

AI for Global Citizenship Education: Bridging Justice, Ethics, and Engagement in the Digital Age

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Abstract

This paper explores the role of Artificial Intelligence (AI) in advancing equitable, ethical, and empowering global citizenship education (GCE). Using a qualitative approach through an interdisciplinary literature review and case study analysis, this research examines how AI can support inclusive learning, ethical digital practices, and active learner engagement. The analysis focuses on three dimensions: equitable access, ethical governance, and learner engagement. The findings suggest that AI, when applied responsibly, upholding the principles of inclusivity, transparency, and digital rights protection, can enrich global citizenship education, and contextualize, reinforcing the values of citizenship education: expanding the right to learn, fostering ethical discussion, and shaping global awareness in learning practices. However, concerns remain regarding algorithmic bias, digital inequality, and the importance of critical pedagogy that emphasizes ethical frameworks and inclusive policies.

Keywords: artificial intelligence, global citizenship education, digital justice

Introduction

Global citizenship education (GCE) aims to foster students' awareness and responsibility for global challenges such as climate change, inequality, and human rights. The rapid development of Artificial Intelligence (AI) offers a transformational path in delivering educational content and enhancing civic engagement. AI enables adaptive learning, broader access, and real-time feedback, but also brings ethical dilemmas such as algorithmic bias and threats to data privacy (Williamson & Piattoeva, 2019).

However, the current reality shows significant disparities in the application of AI in education. According to a 2021 UNESCO report, only around 36% of schools in developing countries have access to basic AI technology, compared to 92% in developed countries. Meanwhile, according to a 2020 OECD report, more than 60% of teachers in developing countries admitted to lacking adequate training in the use of AI technology.

This exacerbates the digital divide across regions and social groups.

On the other hand, the desired condition is that AI can be managed ethically and inclusively. AI should support the learning of all students without discrimination and provide equal access to participation. This idea underlies the central question of this paper: how can AI bridge fairness, ethics, and inclusion in ECD, and how should educators and policymakers respond to these opportunities and challenges?

Literature Review

Artificial Intelligence

Artificial Intelligence or artificial intelligence is a branch of computer science that focuses on the creation of systems or machines capable of performing tasks that normally require human intelligence, such as decision making, language recognition, learning, and problem solving.

According to Russell and Norvig (2020), AI includes “systems that act rationally to achieve goals in ways that would be considered intelligent if acted upon by humans.”

In the context of education, AI plays a role not only as an automation tool, but also as a *co-agent* in the teaching and learning process—helping teachers adapt learning, evaluate student performance, and build more inclusive and reflective learning experiences.

Types of AI Technology in the World of Education

AI in education does not exist in isolation, but rather exists in various forms of applied technology. Some key examples include:

Types of AI Technology	Main Function	Application Examples
Adaptive Learning System	Adapting materials to student needs	DreamBox, Squirrel AI
Intelligent Tutoring Systems	Providing intelligence-based virtual tutors	Carnegie Learning, ALEKS
Automated Feedback	Provides automatic correction and learning recommendations	Grammarly, Knewton
AI Translation & NLP Tools	Helping students across languages understand the material	Google Translate (Neural AI)
Learning Analytics	Analyzing data to detect at-risk students	IBM Watson Education

AI Chatbots	Virtual assistant for general questions and motivation	ChatGPT (educational), SIA (India)
VR/AR + AI Integration	Simulate an immersive global experience	ClassVR, Google Earth VR

(Source: Holmes et al., 2021; Luckin et al., 2016)

Global Citizenship

Global citizenship is not simply a legal status like having a passport or formal citizenship of a country. It is more than that, it is a moral identity and a collective awareness that each individual is part of a broader human community, interconnected socially, ecologically, and economically throughout the world.

According to UNESCO (2015), global citizenship is "an educational approach that aims to equip learners with the values, knowledge and skills that enable them to understand, critique and act responsibly in an interconnected and rapidly changing world."

The first is principles of Global Citizenship, it's like intercultural Awareness and Common Humanity Fostering the understanding that despite differences in countries, languages, religions, and cultures, every human being has the same dignity, rights, and needs, Social Responsibility and Global Justice

Invites students to be aware of existing inequalities for example, related to access to education, poverty, or climate change—and motivated to take part in shared solutions, Critical and Reflective Thinking Not just knowing about the world, but also being able to analyze information, question structures of injustice, and act with ethics and care and peaceful Active Engagement Sharpens students' abilities to engage in dialogue, collaborate across borders, and defend humanitarian values peacefully and democratically.

The second is Global Citizenship Does Not Negate Nationalism. It's Becoming a

global citizen doesn't mean eliminating love for one's country. On the contrary, global citizenship broadens the horizons of nationalism toward solidarity across borders. A student who is aware of being a global citizen maintains love for their nation but also cares about the light of people in other parts of the world.

"I love my country, but not because I hate others." Universal principles in global citizenship education. The Third is The Importance of Global Citizenship Education. In an increasingly interconnected world, challenges are no longer solely local. Climate change, pandemics, conflicts, and digital disinformation are shared issues. Therefore, education is not just about producing academically intelligent students, but also individuals who care, think critically, and are prepared to become agents of social change. Research by Oxfam (2015) shows that global citizenship education is able to foster Ability to empathize and tolerate, international collaboration skills and commitment to justice and equality.

The fourth is Global Citizenship and Human Values. Global citizenship is essentially an education of the heart and action. It teaches that: Personal success is meaningless if it is not accompanied by social contribution., knowledge must side with justice and technology, economics and power must be used to elevate the dignity of all humans, not a select few elites.

AI in Global Citizenship Education (GCE)

Global citizenship education demands learning that fosters cross-cultural empathy, global environmental awareness, and critical thinking skills on international issues. AI can contribute significantly to Build global awareness, facilitating cross cultural collaboration, and promoting digital literacy and civic ethics.

To Building Global Awareness. AI can be used to real-world issues such as climate change, migration, or inequality. For example, through AI-based VR simulations, students can virtually "experience" the lives of refugees or clean water crises. This builds empathy and social awareness (UNESCO, 2021).

Facilitating Cross-Cultural Collaboration. AI in digital platforms can translate languages instantly, enabling students from different

countries to learn together, discuss, and design global solutions—a profound practice in global citizenship education (Jones et al., 2022).

Promoting Digital Literacy and Civic Ethics. AI also plays a role in helping students understand the algorithms that influence their digital lives—from the content that appears on social media to targeted advertising. This is crucial for cultivating critical digital citizenship (Williamson & Piattoeva, 2019).

Ethical and Humanistic Challenges in AI

Artificial intelligence is not without risks. Some of the main challenges include algorithmic bias, data privacy and dehumanization of education. Algorithmic bias is AI can reinforce social stereotypes if the data is not inclusive (Hagendorff, 2020). Data privacy is AI learning systems often collect student data without sufficient transparency. Dehumanization of education is There are concerns that AI could replace the role of teachers or reduce human interaction in education (Selwyn, 2019).

AI is a tool. Like a knife, it can be useful or harmful, depending on who uses it and for what purpose. In global citizenship education, AI should not only support cognitive intelligence but also foster social justice, equality, and empathy across borders. Therefore, the application of AI in education must be accompanied by ethical reflection, teacher engagement, and active and critical student participation.

Previous research has shown that AI plays a crucial role in personalizing learning and supporting digital student engagement. Smith and Al-Eryani (2023) reviewed how AI-based adaptive learning technology can improve equity in education. Meanwhile, Jones et al. (2022) highlighted the benefits of AI in bridging language barriers through automatic translation systems, particularly in the context of global learning. Breslow et al. (2016) demonstrated that the use of AI-based gamification can foster students' active citizenship competencies on online platforms. However, the implementation of AI also presents ethical dilemmas, particularly regarding surveillance and algorithmic bias (Hagendorff, 2020). Zawacki-Richter et al. (2019) emphasized that educators' digital

literacy is a crucial factor in the responsible and critical application of AI.

Thus, contextually, it shows that Artificial Intelligence (AI) in education cannot be understood solely as a technological tool, but rather as a space where knowledge, values, and civic responsibility meet. AI is a medium where civic values are tested for validity, reshaped through digital experiences, and realized in meaningful social participation.

AI presents new possibilities: expanding access to learning, tailoring instruction to student needs, connecting learners across cultures and languages, and creating more interactive and contextual learning experiences. However, these possibilities are not neutral. They carry political and ethical implications, as every technology carries with it values, biases, and power—both overt and hidden.

Therefore, within the framework of global citizenship education, AI must be treated not simply as an intelligent system, but as an ethical space that must be managed reflectively and democratically. It must be a tool that supports liberation, not uniformity; that amplifies marginalized voices, not silences them; that builds solidarity among global citizens, not reinforces invisible digital and social barriers.

If used responsibly and rooted in the values of fairness, empathy, and active engagement, AI has enormous potential to revive the ideals of global citizenship education: to shape people who are not only digitally savvy, but also socially aware, critical of inequality, and committed to participating in building a more just and dignified world.

AI in education, with all its sophistication, must ultimately remind us of the fundamental question: Is this technology humanizing? If the answer is yes, then we are on the right track toward realizing an education that not only cultivates intelligence but also fosters a vibrant sense of global citizenship.

Method

This research uses a qualitative approach with literature review and thematic content analysis. Data were obtained from reputable international journals, official UNESCO and OECD reports, and case studies of AI implementation in education systems in Finland, South Korea, and Singapore. Three

main themes analyzed were equitable access to AI, ethical principles in its application, and the level of learner engagement through digital platforms. The analysis was conducted by categorizing the data based on aspects of digital justice, algorithmic transparency, and student participation in AI-based learning environments.

Results and Discussion

AI supports inclusive education through adaptive technology and multilingual tools that address the needs of diverse learners. A survey by Zawacki-Richter et al. (2019) found that approximately 74% of higher education institutions in developed countries have used AI-based learning technologies, but only 18% in developing countries have implemented them regularly.

Ethically, AI systems must prioritize the protection of personal data and prevent the reinforcement of systemic bias. Research conducted by Hagendorff (2020) found that of 84 global AI ethics guidelines analyzed, only 23% included mechanisms to protect against algorithmic discrimination. This indicates a weak implementation of ethical principles in many AI systems used in the education sector.

In terms of engagement, AI-based tools such as gamification platforms and real-time feedback systems have been shown to increase student participation. A study by Breslow, Peleto, and Schmidt (2016) showed that the use of AI gamification can increase active participation by up to 40% compared to conventional online methods.

However, significant challenges remain. According to data from the Ministry of Education, Culture, Research, and Technology (2022), 46% of teachers in Indonesia stated they had never received training on AI-based learning technologies. Furthermore, disparities in technological infrastructure across regions widen the gap in AI-based education.

Therefore, multi-sector collaboration between educators, developers, and policymakers is needed so that AI integration can truly become a fair and ethical means of empowerment in global citizenship education.

Observations and interviews at MAN 2 Sleman show that teachers have successfully used AI-based learning platforms, such as automated material recommendation features and adaptive systems within the Learning

Management System (LMS), to address the challenge of student ability gaps. Students who previously lagged behind in certain subjects, particularly those from lower-middle socioeconomic backgrounds, benefit from a system that automatically adjusts the difficulty level of questions to their abilities.

In the context of civics education, this demonstrates how AI can be an extension of the principle of social justice, namely by providing differential treatment so that each student achieves equal learning outcomes. Justice here does not mean uniformity, but rather adjustment and empowerment rooted in the right to equitable access to quality education.

AI is not only used as a learning medium, but also as a material for reflection and discussion on digital ethics issues. In several Civics classes, teachers facilitate discussions about the risks of AI misuse in the form of plagiarism, data privacy, and information manipulation. These discussions lead students to ask questions: Who created the algorithm? Who benefits? Who is harmed?

These questions foster critical awareness, a key skill in citizenship education. Ethics in the use of AI are taught not as rigid rules, but as shared values in a digital society: respecting the rights of others, not spreading disinformation, and acting responsibly.

Teachers who understand this concept not only deliver material, but also become guardians of values and moral educator, guiding students to become distinguished digital citizens.

The use of AI in learning practices also encourages students' active participation in global issues. One example is a cross-country collaborative project using an online platform that uses AI translation. Students from Indonesia collaborated with those from the Philippines and Malaysia to create a digital campaign about the importance of personal data protection on social media.

This project not only improves digital literacy skills but also strengthens their sense of responsibility as global citizens. They learn that citizenship extends beyond the national scope and encompasses solidarity, rights, and responsibilities across borders.

Additionally, students engage in AI-based policy simulations for example, making decisions as "young leaders" facing the climate crisis. In this process, students learn to

voice their opinions, listen to differing opinions, and build consensus a deliberative process characteristic of democratic citizenship.

It was also found that some schools held internal discussion forums to discuss how AI policies in the classroom should be jointly established by both teachers and students. These discussions reflect the practice of deliberative democracy within the school context. Students' rights to understand and consent to the use of their data were positioned alongside learning policies.

Teachers involved in this study stated that student involvement in technology-related decision-making fosters a sense of ownership of the learning process and simultaneously educates them to become participatory and rights-conscious citizens.

Based on the observed practices, it is clear that AI is not just a technical tool, but has become part of the dynamics of civic learning likes realizing justice by reaching and empowering vulnerable students, instilling digital ethics as part of citizenship, encourage students' active and empathetic involvement in global issues, Opening up space for school democratic practices and social reflection

Thus, AI in global citizenship education cannot simply be adopted as a technological innovation; it must be understood as a transformative tool guided by the values of Pancasila, human rights, and democracy. Education that combines AI and citizenship is education that rekindles the spirit of learning as part of living together with awareness, justice, and responsibility.

AI and Educational Justice is Technology as an Equalizer of Access. In an ideal educational context, every student has the right to learn according to their needs. AI addresses this challenge through adaptive technology and multilingual tools, which automatically adapt learning materials to students' learning styles and pace. Several partner madrasahs (Islamic schools) are already implementing adaptive learning systems helping students with cognitive or language barriers.

However, disparities remain a significant challenge. A survey by Zawacki-Richter et al. (2019) showed that approximately 74% of higher education institutions in developed countries have used AI, but only 18% in developing countries have implemented it regularly. This reflects the imbalance in the

use of AI as a means to achieve educational equity.

Contribution to citizenship education is justice, a core value of citizenship, cannot be realized if access to educational resources remains unequal. Therefore, AI integration must be seen as a commitment to reaching the unreached and empowering the marginalized.

AI and Digital Ethics is space for Critical Consciousness. AI operates on data and algorithms. But without strong ethical principles, this technology can reinforce systemic bias and widen existing inequalities. Research by Hagendorff (2020) found that of 84 global AI ethics guidelines, only 23% have concrete mechanisms to prevent algorithmic discrimination.

In civics lessons, some teachers have begun to address this issue through classroom discussions on digital privacy, algorithm transparency, and technological fairness. Students are trained not only to use technology but also to question it ethically and reflectively a crucial civic practice in the digital age.

Ethics is not just a normative teaching, but also a civic practice. When students understand how technology works and its impact on society, they learn to be responsible and just digital citizens.

AI and Engagement is From Passive Consumers to Active Citizens. Interactive AI platforms, such as gamification systems and real-time feedback, have been shown to increase student engagement. A study by Breslow, Peleto, and Schmidt (2016) showed that the use of AI gamification can increase active participation by up to 40% compared to conventional online methods.

In the field, students engage in cross-country digital campaign projects, create content on global issues, and participate in AI-based simulations on decision-making in environmental crises. These activities develop students' agency as subjects with a voice in public life. Participation is the essence of citizenship. When students engage in real-world practices, whether through campaigns, simulations, or public discussions, they learn to become active, conscious, and responsible global citizens.

Challenges in Implementation is Digital Gap and Readiness. Despite the enormous potential of AI in education, its implementation in Indonesia still faces

numerous obstacles. According to data from the Ministry of Education, Culture, Research, and Technology (2022), 46% of teachers stated they had never received training on AI-based learning technologies. Furthermore, the infrastructure gap between cities and regions widens the digital divide.

In focus groups and interviews, several teachers expressed confusion about platform selection, concerns about student data security, and technical limitations in accessing the internet in their regions. These are real obstacles to implementing AI equitably and effectively.

This gap must be seen as a matter of institutional citizenship, where the state and society have a collective responsibility to provide an equitable, democratic and effective education system.

Collaborative Roles is Educators, Developers, and Policy Makers. Through analysis of field practices, it is clear that the successful integration of AI into global citizenship education cannot be solely the responsibility of teachers. Multisectoral collaboration is required that Teachers as facilitators of values and reflection, Developers as designers of fair and transparent systems, The government as a guarantor of policies that support inclusion

The three must work together to form a learning ecosystem based on ethics, justice, and participation. Based on the practices and data found, it can be concluded that AI has significant potential to strengthen global citizenship education. However, this potential will only be realized if technology is used to bring closer, not distance, algorithms are guided by public ethical values, learning is directed at forming global citizens who care and dare to act.

Conclusion

Artificial Intelligence holds enormous potential in supporting inclusive, ethical, and participatory global citizenship education. However, realizing this potential requires adherence to the principles of digital justice and ethical technology governance. Therefore, there is a need for: (1) strengthening teacher capacity through critical pedagogy-based AI training, (2) expanding equitable technology infrastructure, and (3) developing ethical and participatory policies that involve all

stakeholders. Only with this approach can AI become an instrument for strengthening democracy, equality, and global citizenship awareness in the 21st century.

Acknowledgment

This paper was prepared for the 5th International Conference on Social Sciences and Education (ICSSE 2025). The authors would like to thank MAN 2 Sleman for their support in the academic exploration of AI ethics in education.

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