI can bolster emergency education services, providing continuity of learning despite crises.

Nonetheless, while AI-driven tools can be a powerful force for inclusion, the issue of the digital divide must be addressed. High-speed internet, modern devices, and digital literacy training are prerequisites to harnessing the full potential of AI in education[16]. As underlined by the UN's *Secretary-General's Roadmap for Digital Cooperation*[17], ensuring equitable access to technology must be a global priority. Otherwise, AI integration risks amplifying existing inequalities, leaving the most vulnerable behind.

Preserving Human Agency in a World of Automation

[12] Ibid.
[13] UNESCO (2019). *Teacher Policy Development Guide*. Available at: < https://unesdoc.unesco.org/ark:/48223/pf0000370966> accessed 16 January 2025.
[14] Ibid.
[15] *Global education monitoring report* (see Footnote 6).
[16] UNESCO (2024). What you need to know about digital learning and transformation of education. Available at: <https://www.unesco.org/en/digital-education/need-know> accessed 17 January 2025.
[17] United Nations. United Nations Secretary-General' Roadmap for Digital Cooperation. Available at: <https://www.un.org/en/content/digital-cooperation-roadmap/> accessed 16 January 2025.

The rapid ascent of AI inevitably raises questions about autonomy, privacy, and agency. According to UNESCO's *Recommendation on the Ethics of Artificial Intelligence*, it is crucial that AI systems be developed and deployed with respect for human rights, democratic values, and social justice[18]. This is particularly relevant in educational contexts, where AI-based assessments or interventions can significantly influence learners' trajectories.

Algorithms used for grading, for instance, might inadvertently reflect biases embedded in their training data, resulting in unfair outcomes for certain student groups. Likewise, intelligent tutoring systems that heavily rely on analytics may encourage a narrow definition of "learning success," neglecting the importance of creativity, emotional intelligence, and critical thinking. To maintain learners' agency and dignity, educators and policymakers must ensure transparency in how AI-based decisions are made, providing avenues for appeal, critique, and human oversight.

In this vein, UNESCO advocates for an approach known as "human-in-the-loop,"[19] wherein humans always retain final decision-making authority, guided by a robust regulatory framework that demands explainability and accountability. By retaining a degree of oversight and intentionally designing AI tools to complement rather than usurp human judgment, educational institutions can prevent the erosion of essential values such as independence, privacy, and justice.

Data management lies at the heart of AI deployments. From collecting facial recognition data to capturing keystroke patterns, AI systems thrive on large datasets that often originate from vulnerable student populations, including children. The question of meaningful consent thus becomes paramount. Learners and their guardians should have clear, understandable information about how their data is being used, stored, and shared, as well as the opportunity to opt out when appropriate[20].

Transparency initiatives, such as UNESCO's emphasis on open data policies and open-source algorithms[21], can also build trust in AI systems. When educators, parents, and students have a clearer understanding of how AI functions, they are better positioned to evaluate its benefits and challenges, thereby preserving a sense of agency rather than succumbing to the opaque influence of black-box technologies.

Preserving human agency also depends on how well learners are equipped to critically engage with AI-driven systems. Digital literacy should encompass not only the operational aspects of using digital tools but also the ethical and societal implications tied to AI[22]. A digitally literate citizen is one who can interpret algorithmic

[18] Recommendation on the Ethics of Artificial Intelligence. (see Footnote 4).
[19] *Recommendation on the Ethics of Artificial Intelligence*. (see Footnote 4).
[20] *Recommendation on the Ethics of Artificial Intelligence*. (see Footnote 4).
[21] Ibid.
[22] UNESCO (2019). Recommendation on Open Educational Resources. Available at: <https://www.unesco.org/en/legal-affairs/recommendation-open-educational-resources-oer> accessed 16 January 2025.

outputs, question their validity, and understand the broader societal impacts of automated decision-making.

By teaching students to be discerning consumers (and, eventually, producers) of AI technologies, educational systems can fortify the foundations of participatory democracy. Learners should gain not only technical know-how but also a sense of responsibility in shaping how AI evolves, ensuring that the next generation of innovators upholds principles of transparency, fairness, and social responsibility.

The Role of Policy and Global Collaboration

Given AI's far-reaching societal impact, both the UN and UNESCO emphasize the urgent need for coherent regulatory frameworks that protect human rights and promote social good. UNESCO's *Recommendation on the Ethics of Artificial Intelligence* outlines a set of values-based principles to guide AI development and usage, ranging from respect for human dignity and agency to ensuring solidarity and diversity[23].

These regulations are vital to the education sector for several reasons. First, they safeguard learners especially children from unethical data extraction or manipulation. Second, they reinforce the importance of teacher autonomy, preventing commercially driven AI solutions from eroding professional judgment or turning schools into profit-driven data hubs. Third, they help align AI initiatives with broader educational goals, ensuring that technology remains a tool for enabling holistic, learner-centered development.

International cooperation is crucial to ensure that AI in education does not merely benefit those already endowed with advanced technological infrastructure. The *UN Secretary-General's Roadmap for Digital Cooperation* underscores the necessity of investments in digital connectivity, local content creation, and capacity-building initiatives to help all regions, particularly developing countries, integrate AI tools effectively[24].

Collaboration can take various forms, including joint research projects, cross-border teacher training programs, and the development of localized AI-driven content in multiple languages. UNESCO's Global Education Coalition[25], for instance, brings together public and private actors to advance digital learning solutions, aiming to mitigate disruptions caused by pandemics or conflict. Such alliances show that purposeful, collaborative efforts can accelerate the ethical and equitable deployment of AI for educational improvement on a global scale.

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[23] *Recommendation on the Ethics of Artificial Intelligence*. (see Footnote 4).
[24] *UN Secretary-General's Roadmap for Digital Cooperation.* (see Footnote 17).
[25] UNESCO. Global Education Coalition. Available at: <https://globaleducationcoalition.unesco.org/> accessed 17 January 2025.

For AI in education to evolve responsibly, a broad spectrum of stakeholders must be involved in policy design and implementation. Beyond governments and international organizations like the UN and UNESCO, civil society groups, private-sector technology companies, educators, parents, and learners themselves have crucial roles to play.

Involving students and teachers in discussions about AI not only fosters democratic participation but also yields valuable insights into the practical realities of AI in classrooms. Meanwhile, private-sector partnerships can bring the latest innovations and resources to underserved regions, provided they adhere to internationally recognized ethical guidelines. Civil society organizations can act as watchdogs, ensuring transparency and accountability across AI initiatives.

Uzbekistan's Experience with AI in Education

Uzbekistan is actively using AI and digital technologies to improve educational outcomes, keep up with global trends and modernise the economy. As part of the national strategy '*Digital Uzbekistan 2030'*, the government is focusing on the digital transformation of public services, including education[26].

Alongside AI integration, Uzbekistan has joined regional and global initiatives to enhance digital literacy. One prominent example is the *One Million Uzbek Coders* program launched in partnership with the UAE, aimed at training young people in programming and data science[27].

The plan for advancing Uzbekistan's higher education system by 2030 involves the integration of digital technologies and modern teaching methods into the educational framework. To facilitate this, there are initiatives to implement digital tools and contemporary approaches within the learning process. President Shavkat Mirziyoyev of Uzbekistan highlighted that "*enhancing the quality of education is the only true path to developing the New Uzbekistan*"[28]. Furthermore, the renowned poet and philosopher Yusuf Khos Khojib remarked, '*Where there is intelligence, there is greatness, where there is knowledge, there is glory'*[29]. To accomplish these aims, it is crucial to persist with the ongoing reforms in this field, engage more frequently with educators and mentors, collaboratively address current issues, and support the execution of their ideas to improve the quality of the educational process.

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[26] GlobalCIO. "Current Aspects of Digitalization in Uzbekistan. Available at: <https://globalcio.com/articles/main/current-aspects-of-digitalization-in-uzbekistan/> accessed January 19, 2025.

[27] "There are already 500 thousand participants on the 'One Million Uzbek Coders' project," IT Park Uzbekistan, accessed January 18, 2025. https://it-park.uz/en/itpark/news/there-are-already-500-thousand-participants-on-the-one-million-uzbek-coders-project

[28] Абдурахманов, К. Х. Искусственный интеллект - основа устойчивого развития экономики. - Москва: ФГБОУ ВО «РЭУ им. Г. В. Плеханова», 2023. - 199 с.

[29] Address by the President of the Republic of Uzbekistan H.E. Mr. Shavkat Mirziyoyev to the Oliy Majlis and the People of Uzbekistan. - URL: https://president.uz/en/lists/view/5774.

Uzbekistan is implementing a specialized framework for the use of artificial intelligence (AI) technologies. This initiative involves establishing the necessary organizational and legal infrastructures for businesses and research institutions engaged in AI-based experimental activities, software development, and the provision of services through pilot projects. Additionally, it includes offering legal advantages related to the testing and deployment of software products in practical applications.

The special framework is set to remain in effect for five years, with the possibility of extension based on the coordination commission's evaluation of the 'Digital Uzbekistan-2030' Strategy's progress.

Muhammad Al-Khwarizmi University of Information Technologies in Tashkent will educate experts in artificial (computer) intelligence, one of the most promising disciplines within informatics and computer science. Efforts in the AI sector are focused on developing methods, tools, and technologies for designing computer systems including training programs, expert systems, counseling services, and robotics to address challenges traditionally considered intellectual in nature[30].

In 2023, UNICEF collaborated with the Ministry of Preschool and School Education to pilot Eduten, a Finnish AI-based digital math learning platform. Implemented over 12 weeks in Tashkent, the program replaced one regular math lesson per week with Eduten for 527 students. The results showed an average improvement of 16.9% in mathematics skills among participants. Teachers noted that Eduten adapts to individual student needs, providing personalized learning experiences[31].

The government has established an Artificial Intelligence Council under the Ministry of Innovation to develop Uzbekistan's National AI Strategy. This council aims to foster collaboration between AI researchers and companies for practical applications across various sectors, including education[32].

These efforts reflect Uzbekistan's commitment to leveraging AI to enhance educational outcomes and align with global technological advancements. While challenges remain, these early efforts suggest a roadmap for other nations similarly seeking to balance innovation with inclusivity and ethical considerations.

Challenges and Opportunities Ahead

Despite progress, significant challenges remain. Approximately 244 million children and adolescents worldwide are out of school, and 617 million lack basic literacy and numeracy skills. Barriers such as poverty, discrimination, and conflict

[30] Абдурахманов, К. Х. Искусственный интеллект - основа устойчивого развития экономики. - Москва: ФГБОУ ВО «РЭУ им. Г. В. Плеханова», 2023. - 231 с.

[31] UNICEF. Digital learning – innovative approach in education system in Uzbekistan. Eduten - digital math learning platform based on artificial intelligence. Available at: https://www.unicef.org/uzbekistan/en/stories/digital-learning-innovative-approach-education-system-uzbekistan?utm_source=chatgpt.com

[32] Yuz.uz. An Artificial Intelligence Council has been established in Uzbekistan under the Ministry of Innovation Available at: < https://yuz.uz/en/news/v-uzbekistane-pri-mininnovatsii-sozdan-sovet-po-iskusstvennomu-intellektu?utm_source=chatgpt.com>.

continue to impede access to quality education. Addressing these issues is crucial for achieving Sustainable Development Goal 4, which aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" by 2030[33].

Algorithmic bias remains a pressing concern in AI deployments. Education is no exception. If AI systems are fed data that reflect existing social inequities be they racial, gender-based, or socio-economic the technology may inadvertently perpetuate these biases in assessing student performance or recommending academic paths[34].

Addressing algorithmic bias requires rigorous auditing, diverse data sets, and inclusive design processes that involve stakeholders from varied backgrounds. UNESCO's guidelines urge developers and educational institutions to proactively identify and mitigate bias through transparent methodologies and ongoing evaluations. By confronting bias at its source, AI can better serve as a tool to enhance, rather than undermine, equity in education.

Another significant challenge is the lack of consistent funding and capacity-building opportunities. Many countries, especially in low-income regions, grapple with insufficient resources to deploy advanced AI tools or train educators in their use. Even in high-income nations, economic disparities within communities can limit equitable access to AI-enabled education.

Closing these gaps demands sustained financial commitments from governments, philanthropic organizations, and private-sector partners. It also calls for large-scale capacity-building efforts that equip educators and administrators with the skills they need to harness AI effectively. UNESCO's frameworks emphasize the importance of teacher training programs, curriculum development, and the creation of open educational resources that can be easily adapted across diverse contexts[35].

While AI can streamline many educational processes, it cannot replicate the emotional and social nuances intrinsic to teaching and learning. Social and emotional learning (SEL) is increasingly recognized as a critical component of holistic education, helping students develop empathy, resilience, cooperation skills, and self-awareness. AI-driven platforms, at best, can provide data-driven insights into a student's emotional state or engagement levels, but actual emotional support remains the province of human relationships[36].

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[33] United Nations, *International Day of Education* <https://www.un.org/en/observances/education-day> accessed 10 January 2025.

[34] Baker, R.S., Hawn, A. Algorithmic Bias in Education. *Int J Artif Intell Educ* **32**, 1052–1092 (2022). https://doi.org/10.1007/s40593-021-00285-9.

[35] UNESCO (2024). *AI competency framework for teachers*. Available at: <https://www.unesco.org/en/articles/ai-competency-framework-teachers> accessed 17 January 2025.

[36] Olateju Temitope Akintayo, Chima Abimbola Eden, Oyebola Olusola Ayeni, and Nneamaka Chisom Onyebuchi (2024). Integrating AI with emotional and social learning in primary education: Developing a holistic adaptive learning ecosystem. Computer Science & IT Research Journal. 5. 1076-1089. 10.51594/csitrj.v5i5.1116.

In a world where automation is pervasive, educational systems must affirm the importance of human connection, empathy, and mutual understanding. Teachers, counselors, and support staff are irreplaceable in nurturing students' emotional well-being. Moreover, students themselves learn valuable interpersonal skills through face-to-face interactions with peers. As AI advances, schools and universities should endeavor to strike a balance that preserves and promotes these essential human qualities.

The accelerating pace of technological change underscores the need for lifelong learning. Gone are the days when formal education would adequately prepare a person for an entire career. AI-driven transformations in the labor market are reshaping jobs, demanding continuous upskilling and reskilling[37].

Educational institutions, in tandem with policymakers and industry stakeholders, must reimagine curricula and credentialing systems to embrace flexible and modular learning pathways. Micro-credentials, stackable courses, and recognized skills badges may become the norm, allowing individuals to adapt as technology evolves[38]. AI can assist in identifying emerging skill demands, guiding learners toward relevant training opportunities, but the onus is on educational leaders to ensure that these tools remain accessible and transparent[39]. UNESCO's *Futures of Education* initiative points to the importance of cultivating not just technical skills, but also ethical discernment, cultural awareness, and a sense of global citizenship.

Charting the Path Forward: Recommendations and Conclusions

In order to harness AI for the benefit of all learners while preserving human agency, policymakers should prioritize the following actions:

First, countries should align their national AI strategies with UNESCO's *Recommendation on the Ethics of Artificial Intelligence*, embedding values of transparency, accountability, and human oversight into every step of AI adoption in education.

Second, legal frameworks are needed to protect students' personal information. Consent protocols must be clear and tailored for children, with the provision of regular audits to ensure ethical data usage.

Third, encourage the development of diverse and representative datasets, along with rigorous auditing tools, to mitigate biases that could marginalize certain groups of learners.

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[37] Li Ling. (2022). Reskilling and Upskilling the Future-ready Workforce for Industry 4.0 and Beyond. Information systems frontiers: a journal of research and innovation, 1–16. Advance online publication. https://doi.org/10.1007/s10796-022-10308-y.

[38] UNESCO (2023). Short courses, micro-credentials, and flexible learning pathways: a blueprint for policy development and action: policy paper. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000384326> accessed 17 January 2025.

[39] World Economic Forum (2024). Shaping the Future of Learning: The Role of AI in Education 4.0. Available at: < https://www3.weforum.org/docs/WEF_Shaping_the_Future_of_Learning_2024.pdf> accessed 17 January 2025.

Fourth, teachers and school administrators require ongoing professional development, not only in using AI-based tools but also in understanding their ethical and social implications.

Fifth, Governments and international organizations must collaborate to bridge the digital divide by expanding internet connectivity, providing devices, and bolstering digital literacy across regions and populations.

Sixth, Multistakeholder forums should be organized at local, national, and global levels to discuss best practices, share resources, and promote inclusive policymaking on AI in education.

No country can address the challenges and seize the opportunities of AI in education in isolation. Global collaboration through UN agencies, UNESCO programs, and partnerships between public and private sectors is essential. By pooling resources and expertise, nations can accelerate the responsible deployment of AI, benefiting learners worldwide and preventing the emergence of a technology-driven global divide.

Human agency, dignity, and creativity must remain at the center of educational endeavors. In practical terms, this means that AI should be treated as a tool—an advanced one, but still a tool whose primary function is to amplify rather than replace human capabilities. By maintaining strict ethical guidelines, ensuring stakeholder participation, and cultivating digital literacy from a young age, schools and universities can transform AI from a source of apprehension into an engine of empowerment.

In this dynamic landscape, UNESCO's ethical guidelines for AI, along with the UN's broader sustainable development frameworks, serve as guideposts. They remind us that technology must be subservient to the welfare of humanity, not the other way around. *"Preserving human agency in a world of automation"* demands vigilance, advocacy, and cooperation at all levels of society. This includes recognizing teachers' indispensable role, ensuring equitable access to digital infrastructure, involving all stakeholders in policy decisions, and fortifying students' capacity to critically engage with AI tools.

As we celebrate the **2025 International Day of Education**, the lessons we carry forward should inspire collective action: AI can be integrated into education to promote a more equitable and enlightened global community if we approach it with foresight, inclusivity, and respect for human dignity. *We stand at the threshold of a new era, where the symbiosis between human ingenuity and machine capabilities can herald an educational renaissance one that preserves and amplifies our distinctively human values even as it opens new frontiers of knowledge and collaboration.* Through **thoughtful regulation**, **wide-ranging collaboration**, and **unwavering dedication to ethical principles**, we can ensure that the transformative power of AI remains in

service of empowering learners worldwide and building a future where *no one is left behind*.