

**Education in an age of Artificial Intelligence:
Harnessing the Technology, Avoiding
Cultural Bias, and Eliminating other
Emerging Risks**

Kariuki Muigua

Education in an age of Artificial Intelligence: Harnessing the Technology, Avoiding Cultural Bias, and Eliminating other Emerging Risks

Table of Contents

Abstract..... 3

1.0 Introduction 3

2.0 Artificial Intelligence and Education: Opportunities and Risks 6

3.0 Adopting Technology and AI in Education for Sustainable Development 10

4.0 Conclusion 12

References 13

Education in an age of Artificial Intelligence: Harnessing the Technology, Avoiding Cultural Bias, and Eliminating other Emerging Risks

Kariuki Muigua*

Abstract

This paper critically examines the landscape of education in age of Artificial Intelligence (AI). The paper observes that technology and AI are powerful tools that are revolutionizing education thus driving human progress and Sustainable Development. In particular, the paper posits that AI has the potential to address some of the biggest challenges in education by ensuring accessibility, affordability, inclusivity and quality of education. It discusses how AI is transforming education at all levels. Despite their efficacy, the paper points out that the integration of technology and AI into education raises several concerns. It examines some of the key risks and ethical concerns arising from the adoption of AI in education. In light of these concerns, the paper discusses how technology and AI can be effectively harnessed including through avoiding biases and eliminating risks in order to ensure inclusion, equity and fairness in education for human progress and Sustainable Development.

1.0 Introduction

Education is a powerful tool that is driving human progress and Sustainable Development. Quality education and learning is linked to progress in the economic, social, cultural and political spheres of life¹. Education enables individuals and societies to acquire knowledge, develop skills, cultivate personal growth and foster community cohesion towards human progress and development². Due to its importance in ensuring

* PhD in Law (Nrb),SC, FCI Arb (Chartered Arbitrator),OGW, LL. B (Hons) Nrb, LL.M (Environmental Law) Nrb; Dip. In Law (KSL); FCPS (K); Dip. in Arbitration (UK); MKIM; Mediator; Consultant: Lead expert EIA/EA NEMA; BSI ISO/IEC 27001:2005 ISMS Lead Auditor/ Implementer; ESG Consultant; Advocate of the High Court of Kenya; Professor of Environmental Law and Conflict Management at the University of Nairobi, Faculty of Law; Member of the Permanent Court of Arbitration (PCA) [March, 2026].

¹ The Role of Education in Human Growth and Development., Available at <https://aithor.com/essay-examples/the-role-of-education-in-human-growth-and-development> (Accessed on 16/03/2026)

² Deshmane. P.H., & Thombre. K., 'The Impact of Education on Human Development in the 21st Century: Needs, Challenges& Opportunities' Available at <https://ibrj.us/wp-content/uploads/010302.pdf> (Accessed on 16/03/2026)

human progress, it has been pointed out that education is a fundamental human right and not a privilege³. Consequently, states have an obligation to protect, respect, and fulfil the right to education for all without any form of discrimination⁴.

International human right instruments including the *Universal Declaration of Human Rights (UDHR)*⁵; the *International Covenant on Economic, Social and Cultural Rights (ICESCR)*⁶; the *Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)*⁷; and the *Convention on the Rights of the Child*⁸ require all states to uphold the right to education including through ensuring free, compulsory primary education for all children; developing secondary education, supported by measures to render it accessible to all children; ensuring equitable access to higher education for all; eliminating discrimination against women and girls in access to education; and providing basic education for individuals who have not completed primary education⁹. The *African Charter on Human and Peoples' Rights*¹⁰ also stipulates that every individual in Africa has the right to quality education¹¹. At a national level, the *Constitution of Kenya*¹² recognises

³ Understanding Education as a Right., Available at <https://www.right-to-education.org/page/understanding-education-right> (Accessed on 16/03/2026)

⁴ Ibid

⁵ United Nations General Assembly. The Universal Declaration of Human Rights (UDHR). New York: United Nations General Assembly, 1948

⁶ United Nations General Assembly, *International Covenant on Economic, Social and Cultural Rights*, United Nations, Treaty Series, vol. 993, p. 3, 16 December 1966

⁷ United Nations General Assembly, *Convention on the Elimination of All Forms of Discrimination Against Women*, United Nations, Treaty Series, vol. 1249, p. 13, 18 December 1979

⁸ United Nations General Assembly, *Convention on the Rights of the Child*, United Nations, Treaty Series, vol. 1577, p. 3, 20 November 1989

⁹ United Nation's Children Fund., 'A Human Rights-Based Approach to Education for All' Available at https://www.right-to-education.org/sites/right-to-education.org/files/resource-attachments/A%20Human%20Rights-based%20Approach%20to%20Education%20for%20All_0.pdf (Accessed on 16/03/2026)

¹⁰ Organization of African Unity (OAU), *African Charter on Human and Peoples' Rights ("Banjul Charter")*, CAB/LEG/67/3 rev. 5, 21 I.L.M. 58 (1982), 27 June 1981

¹¹ Ibid, article 17 (1)

¹² Constitution of Kenya., 2010., Government Printer, Nairobi

the human right to education for all including children, the youth, persons with disabilities, minorities and marginalised groups¹³.

Education is therefore a fundamental human right whose attainment is necessary towards human progress and Sustainable Development. Quality education empowers people with the knowledge, skills, values, attitudes and behaviors that are vital for economic development, social cohesion and environmental conservation towards Sustainable Development¹⁴. Education is at the heart of Sustainable Development since it equips individuals and societies with a sense of responsibility to protect and conserve the environment, advocate for social justice, and pursue economic opportunities in a sustainable manner¹⁵. The United Nation's *2030 Agenda for Sustainable Development*¹⁶ recognises the fundamental role of education in fostering development. Sustainable Development Goal (SDG) 4 seeks to ensure inclusive and equitable education and promote lifelong learning opportunities for all towards sustainability¹⁷.

Strengthening access to and quality of education is therefore a global imperative towards ensuring human progress and Sustainable Development. Consequently, it has been observed that the growth of technology and Artificial Intelligence (AI) provides opportunities to ensure accessibility, inclusivity and quality of education in the pursuit of Sustainable Development¹⁸. However, achieving this goal involves addressing

¹³ Ibid

¹⁴ United Nations Educational, Scientific and Cultural Organization., 'Education for Sustainable Development' Available at <https://www.unesco.org/en/sustainable-development/education> (Accessed on 16/03/2026)

¹⁵ Role of Education in Sustainable Development., Available at <https://icecd.org/blog/role-of-education-in-sustainable-development/> (Accessed on 16/03/2026)

¹⁶ United Nations General Assembly., 'Transforming Our World: the 2030 Agenda for Sustainable Development.' 21 October 2015, A/RES/70/1., Available at <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf> (Accessed on 16/03/2026)

¹⁷ Ibid

¹⁸ United Nations Educational, Scientific and Cultural Organization., 'Empowering Education: The Transformative Role of Technology in Africa' Available at

multiple risks and challenges in technology and AI for inclusion, equity, justice and fairness¹⁹.

This paper critically examines the landscape of education in age of Artificial Intelligence (AI). The paper observes that technology and AI are powerful tools that are revolutionizing education thus driving human progress and Sustainable Development. In particular, the paper posits that AI has the potential to address some of the biggest challenges in education by ensuring accessibility, affordability, inclusivity and quality of education. It discusses how AI is transforming education at all levels. Despite their efficacy, the paper points out that the integration of technology and AI into education raises several concerns. It examines some of the key risks and ethical concerns arising from the adoption of AI in education. In light of these concerns, the paper discusses how technology and AI can be effectively harnessed including through avoiding biases and eliminating risks in order to ensure inclusion, equity and fairness in education for human progress and Sustainable Development.

2.0 Artificial Intelligence and Education: Opportunities and Risks

The growth of technology including AI holds immense potential to improve accessibility, affordability, inclusivity and quality of education. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), technology has emerged as a powerful tool that is revolutionizing education all over the world²⁰. For instance, the widespread availability and accessibility of mobile devices and internet connectivity is enabling students in both urban and remote areas to access diverse educational content, engage in interactive learning experiences, and connect with educators and peers all over

<https://www.iicba.unesco.org/en/empowering-education-transformative-role-technology-africa>

(Accessed on 16/03/2026)

¹⁹ United Nations Educational, Scientific and Cultural Organization., 'Artificial intelligence in education' Available at <https://www.unesco.org/en/digital-education/artificial-intelligence> (Accessed on 16/03/2026)

²⁰ United Nations Educational, Scientific and Cultural Organization., 'Empowering Education: The Transformative Role of Technology in Africa' Op Cit

the world²¹. Further, technology is enabling educators to create dynamic and interactive learning platforms, tailor instructions to the unique needs of students, provide real time feedbacks, and improve the quality of learning and teaching²². Technology is improving education and learning experiences by enabling broader inclusion, and student engagement and collaboration²³.

According to the United Nations, harnessing the power of the digital revolution can ensure that quality education is provided as a public good and a human right especially for vulnerable and marginalised individuals and communities²⁴. Harnessing technology is key in accelerating progress towards SDG 4 (quality education and lifelong learning opportunities for all)²⁵. Further, it has been observed that technology can ensure that no one is left behind by narrowing the gap in quality education between developed and developing countries and urban and rural areas²⁶. Technology can therefore improve accessibility and quality of education towards Sustainable Development.

In particular, AI is a modern technological solution that is transforming the landscape of education. It has been observed that AI promises broader access, personalized learning experiences, and more efficient educational management²⁷. For instance, AI can empower students by providing access to otherwise unavailable learning materials and

²¹ Ibid

²² Ibid

²³ Technology in the Classroom: Benefits and the Impact on Education., Available at <https://www.gcu.edu/blog/teaching-school-administration/how-using-technology-teaching-affects-classrooms> (Accessed on 16/03/2026)

²⁴ United Nations., 'Assuring and improving quality public digital learning for all' Available at <https://www.un.org/en/transforming-education-summit/digital-learning-all> (Accessed on 16/03/2026)

²⁵ United Nations., 'New Partnership for Digital Education' Available at <https://www.un.org/en/academic-impact/new-partnerships-digital-education> (Accessed on 16/03/2026)

²⁶ Ibid

²⁷ United Nations Educational, Scientific and Cultural Organization., 'AI and education: Protecting the rights of learners' Available at <https://www.unesco.org/en/articles/ai-and-education-protecting-rights-learners> (Accessed on 16/03/2026)

opportunities and presenting content in a manner that is more engaging and accessible²⁸. Further, AI can ensure personalized learning experiences and provide a platform for quick and immediate feedback between learners and educators²⁹. In under-resourced institutions and communities, embracing AI can address teacher shortages by ensuring access to learning materials from all over the world³⁰. In addition, AI can enable educators to prepare quality and interactive learning models thus improving learning experiences³¹.

AI can therefore improve education outcomes for students, educators and institutions. For students, AI tools including adaptive tutoring systems, automatic writing evaluation systems, and chatbots can enhance access to learning materials and research thus ensuring quality education³². For educators, AI tools such as assessment supports, lesson planning tools, and resource curation systems enables them to adequately prepare and enhance their competence to provide quality education³³. In addition, AI tools enable institutions to automate administrative tasks, identify vulnerable students, receive feedback, and design inclusive and quality learning curriculums³⁴.

Adopting technology and AI can therefore improve education and learning outcomes for students, educators and institutions. However, AI is also associated with risks and ethical concerns that can undermine its transformative role in education. For instance, racial and cultural biases in AI fuel human right concerns in education. It has been observed that

²⁸ AI's future for students is in our hands., Available at <https://www.brookings.edu/articles/ais-future-for-students-is-in-our-hands/> (Accessed on 16/03/2026)

²⁹ Ibid

³⁰ Ibid

³¹ Guidelines on the ethical use of artificial intelligence and data in teaching and learning., Available at <https://education.ec.europa.eu/focus-topics/digital-education/action-plan/ethical-guidelines-for-educators-on-using-ai> (Accessed on 16/03/2026)

³² National Education Association., 'The Current State of Artificial Intelligence in Education' Available at <https://www.nea.org/resource-library/artificial-intelligence-education/iii-current-state-artificial-intelligence-education> (Accessed on 16/03/2026)

³³ Ibid

³⁴ Ibid

some AI algorithms are inherently biased such as facial recognition systems that do not recognize black students³⁵. Further, it has been pointed out that in institutions of higher learning, there have been instances of falsely flagging essays written by non-native English speakers as AI-generated³⁶. In addition, since most AI models are designed and rely on data from the Global North, adopting them in the Global South without necessary modifications can raise cultural bias. It has been correctly noted that most AI-models are Western-centric and can thus perpetuate biases and stereotypes against indigenous knowledge systems in the Global South³⁷. The United Nations points out that since AI systems often reflect biases embedded in the data they are trained on, without appropriate safeguards in place, the use of such models in education can reinforce harmful biases and exclusion against indigenous languages and knowledge systems in the Global South³⁸.

The use of AI in education can therefore raise cultural biases. In addition, it has been observed that the digital divide between developed and developing countries and urban and rural areas can undermine quality education³⁹. It has been observed that many students especially those in developing countries and rural areas lack access to basic technological infrastructure, such as reliable internet connectivity, computers, and digital devices⁴⁰. This fuels disparities and inequalities in access to education. Further, there are ethical concerns over student data privacy when adopting AI in education⁴¹. It has been

³⁵ Does AI Have a Bias Problem?., Available at <https://www.nea.org/nea-today/all-news-articles/does-ai-have-bias-problem> (Accessed on 16/03/2026)

³⁶ Ibid

³⁷ How AI can adapt to Indigenous knowledge., Available at <https://medium.com/blog/how-ai-can-adapt-to-indigenous-knowledge-2ae3cd442096> (Accessed on 16/03/2026)

³⁸ United Nations., 'Ensuring Indigenous Peoples' rights in the age of AI' Available at <https://www.un.org/en/desa/ensuring-indigenous-peoples%E2%80%99-rights-age-ai> (Accessed on 16/03/2026)

³⁹ United Nations Educational, Scientific and Cultural Organization., 'Empowering Education: The Transformative Role of Technology in Africa' Op Cit

⁴⁰ Ibid

⁴¹ United Nations Educational, Scientific and Cultural Organization., 'AI and education: Protecting the rights of learners' Op Cit

observed that AI systems can collect vast amounts of information on students including behavioral patterns, contact information, home addresses, personal preferences and assessment results thus exposing learners to over surveillance while also exposing them to unauthorised access to their data and cyberbullying⁴². The integration of AI into education also raises concerns over integrity of education such as in cases of overreliance on AI systems including ChatGPT for research in academic institutions⁴³.

In light of the foregoing, it is imperative to harness AI while avoiding cultural bias and eliminating risks in order to foster accessibility, inclusivity, and quality of education for Sustainable Development.

3.0 Adopting Technology and AI in Education for Sustainable Development

Technology has the potential to enhance accessibility and quality of education including through enhancing access to diverse learning content, ensuring interactive learning experiences, connecting learners with educators and peers from all over the world, and bridging the quality in education between developed and developing countries⁴⁴. In particular, AI promises to improve education and learning outcomes through personalized learning experiences, enhancing student engagement in education, predictive tools that can identify patterns and predict future education outcomes, and systems that can automate and streamline administrative tasks⁴⁵. However, in light of risks and ethical concerns including cultural, language, and racial biases, digital divide and integrity challenges, there is need to appropriately harness AI in order to transform education for Sustainable Development⁴⁶.

⁴² Ibid

⁴³ AI's future for students is in our hands., Op Cit

⁴⁴ United Nations Educational, Scientific and Cultural Organization., 'Empowering Education: The Transformative Role of Technology in Africa' Op Cit

⁴⁵ The Role of AI in Our Education Systems., Available at <https://www.hu.ac.ae/knowledge-update/from-different-corners/the-role-of-ai-in-our-education-systems> (Accessed on 16/03/2026)

⁴⁶ United Nations Educational, Scientific and Cultural Organization., 'AI and education: Protecting the rights of learners' Op Cit

In order to harness its potential, it is imperative to address algorithmic biases in AI in order to protect the rights of learners⁴⁷. Since AI algorithms are only as unbiased as the data sets they are trained on, algorithmic decision-making may perpetuate existing biases and discrimination⁴⁸. Consequently, it has been observed that given that most AI systems are designed in the Global North, they may perpetuate bias and prejudices in the Global South unless they are tuned to fit with local circumstances⁴⁹. This is evidenced in the education sector in form of racial biases and discrimination against indigenous languages and knowledge systems in the Global South⁵⁰. Addressing biases including through making AI algorithms more inclusive, adopting AI in the Global South in accordance with cultural and language contexts, and enhancing transparency and accountability in AI through human oversight is necessary in harnessing the power of technology for inclusivity, equity, justice and fairness in education⁵¹.

In addition to biases, eliminating other risks in technology and AI is key towards strengthening education outcomes. For example, bridging the digital divide between developed and developing countries and urban and rural areas can ensure more equal education opportunities for all learners⁵². It is therefore imperative to invest in technology and AI in order to provide quality and equal learning opportunities for all students⁵³. Further, enhancing digital literacy skills for students, educators and institutions can ensure that all stakeholders have the capacity to embrace the digital revolution in

⁴⁷ Ibid

⁴⁸ Orero. L.O., & Kaaniru. J., 'Automated Decision-Making Policies in Africa' Available at <https://cipit.strathmore.edu/wp-content/uploads/2023/08/Policy-Brief-Design-Automated-Decision-Making.pdf> (Accessed on 16/03/2026)

⁴⁹ Ibid

⁵⁰ Does AI Have a Bias Problem?., Op Cit

⁵¹ United Nations Educational, Scientific and Cultural Organization., 'AI and education: Protecting the rights of learners' Op Cit

⁵² United Nations Educational, Scientific and Cultural Organization., 'Empowering Education: The Transformative Role of Technology in Africa' Op Cit

⁵³ United Nations., 'Assuring and improving quality public digital learning for all' Op Cit

education⁵⁴. In addition, there is need to maintain academic integrity including through ethical and responsible use of AI for students and educators⁵⁵.

By adopting the foregoing strategies, it is possible to ensure that technology and AI re appropriately harnessed towards accessibility, inclusion and quality of education and learning outcomes.

4.0 Conclusion

AI is a transformative technology that has the potential to improve education and learning outcomes. However, in light of biases and other emerging risks, it is imperative to ensure that AI is appropriately harnessed in order to improve education at all levels for Sustainable Development. Attaining this ideal involves addressing racial, cultural and language biases through inclusivity, human rights, transparency, and accountability in algorithmic decision-making⁵⁶. Further, there is need to bridge the digital divide and ensure academic integrity in order to appropriately harness AI and technology in education⁵⁷. By harnessing its positive attributes and addressing biases, inequalities and ethical concerns, it is possible to effectively utilise AI for accessibility, inclusion and quality in education systems towards Sustainable Development.

⁵⁴ Ibid

⁵⁵ Teaching academic integrity in the era of AI., Available at <https://www.apa.org/ed/precollege/psychology-teacher-network/introductory-psychology/teaching-academic-integrity> (Accessed on 16/03/2026)

⁵⁶ United Nations Educational, Scientific and Cultural Organization., 'AI and education: Protecting the rights of learners' Op Cit

⁵⁷ Ibid

References

AI's future for students is in our hands., Available at <https://www.brookings.edu/articles/ais-future-for-students-is-in-our-hands/>

Constitution of Kenya., 2010., Government Printer, Nairobi

Deshmane. P.H., & Thombre. K., 'The Impact of Education on Human Development in the 21st Century: Needs, Challenges& Opportunities' Available at <https://ibrj.us/wp-content/uploads/010302.pdf>

Does AI Have a Bias Problem?., Available at <https://www.nea.org/nea-today/all-news-articles/does-ai-have-bias-problem>

Guidelines on the ethical use of artificial intelligence and data in teaching and learning., Available at <https://education.ec.europa.eu/focus-topics/digital-education/action-plan/ethical-guidelines-for-educators-on-using-ai>

How AI can adapt to Indigenous knowledge., Available at <https://medium.com/blog/how-ai-can-adapt-to-indigenous-knowledge-2ae3cd442096>

National Education Association., 'The Current State of Artificial Intelligence in Education' Available at <https://www.nea.org/resource-library/artificial-intelligence-education/iii-current-state-artificial-intelligence-education>

Orero. L.O., & Kaaniru. J., 'Automated Decision-Making Policies in Africa' Available at <https://cipit.strathmore.edu/wp-content/uploads/2023/08/Policy-Brief-Design-Automated-Decision-Making.pdf>

Organization of African Unity (OAU), *African Charter on Human and Peoples' Rights* ("Banjul Charter"), CAB/LEG/67/3 rev. 5, 21 I.L.M. 58 (1982), 27 June 1981

Role of Education in Sustainable Development., Available at <https://icecd.org/blog/role-of-education-in-sustainable-development/>

Teaching academic integrity in the era of AI., Available at <https://www.apa.org/ed/precollege/psychology-teacher-network/introductory-psychology/teaching-academic-integrity>

Technology in the Classroom: Benefits and the Impact on Education., Available at <https://www.gcu.edu/blog/teaching-school-administration/how-using-technology-teaching-affects-classrooms>

Education in an age of Artificial Intelligence: Harnessing the Technology, Avoiding Cultural Bias, and Eliminating other Emerging Risks

The Role of AI in Our Education Systems., Available at <https://www.hu.ac.ae/knowledge-update/from-different-corners/the-role-of-ai-in-our-education-systems>

The Role of Education in Human Growth and Development., Available at <https://aithor.com/essay-examples/the-role-of-education-in-human-growth-and-development>

Understanding Education as a Right., Available at <https://www.right-to-education.org/page/understanding-education-right>

United Nation's Children Fund., 'A Human Rights-Based Approach to Education for All' Available at https://www.right-to-education.org/sites/right-to-education.org/files/resource-attachments/A%20Human%20Rights-based%20Approach%20to%20Education%20for%20All_0.pdf

United Nations Educational, Scientific and Cultural Organization., 'Education for Sustainable Development' Available at <https://www.unesco.org/en/sustainable-development/education>

United Nations Educational, Scientific and Cultural Organization., 'Empowering Education: The Transformative Role of Technology in Africa' Available at <https://www.iicba.unesco.org/en/empowering-education-transformative-role-technology-africa>

United Nations Educational, Scientific and Cultural Organization., 'Artificial intelligence in education' Available at <https://www.unesco.org/en/digital-education/artificial-intelligence>

United Nations Educational, Scientific and Cultural Organization., 'AI and education: Protecting the rights of learners' Available at <https://www.unesco.org/en/articles/ai-and-education-protecting-rights-learners>

United Nations General Assembly, *Convention on the Elimination of All Forms of Discrimination Against Women*, United Nations, Treaty Series, vol. 1249, p. 13, 18 December 1979

United Nations General Assembly, *Convention on the Rights of the Child*, United Nations, Treaty Series, vol. 1577, p. 3, 20 November 1989

United Nations General Assembly, *International Covenant on Economic, Social and Cultural Rights*, United Nations, Treaty Series, vol. 993, p. 3, 16 December 1966

Education in an age of Artificial Intelligence: Harnessing the Technology, Avoiding Cultural Bias, and Eliminating other Emerging Risks

United Nations General Assembly. The Universal Declaration of Human Rights (UDHR). New York: United Nations General Assembly, 1948

United Nations General Assembly., 'Transforming Our World: the 2030 Agenda for Sustainable Development.' 21 October 2015, A/RES/70/1., Available at <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>

United Nations., 'Assuring and improving quality public digital learning for all' Available at <https://www.un.org/en/transforming-education-summit/digital-learning-all>

United Nations., 'Ensuring Indigenous Peoples' rights in the age of AI' Available at <https://www.un.org/en/desa/ensuring-indigenous-peoples%E2%80%99-rights-age-ai>

United Nations., 'New Partnership for Digital Education' Available at <https://www.un.org/en/academic-impact/new-partnerships-digital-education>