

*Academic Article (English)/ บทความวิชาการ (ภาษาอังกฤษ)***Transforming Thai Education with AI to Cultivate Public-Minded Global Citizens**กวิตา ปานล้ำเลิศ¹, วินาภรณ์ แท่งจ้อย^{2*}, พรพิมล นามวงศ์³Kawita Panlumlers¹, Winaphorn Thangjui^{2*}, Pornpimon Namwong³^{1, 3}อาจารย์ประจำคณะศึกษาศาสตร์ มหาวิทยาลัยสวนดุสิต กรุงเทพมหานคร ประเทศไทย^{1, 3}(Lecturer, Faculty of Education, Suan Dusit University, Bangkok, Thailand)^{2*}อาจารย์ประจำคณะมนุษยศาสตร์และสังคมศาสตร์ มหาวิทยาลัยสวนดุสิต กรุงเทพมหานคร ประเทศไทย^{2*}(Lecturer, Faculty of Humanities and Social Sciences, Suan Dusit University, Bangkok, Thailand)E-mail address (Corresponding author): ^{2*} winaphorn_tha@dusit.ac.th; (Author/Translator): ¹kawita_pan@dusit.ac.th, ³pornpimon_nam@dusit.ac.th

รับบทความ: 20 เมษายน 2569 / ปรับแก้ไข: 20 มิถุนายน 2569 / ตอบรับบทความ: 23 มิถุนายน 2569

Received: 20 April 2026 / Revised: 22 June 2026 / Accepted: June 23 June 2026

Abstract

Introduction: The rapid advancement of Artificial Intelligence (AI) has created new opportunities and challenges for education systems worldwide. In Thailand, persistent issues such as educational inequality, uneven access to quality learning resources, centralized administration, and the need to develop future-ready competencies have intensified the urgency of educational reform. This academic article aims to synthesize current knowledge and conceptual perspectives on the integration of AI into Thai education to cultivate public-minded global citizens who are ethically aware, socially responsible, and capable of engaging constructively in an interconnected world.

Subject: The article examines the relationship between AI in education, public-mindedness, and global citizenship education. It discusses how AI can support personalized and adaptive learning, learning analytics, automated assessment, instructional content generation, and inclusive learning for students with diverse needs. At the same time, it emphasizes that AI should not be viewed merely as a technological tool for efficiency, but as a transformative mechanism for promoting equity, learner agency, civic responsibility, and human-centered learning. The article also addresses key ethical considerations, including data privacy, algorithmic transparency, equitable access to AI technologies, AI literacy, and the preservation of the human role of teachers in AI-enhanced learning environments.

Conclusion: The synthesis indicates that AI has strong potential to reshape Thai education by enabling more flexible, personalized, and inclusive learning experiences. However, successful integration requires coherent national policies, ethical governance, inclusive digital infrastructure, teacher competency development, and continuous evaluation of both learning outcomes and social impacts.

Benefit, Utilization: The article provides a conceptual framework for transforming Thai education with AI to cultivate public-minded global citizens. This framework can be utilized by policymakers, educators, curriculum developers, and educational institutions as a strategic guideline for designing AI-supported learning systems that promote equity, ethical awareness, social responsibility, and sustainable educational development in Thailand.

Keywords: Artificial Intelligence in Education; Global Citizenship; Public-Mindedness; Thai Education Reform

บทคัดย่อ

บทนำ: ความก้าวหน้าอย่างรวดเร็วของปัญญาประดิษฐ์ก่อให้เกิดทั้งโอกาสและความท้าทายต่อระบบการศึกษาทั่วโลก สำหรับประเทศไทย ปัญหาความเหลื่อมล้ำทางการศึกษา การเข้าถึงทรัพยากรการเรียนรู้ที่มีคุณภาพอย่างไม่เท่าเทียม การบริหารจัดการศึกษาที่ยังมีลักษณะรวมศูนย์ และความจำเป็นในการพัฒนาสมรรถนะผู้เรียนให้พร้อมต่อโลกอนาคต ล้วนสะท้อนถึงความเร่งด่วนของการปฏิรูปการศึกษา บทความวิชาการนี้มีวัตถุประสงค์เพื่อสังเคราะห์องค์ความรู้และมุมมองเชิงแนวคิดเกี่ยวกับการบูรณาการปัญญาประดิษฐ์ในระบบการศึกษาไทย เพื่อบ่มเพาะผู้เรียนให้เป็นพลเมืองโลกที่มีจิตสาธารณะ มีความตระหนักเชิงจริยธรรม มีความรับผิดชอบต่อสังคม และสามารถมีส่วนร่วมอย่างสร้างสรรค์ในโลกที่เชื่อมโยงถึงกัน

เนื้อเรื่อง: บทความนำเสนอความสัมพันธ์ระหว่างปัญญาประดิษฐ์ทางการศึกษา จิตสาธารณะ และการศึกษาเพื่อความเป็นพลเมืองโลก โดยอภิปรายบทบาทของปัญญาประดิษฐ์ในการสนับสนุนการเรียนรู้เฉพาะบุคคล การเรียนรู้แบบปรับเหมาะ การวิเคราะห์ข้อมูลการเรียนรู้ การประเมินผลอัตโนมัติ การสร้างสื่อการเรียนรู้ และการส่งเสริมการเรียนรู้แบบทั่วถึงสำหรับผู้เรียนที่มีความต้องการหลากหลาย ทั้งนี้ ปัญญาประดิษฐ์ควรถูกใช้เป็นกลไกในการส่งเสริมความเสมอภาค ศักยภาพผู้เรียน ความรับผิดชอบต่อในฐานะพลเมือง และการเรียนรู้ที่มีมนุษย์เป็นศูนย์กลาง ควบคู่กับการคำนึงถึง จริยธรรม ความเป็นส่วนตัวของข้อมูล ความโปร่งใสของอัลกอริทึม ความเท่าเทียมในการเข้าถึง เทคโนโลยี สมรรถนะด้านปัญญาประดิษฐ์ และบทบาทสำคัญของผู้สอน

สรุป: ผลการสังเคราะห์ชี้ให้เห็นว่า ปัญญาประดิษฐ์มีศักยภาพสูงในการปรับเปลี่ยน การศึกษาไทยให้มีความยืดหยุ่น เฉพาะบุคคล และทั่วถึงมากยิ่งขึ้น อย่างไรก็ตาม การบูรณาการ ดังกล่าวจำเป็นต้องอาศัยนโยบายระดับชาติที่ชัดเจน ธรรมชาติของจริยธรรม โครงสร้างพื้นฐาน ดิจิทัลที่ครอบคลุม การพัฒนาสมรรถนะผู้สอน และการประเมินผลอย่างต่อเนื่องทั้งในมิติผลลัพธ์การเรียนรู้และผลกระทบทางสังคม

องค์ความรู้: บทความนี้นำเสนอกรอบแนวคิดการยกระดับการศึกษาไทยด้วยปัญญาประดิษฐ์ เพื่อมุ่งเป้าพลเมืองโลกที่มีจิตสาธารณะ ซึ่งสามารถใช้เป็นแนวทางเชิงยุทธศาสตร์ในการออกแบบ ระบบการเรียนรู้ที่ส่งเสริมความเสมอภาค จริยธรรม ความรับผิดชอบต่อสังคม และการพัฒนา การศึกษาไทยอย่างยั่งยืน

คำสำคัญ: ปัญญาประดิษฐ์ทางการศึกษา; พลเมืองโลก; จิตสาธารณะ; การปฏิรูปการศึกษาไทย

Introduction

The results of the PISA 2022 international assessment reveal that Thai students scored significantly below the OECD average, despite the country's per capita investment in education being comparable to nations with higher educational outcomes (OECD, 2023). This indicates a persistent misalignment between educational investment and actual learning achievements. One of the core issues lies in the prevalent reliance on rote memorization, rather than fostering higher-order thinking skills (IPGCE, 2023). Moreover, rural schools in Thailand continue to suffer from shortages of qualified teachers and essential learning resources, leading to pronounced disparities between urban and rural education (The Asia Foundation, 2023). Additionally, the education system remains highly centralized, limiting school leaders' autonomy and flexibility in decision-making (The Asia Foundation, 2023). These conditions underscore an urgent need to elevate both the quality and equity of Thai education, particularly through the integration of emerging digital innovations, including Artificial Intelligence, to transform learning processes and cultivate 21st-century Thai citizens equipped with AI literacy and a strong sense of civic responsibility.

Scholarly research highlights that public-minded global citizenship cultivates awareness, altruism, and civic engagement, enabling individuals to actively contribute to resolving pressing global challenges—including climate change, socioeconomic inequality, and migration crises—through collaborative and transnational efforts (Bosio, 2022; Akkari & Radhouane, 2022). Second, public-mindedness is a cornerstone of a robust democracy, where citizens actively hold governments accountable and promote transparency (Sibanda, 2023). The findings reveal a significant positive relationship between social equity integration and the perceived effectiveness of sustainable development programs, with projects incorporating social equity principles performing better in addressing social inequalities, despite facing challenges in financing, policy support, and stakeholder resistance. (Ahmad, 2024). Therefore, instilling public-mindedness is pivotal in building just, democratic, and sustainable societies.

In an era where AI is reshaping multiple domains of society, education is no exception. AI enables personalized learning through adaptive systems that adjust content based on learner behavior, thereby increasing learning efficiency and reducing cognitive stress (Wang et al., 2023). For educators, AI supports lesson planning, test scoring, and learning analytics, allowing teachers to better focus on enhancing learner potential (Owoc et al., 2021). AI-powered learning

analytics also help predict learning difficulties and guide timely interventions (UNESCO, 2024). Furthermore, AI expands educational access for vulnerable learners, such as those with hearing impairments, through tools like speech recognition and assistive chatbots (Associated Press, 2025). Nonetheless, ethical considerations such as data privacy, equity of access, and algorithmic transparency must be carefully addressed (Kamalov et al., 2023). In summary, AI is a transformative force capable of reshaping the structural and conceptual dimensions of Thai education to align with global futures.

The purpose of this article is to synthesize current literature and conceptual perspectives on the use of AI in Thai education to cultivate public-minded global citizens. The scope of the article covers key challenges in Thai education, the concept and dimensions of public-minded global citizenship, AI-driven educational reform, ethical and equity-related considerations and strategic pathways for policy formulation and practical implementation. This synthesis leads to the development of a conceptual framework that integrates technology, ethics, learning science and learner development within the evolving context of Thai education.

Challenges of Thai Education in the 21st Century

Educational Gaps and Structural Inequality

In the 21st century, Thailand's education system continues to grapple with deeply embedded structural inequalities that directly affect the quality of education and learning opportunities for students. Recent studies reveal that the disparity between urban and rural schools remains a critical issue, particularly in terms of access to educational resources, teacher quality, and technological infrastructure (Wongsuwan & Makpa, 2025). The COVID-19 pandemic further exposed the severity of the digital divide, highlighting how students in remote areas lacked equitable access to online learning platforms (UNESCO, 2024). A report by The Asia Foundation (2023) noted that school principals in regional areas often face restrictions in decision-making autonomy, limiting their ability to allocate resources appropriately based on local needs. Furthermore, the current education system remains overly focused on academic achievement, neglecting essential life skills and civic responsibility—key attributes of global citizenship in the modern era. Therefore, the utilization of AI in education should go beyond enhancing academic performance; it must also be leveraged as a tool to reduce disparities, enhance flexibility, and expand educational equity, especially for learners in marginalized or underserved communities.

Developing Future-Ready Skills

As technology evolves rapidly and the global landscape becomes increasingly complex, developing future-ready competencies among learners has become an urgent priority for Thai education. Ng et al. (2021) emphasized that critical thinking, complex problem-solving, lifelong learning, and the ethical use of technology are among the key competencies required for the 21st century. However, many education systems, including Thailand's, still prioritize content transmission over the cultivation of real-world competencies. The World Economic Forum (2024) further argues that schools must shift their role from being mere information providers to becoming incubators of future-ready skills. In this paradigm, AI serves as an enabling tool that empowers teachers to design personalized learning experiences and integrate critical thinking, communication, collaboration, and civic responsibility into instructional practices. Effective use of AI in classrooms not only tailors content to individual learners but also enhances deep learning through data-driven insights, helping students track their progress, build intrinsic motivation, and develop competencies aligned with the demands of the global future and Thai society.

Cultivating Public-Mindedness in the Digital Age

In the contemporary digital era, where technology connects individuals across the globe, cultivating public-mindedness has become more crucial than ever. Public-mindedness now extends beyond physical communities to include responsible engagement in the online world. Scholarly evidence suggests that fostering public-minded digital engagement increases awareness of structural digital inequalities and acts as a catalyst for collaborative knowledge exchange and resource sharing, thereby expanding equitable access to digital equity and inclusive access for marginalized communities in digitally enabled environments (Akkari & Radhouane, 2022; Wei et al., 2022). Empirical research indicates that social media platforms function as influential digital infrastructures that facilitate rapid information dissemination, public discussion, and collective environmental action. These platforms enhance public awareness of social and environmental issues while strengthening networked civic engagement and cross-sector collaboration in digitally mediated societies. (Lestari et al., 2025). These insights suggest that cultivating digital public-mindedness requires not only values education but also strategic use of digital technologies to promote ethical participation and collective responsibility in both virtual and real-world communities. A summary of strategies for fostering public-mindedness in the digital era is presented in Table 1.

Table 1. Strategies for Cultivating Public-Mindedness in the Digital Age

Strategy	Core Concept	Benefits for Thai Education	Reference
1. Digital Media Literacy Education	Digital Literacy	Integrating digital literacy into curricula promotes learners' ability to analyze and validate information critically and responsibly create digital content within contemporary digital environments.	(Ng, 2021; Carretero et al., 2021)

Strategy	Core Concept	Benefits for Thai Education	Reference
2. Promoting Responsible Online Behavior	Good Global Citizenship	Promoting online etiquette, respect for privacy, and the avoidance of harmful or illegal content is essential for developing responsible global citizenship and ethical participation in online environments.	(Ribble, 2021; Livingstone et al., 2021; UNESCO, 2021)
3. Using Technology for Public Good	Social Innovation	Applying technology to meet community needs and address public issues through socially driven digital innovation.	(Buyannemekh, 2024)
4. Building Collaborative Online Communities	Goal-Oriented Online Community	Digital communities encourage collective action and shared purposes that contribute to social well-being while enhancing public-mindedness and civic engagement within digitally connected environments.	(Lestari et al., 2025)

The Concept of Public-Minded Global Citizenship

Public-minded global citizens are individuals who recognize the interconnectedness between local and global issues and are prepared to actively engage in addressing them (UNESCO, 2023b). This concept emphasizes cultivating a sense of responsibility toward humanity and the environment, rather than solely focusing on one's own nation or community. The survival of democratic values in a globalized world depends on an education system that promotes 'citizenship of the world' by nurturing the capacity for compassionate understanding and intercultural dialogue (Robinson-Pant, 2023). Scholarly studies highlight that fostering global citizenship entails cultivating critical thinking and promoting active engagement in addressing pressing global issues—such as climate change and economic inequality—through participatory and reflective approaches that empower individuals to contribute to sustainable and socially just societies (Bosio, 2022; Akkari & Radhouane, 2022). The development of public-minded global citizens is thus considered a key foundation for building sustainable and just societies in the 21st century.

Definition and Dimensions of Public-Minded Global Citizenship

Public-minded global citizenship refers to an awareness of oneself as part of an interconnected global community, accompanied by a sense of social and environmental responsibility that extends beyond national boundaries (Bosio, 2022; Akkari & Radhouane, 2022). The concept encompasses multiple interrelated dimensions, including but not limited to:

Table 2. Dimensions of Public-Minded Global Citizenship

Dimension	Significance	Reference
1. Knowledge and Comprehension	Global citizens must develop an integrated understanding of the interconnections among political, economic, social, and ecological systems to effectively engage with complex global challenges	(UNESCO 2021)
2. Values and Attitudes	Globally competent individuals must embody values of equity, justice, and human rights while cultivating empathy, openness to diversity, and a sense of responsibility toward the environment and future generations.	(UNESCO, 2021)
3. Skills	Critical thinking is an essential competency that enables global citizens to critically understand complex global challenges, reflect on social inequalities, and engage responsibly in building more just and sustainable societies.	(Santamaría-Cárdaba et al., 2024)
4. Participation and Action	Individuals with global citizenship competencies are expected to be equipped and willing to take informed and responsible action that contributes to positive change at both local and global levels within an interconnected world.	(UNESCO, 2021; Bosio, 2022)
5. Identity and Consciousness	Cosmopolitan identity encompasses both viewing oneself as a global citizen and feeling a sense of belonging to humanity as a whole. Individuals who hold this identity tend to feel responsible for the well-being of others within an expanded moral circle.	(Manokara, K., Lim, L., Lim, Z. Y., & Westgate, E. C. (2025)
6. Media and Information Literacy	Media literacy is essential for active citizenship in an information-saturated society, enabling individuals to critically engage with media and contribute responsibly in digital spaces.	(Jenkins et al., 2023)

International Approaches to Developing Public-Minded Global Citizens

This approach focuses on fostering learners' awareness of global interconnectedness alongside their capacity to engage responsibly in addressing shared societal challenges. Case-based evidence from various national settings illustrates how these principles have been effectively implemented in educational practice.

- Finland has developed a national framework for education for global competence in that integrates values of justice, sustainability, and human rights into the national curriculum. According to Kasa et al. (2023), students participate in activities that encourage critical questioning of global inequalities and foster the development of tangible public-minded attitudes. These examples show that nurturing global citizens must be coupled with fostering a sense of public responsibility to drive sustainable global transformation.

- Germany has systematically incorporated global citizenship and public-mindedness through initiatives such as Education for Sustainable Development (ESD) and Globales Lernen (Global Learning). These programs raise awareness of interconnected global issues such as poverty, environmental degradation, and human rights violations. Schools implement international exchange programs and community projects that promote collective responsibility at both local and global levels. For instance, the Eine Welt-Schulen ("One World Schools") initiative promotes sustainability-focused learning and civic responsibility, reflecting the nation's commitment to fostering globally engaged, public-minded citizens.

- In Japan, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) has launched the Global Citizenship Education 2030 strategic plan, aiming to cultivate globally responsible citizens (MEXT, 2023). The policy requires all levels of the education system to integrate public-minded global citizenship principles into curricula. The strategy highlights five key competencies: cultural diversity awareness, environmental responsibility, community engagement, global issue understanding, and creative problem-solving. This nationwide approach underscores Japan's commitment to embedding global citizenship and civic responsibility into formal education.

The Potential of AI in Educational Reform

AI Technologies Relevant to Education

AI is playing an increasingly pivotal role in transforming education systems. A wide range of AI-driven technologies are now being applied to enhance teaching, learning, and educational administration. These technologies support both personalized learning and system-level innovation, helping to bridge educational gaps, optimize learning outcomes, and improve operational efficiency. The core AI technologies that are currently relevant to education can be summarized in Table 3.

Table 3. AI Technologies in Education

AI Technology	Educational Applications	Reference
1. Adaptive learning systems	Provide personalized instructional support (e.g., ChatGPT) that offers explanations, answers questions, and guides learners effectively.	(Ravšelj et al., 2025)
2. Learning Analytics	Analyze learning data to identify trends and potential issues, enabling instructors to adjust instruction and offer targeted interventions.	(Alfredo et al., 2024)
3. Automated Assessment	Automatically evaluate student performance, such as grading exams and written work, increasing efficiency and consistency while reducing teacher workload.	(Owoc et al., 2021)
4. Automated Content Generation	Generate instructional materials and exercises tailored to students' knowledge levels and interests, enriching learning diversity and engagement.	(Kamalov et al., 2023)
5. AI Support for Learners with Special Needs	Facilitate equitable learning for students with special needs through assistive technologies and adaptive content tailored to individual abilities.	(Kamalov et al., 2023)

While AI holds significant potential to enhance education, several critical challenges must be addressed. These include concerns regarding student data privacy, equity in access to AI technologies, and the need for comprehensive teacher training to ensure effective and ethical AI integration in educational settings (Owoc et al., 2021).

Adaptive Learning

Adaptive learning is a key application of AI aimed at enhancing educational quality in the 21st century. AI systems can analyze learners' behavioral data in real time and dynamically adjust content, difficulty levels, communication formats, and learning activities to align with each learner's unique needs (Wang et al., 2023). This approach overcomes the constraints of traditional one-size-fits-all educational models by providing more personalized learning experiences. International studies have shown that adaptive learning can enhance students' comprehension,

alleviate learning-related stress, and promote intrinsic motivation, especially among learners with diverse abilities and educational needs (Alamri et al., 2021). Furthermore, adaptive systems provide educators with actionable insights that support targeted instructional planning, reinforcement of strengths, and personalized remediation (Hariyanto et al., 2025). In the Thai context, adopting AI-enabled adaptive learning systems could help bridge educational gaps—especially in under-resourced schools facing shortages of specialized teachers or large class sizes. With adequate development and policy support, AI can serve as an intelligent teaching assistant, advancing equitable and effective learning outcomes nationwide.

Personalized Learning Recommendation Systems

Personalized Learning Recommendation Systems (PLRS) utilize AI to analyze behavioral data, such as task engagement and performance, to tailor lessons and activities to individual learners' abilities, interests, and learning styles, enhancing learning outcomes and learner engagement through personalized instructional experiences (Katiyar et al., 2024).

Recent studies have shown that AI-enhanced collaborative filtering models can improve the personalization and relevance of e-learning resource recommendations by integrating learners' preferences, behavioral data and multimodal learning features (Zhai et al., 2025). Additionally, PLRS support instructors in monitoring learner progress and adapting instruction with greater precision. In Thailand, PLRS hold substantial promise for enhancing educational quality in diverse classrooms and mitigating systemic disparities. When developed holistically and implemented with ethical considerations, PLRS can become a transformative mechanism for equitable access to education and individualized learning pathways in the Thai education system of the future.

Ethical Challenges and Considerations

Privacy and Data Protection

The integration of AI into educational systems has created new opportunities for enhancing learning and institutional management. However, it has also raised significant concerns regarding the privacy and protection of student data—issues that require careful ethical scrutiny. As AI systems increasingly collect, process, and analyze large volumes of sensitive learner information, the risks of data breaches, misuse, or surveillance have become more pronounced. Ensuring that educational AI applications comply with data protection regulations and uphold the rights of learners is therefore essential. These concerns are particularly acute in contexts where digital infrastructure and policy enforcement are uneven, necessitating transparent governance frameworks, informed consent protocols, and secure data handling practices to maintain trust and safeguard learners' digital rights.

Table 4. Privacy and Data Protection Considerations for AI Applications in Education

Issue	Description	Considerations	Reference
1. Data Collection and Usage	AI systems in education often require large volumes of personal data, including academic performance and learning behavior, to optimize outcomes.	Clear protocols for data collection should be implemented to prevent violations of personal privacy.	(Huang, 2023)
2. Transparency and Responsible Governance	Some AI systems function as "black boxes," where decision-making processes are not easily explainable.	Lack of transparency complicates auditing and accountability when errors or privacy breaches occur.	(McNulty, 2024)
3. Risk Education and Awareness	Learners, educators, and parents often lack understanding of how AI works and the associated privacy risks.	Awareness campaigns and training are essential to ensure informed participation in AI-integrated learning.	(Campbell et al., 2025)
4. Legal and Regulatory Compliance	AI use in education must adhere to relevant data protection laws and best practice standards (e.g., data protection acts, ethical guidelines).	Compliance is vital to prevent privacy violations and to maintain trust in educational AI systems.	(Balaban, 2024)

It is essential to develop transparent and auditable frameworks for the use of AI in education. Stakeholders, including educators, learners, administrators, and parents—should be educated about potential risks and privacy safeguards. Clear policies and procedures must be established for the collection, use, and storage of personal data, ensuring ethical compliance and accountability. Regular audits and evaluations of AI systems should be conducted to identify and mitigate privacy violations. Moreover, protecting learners' privacy and data integrity is fundamental to ensuring that AI integration in education yields enhanced benefits alongside effective risk mitigation.

Equity in Access to AI Technologies

While the integration of AI into education presents new learning opportunities, it simultaneously underscores pressing equity concerns that warrant ethical attention.

- **Infrastructure and Access Inequality:** Students in remote areas or from low-income families often lack internet connectivity, appropriate devices, or supportive learning environments, limiting their ability to benefit from AI in education (Nurhaliza, 2025).

- **AI Literacy Gaps:** Learners and educators frequently lack the skills needed to effectively engage with AI tools, which hinders equitable technology-enhanced learning (Campbell et al., 2025).

- **Linguistic and Cultural Barriers:** Most AI systems are developed using dominant language and cultural datasets, which may disadvantage users from local language or minority backgrounds, leading to exclusion from digital learning opportunities (UNESCO, 2024).

- **Policy and Support Disparities:** Inconsistent policy frameworks and uneven governmental support often result in fragmented implementation of AI in education, contributing to systemic inequality (Balaban, 2024).

To address these gaps, stakeholders must invest in digital infrastructure, promote AI literacy among educators and learners, develop AI systems that accommodate language and sociocultural diversity, and establish inclusive national policies. Bridging these divides is essential to building an equitable and sustainable educational system for all.

Preserving Humanity in AI-Driven Education

While AI opens new frontiers for personalized learning, it also raises critical questions about preserving the human essence in education. In AI-enhanced classrooms, teachers continue to play a vital role in nurturing creativity, curiosity, and critical thinking, complementing the personalization enabled by AI systems (Walther, 2025).

International research emphasizes that AI in education should be guided by responsible and human-centered design principles, rather than being driven solely by efficiency. Such an approach is essential for preserving learner agency, ethical values, trust, and meaningful human participation in educational processes (Fu & Weng, 2024). Furthermore, algorithmic decision-making that lacks social and cultural contextualization may lead to biased or overly simplistic outcomes, particularly in educational environments that require empathy, nuanced interpretation, and contextual sensitivity (Williamson, 2021).

Therefore, AI development for education in Thailand should adhere to the principle of “technology for humanity,” emphasizing relationship-building between teachers and learners, fostering meaningful participation, and positioning AI as a supportive—not substitutive—tool. Such humanistic design preserves the core values of education and ensures that AI enhances rather than displaces the richness of human learning experiences.

Framework for Evaluation and Success Measurement

Assessing the Social Impact of AI in Education

The rise of AI is significantly transforming the educational landscape, presenting both promising opportunities and critical challenges that require thoughtful consideration. Evaluating the social impact of AI in education is essential for developing a comprehensive and systematic understanding of these transformations. Key dimensions of such an evaluation include:

Table 5. Framework for Assessing the Social Impact of AI in Education

Positive Impacts	Challenges and Concerns
1. Improved Educational Access and Equity: AI-powered tutoring systems help learners in remote areas access high-quality content. AI also reduces costs and increases accessibility for low-income populations. 2. Personalized Learning: AI can tailor content and instructional methods to each learner's specific needs, identifying gaps in understanding and offering targeted interventions. 3. Administrative Efficiency: Automation reduces teachers' administrative workload—such as grading—freeing time for more meaningful student engagement.	1. Digital Divide: Unequal access to AI technologies may widen gaps between well-resourced and under-resourced institutions, and between different socioeconomic and geographic groups. 2. Social Skills Development: Overreliance on technology may hinder the development of interpersonal and collaborative skills, reducing meaningful human interaction. 3. Privacy and Ethical Concerns: Large-scale data collection to optimize AI systems raises concerns about student privacy, algorithmic transparency, and systematic bias.
Social Impact Evaluation Framework	Policy Recommendations
1. Equity and Access: Evaluate whether AI narrows or widens educational inequality and analyze distribution of necessary infrastructure. 2. Quality of Education: Measure learning outcomes within AI-supported learning environments and evaluate the impact of AI on the development of critical thinking and creativity. 3. Impact on Labor: Analyze transformations in the roles of educators and staff, and assess the need for retraining and upskilling to effectively adapt to evolving educational demands.	1. Balanced Governance: Develop legal frameworks that support innovation while protecting learner rights and privacy, with clear standards for transparency and responsible governance. 2. Infrastructure and Skills Investment: Ensure broad access to digital technologies, especially in under-resourced regions, and invest in AI literacy for both teachers and learners. 3. Support for Research and Evaluation: Promote research on the long-term effects of AI in education and develop tools to evaluate its social and ethical dimensions.

4. Sustainability and Integration: Assess the long-term economic sustainability of AI implementation and its integration into existing curricula and pedagogy

Evaluation Criteria for the Effectiveness of Educational Models

In the context of developing educational models for the transition to an AI-driven society, effective evaluation must extend beyond conventional academic achievement of metrics. UNESCO (2023a) emphasizes the need for more holistic learning assessment frameworks, advocating for the use of AI not only to measure cognitive outcomes but also to evaluate competencies aligned with societal goals—such as global citizenship, public-mindedness, and sustainable development.

The effectiveness of AI-integrated educational models should be evaluated using multiple dimensions:

- Personalized Learning Gains: Includes learner progress at the individual level, measured through adaptive assessment and diagnostic analytics.
- Engagement Analytics: Involves data-driven analysis of learning behaviors through learning management system (LMS) logs and dashboards to assess student participation and motivation.
- Public-Minded Dispositions: Include action for public benefit, collective-oriented cognition, respect for shared resources, responsibility and duty, and compassion, generosity, and solidarity (Sukolrat & Kajornatthapol, 2025).
- User Perception: Gauges the experiences and attitudes of both learners and educators regarding the use of AI and the perceived appropriateness of instructional design.
- Systemic Impact: Assesses the scalability of the model across varied educational contexts and its return on investment (ROI) in terms of educational equity, effectiveness, and policy relevance.

Such evaluation should employ a mixed-methods approach, combining both quantitative data and qualitative insights to reflect the complexity of learning in the AI era. Importantly, it must preserve the human dimension of education and avoid reducing learners to mere data points.

Conceptual Framework for Transforming Thai Education with AI to Cultivate Public-Minded Global Citizens

This conceptual framework demonstrates the process by which artificial intelligence (AI) is employed to enhance learning experiences, promote public-mindedness, and strengthen global citizenship competencies. These efforts collectively contribute to a transformative shift in Thai education in the digital era, as illustrated below:

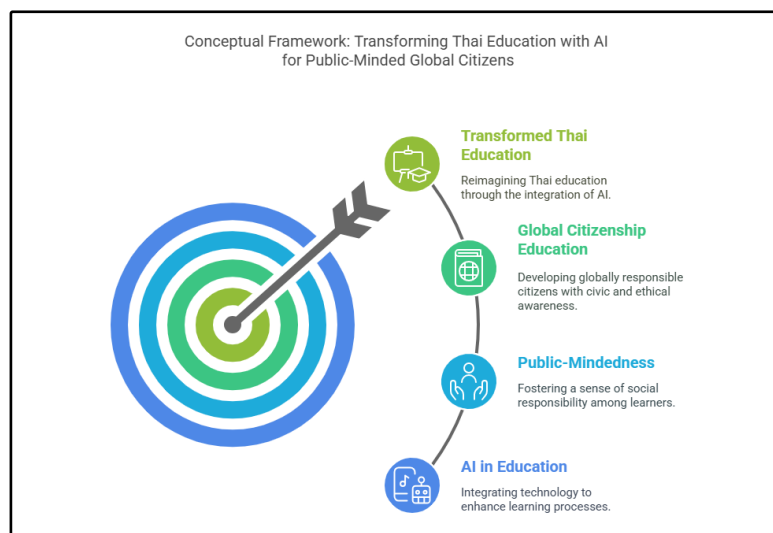


Figure 1. Conceptual Framework for Transforming Thai Education with AI to Cultivate Public-Minded Global Citizens

This framework illustrates a multi-layered approach to transforming Thai education in the digital era. At the foundation lies the integration of AI in Education, which enables personalized and adaptive learning. Building upon this is the cultivation of Public-Mindedness, emphasizing empathy, civic responsibility, and ethical engagement. This leads to the broader development of Global Citizenship Education, equipping learners with the values and competencies necessary to engage constructively in an interconnected world. The culmination of these elements results in a transformative vision of Thai Education Reform, where AI is not merely a tool for efficiency, but a catalyst for equity, sustainability, and human-centered learning.

Conclusion

1. The Vision for Thai Education in the Age of AI

The advent of AI has significantly transformed the educational landscape, necessitating a new vision for the Thai education system—one that not only responds to rapid technological developments but also reflects the nation's aspiration to cultivate global citizens who are public-minded, ethically aware, and capable of coexisting creatively within diverse societies. This vision must be grounded in the principles of lifelong learning, personalized learning, and participatory learning, with AI serving as a supportive tool rather than replacing the irreplaceable role of educators (Luckin et al., 2022). Fu and Weng (2024) emphasize that future-oriented education should adopt responsible and human-centered AI practices that meaningfully connect teachers, learners, technologies, and educational contexts while safeguarding ethical values, learner agency, transparency, and trust. Such an ecosystem would enhance critical thinking, collaboration, empathy, and social responsibility. In the Thai context, the educational vision for the AI era should prioritize Human-Centered AI in Education, with the ultimate goal of nurturing lifelong learners who are virtuous, creative, and capable of contributing to sustainable social development. Achieving this vision necessitates a comprehensive approach that combines aligned policies, strengthened infrastructure, and the ethical and reflective development of educators to ensure meaningful and responsible engagement with AI (Williamson, 2021).

2. Pathways to Developing Public-Minded Global Citizens

In an increasingly interconnected world, the development of globally public-minded citizens has become an urgent imperative for societies committed to sustainable development. Being a global citizen involves not only awareness of global issues but also active engagement in addressing those challenges with responsibility and compassion toward humanity. According to UNESCO (2022), public-minded global citizens are individuals who perceive themselves as part of a global society, respect human rights, embrace cultural diversity, and are committed to promoting justice.

Key Pathways to Cultivating Global Citizenship with Public-Mindedness:

- Education plays a central role in fostering global awareness, critical thinking, intercultural communication, and empathy, with experiential learning and community-based participation serving as key mechanisms for developing these competencies (UNESCO, 2021; Akkari & Radhouane, 2022). For example, student-led research projects that connect local issues to global challenges—such as analyzing plastic waste in local communities in relation to the global plastic crisis—offer tangible learning experiences.

- Family Engagement: Families contribute to the cultivation of values through role modeling, exposure to cultural diversity, and encouraging participatory decision-making. Activities such as monthly volunteer work, community clean-up efforts, reforestation initiatives, and humanitarian aid support help children internalize values of responsibility and empathy.

- Digital Media and Technology: Digital platforms offer unparalleled opportunities for global connectivity, dialogue, and civic engagement. However, this must be coupled with strong media literacy skills (Webster, 2025). Participating in online communities such as Reddit or Discord, where members exchange cross-cultural knowledge and perspectives, can serve as a powerful medium for fostering global awareness and civic engagement.

- Community Participation: Local engagement is an essential component of global citizenship. Actions such as volunteering, supporting socially responsible businesses, or participating in sustainable development networks—like joining a “Green Market” initiative that promotes environmentally conscious producers—build both local agency and global responsibility.

Despite challenges such as political polarization, cultural bias, and systemic inequality, global crises continue to underscore the necessity of shared responsibility and collaboration (Stewart et al., 2021). The development of public-minded global citizens is a lifelong process that serves as a cornerstone for building more inclusive, equitable, and sustainable societies.

Benefit

Based on a synthesis of existing knowledge regarding the integration of AI into educational systems to promote global citizenship and public-mindedness, several key directions for future research are proposed. These recommendations highlight the need for more in-depth and interdisciplinary investigations encompassing technical, social, ethical, and policy dimensions.

First, there is a pressing need to develop and empirically examine context-aware AI learning models that can adapt to the diverse cultural, linguistic, and socio-economic conditions of learners, especially within developing countries (Hariyanto et al., 2025). Such models should go beyond one-size-fits-all approaches and reflect the local realities of education systems.

Second, future studies should investigate the impact of AI on the development of ethical character and public-minded dispositions in learners. This remains a significant research gap, as most existing studies focus predominantly on academic outcomes and system efficiency (Luckin, Holmes, Griffiths, & Forcier, 2022).

Third, it is critical to design ethical governance frameworks for AI in education, ensuring that its deployment aligns with both global standards and local values. These frameworks must address core issues such as data privacy, algorithmic fairness, equity of access, and system transparency (Williamson, 2021).

Finally, future research should embrace interdisciplinary collaboration among educators, data scientists, ethicists, and community practitioners. Such collaborative efforts are vital to developing AI applications that are not only technologically sound but also aligned with long-term social goals and sustainability agendas.

References

- Ahmad, I. (2024). Exploring Advancing Social Equity through Sustainable Development: Challenges and Opportunities. *Sustainability Quest*, 1(1), 1–7. <https://doi.org/10.36923/SQ.v1i1.237>
- Akkari, A., & Radhouane, M. (2022). Global citizenship education. In A. Akkari & M. Radhouane, *Intercultural approaches to education* (163–171). Springer. https://doi.org/10.1007/978-3-030-70825-2_12
- Alamri, H., Lowell, V. L., Watson, W., & Watson, S. L. (2021). Using personalized learning as an instructional approach to motivate learners in online higher education: Learner self-determination and intrinsic motivation. *Journal of Research on Technology in Education*, 53(3), 336–352. <https://doi.org/10.1080/15391523.2020.1728449>
- Alfredo, R., Echeverria, V., Jin, Y., Yan, L., Swiecki, Z., Gašević, D., & Martinez-Maldonado, R. (2024). Human-centred learning analytics and AI in education: A systematic literature review. *Computers and Education: Artificial Intelligence*, 6, 100215. <https://doi.org/10.1016/j.caeai.2024.100215>
- Associated Press. (2025). AI is a game changer for students with disabilities. Schools are still learning to harness it. *AP News*. <https://apnews.com/article/ff1f51379b3861978efb0c1334a2a953>
- Balaban, D. (2024, March 29). Privacy and security issues of using AI for academic purposes. *Forbes*. <https://www.forbes.com/sites/davidbalaban/2024/03/29/privacy-and-security-issues-of-using-ai-for-academic-purposes/>
- Bosio, E. (2022). *Global citizenship education: A transformative approach to developing responsible global actors*. *Education Sciences*, 12(8), 534. <https://doi.org/10.3390/educsci12080534>
- Buyannemekh, B. (2024). Digital social innovation in cities: A systematic literature review and a research agenda. In *Proceedings of the 25th Annual International Conference on Digital Government Research* (pp. 116–132). Association for Computing Machinery. <https://doi.org/10.1145/3657054.3657073>
- Campbell, M., Barthwal, A., Joshi, S., Shouli, A., & Shrestha, A. K. (2025). Investigation of the privacy concerns in AI systems for young digital citizens: A comparative stakeholder analysis. In *Proceedings of the IEEE Conference on Computing and Wireless Communications (CCWC)*. <https://doi.org/10.1109/CCWC62904.2025.10903925>
- Carretero, S., Vuorikari, R., & Punie, Y. (2021). *DigComp 2.2: The digital competence framework for citizens—With new examples of knowledge, skills, and attitudes*. Publications Office of the European Union. <https://doi.org/10.2760/115376>
- Fu, Y., & Weng, Z. (2024). Navigating the ethical terrain of AI in education: A systematic review on framing responsible human-centered AI practices. *Computers and Education: Artificial Intelligence*, 7, Article 100306. <https://doi.org/10.1016/j.caeai.2024.100306>
- Hariyanto, H., Kristianingsih, F. X. D., & Maharani, R. (2025). Artificial intelligence in adaptive education: A systematic review of techniques for personalized learning. *Discover Education*, 4, 458. <https://doi.org/10.1007/s44217-025-00908-6>
- IPGCE. (2023). *Current challenges in Thailand's education system*. Retrieved April 25, 2025, from <https://www.ipgce.com/current-challenges-in-thailands-education-system/>
- Jenkins, H., Shresthova, S., Gamber-Thompson, L., Kligler-Vilenchik, N., & Zimmerman, A. (2023). *By any media necessary: The new youth activism* (2nd ed.). New York University Press.
- Kamalov, F., Calong, D. S., & Gurrib, I. (2023). New era of artificial intelligence in education: Towards a sustainable multifaceted revolution. *Sustainability*. <https://www.mdpi.com/2071-1050/15/16/12451>
- Kasa, T., Karilainen, L., Rajala, A., Cantell, H., & Kallioniemi, A. (2023). Finnish UNESCO school educators' understanding of global citizenship education: Analysis through typologies, ecosocial understanding, and human rights. *Prospects*, 53(3–4), 459–476. <https://doi.org/10.1007/s11125-021-09597-z>
- Katiyar, N., Awasthi, V. K., Pratap, R., Mishra, K., Shukla, N., Singh, R., & Tiwari, M. (2024). AI-driven personalized learning systems: Enhancing educational effectiveness. *Educational Administration: Theory and Practice*, 30(5), 11514–11524. <https://doi.org/10.53555/kuvey.v30i5.4961>
- Lestari, R., Nurmandi, A., Younus, M., Lawelai, H., & Suardi, W. (2025). Optimizing social media platforms to foster active public engagement in tackling climate change and environmental conservation. *Society*, 13(1), 18–34. <https://doi.org/10.33019/society.v13i1.742>
- Livingstone, S., Stoilova, M., & Nandagiri, R. (2021). *Children's data and privacy online: Growing up in a digital age*. London School of Economics and Political Science.
- Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2022). Empowering educators to be AI-ready. *Computers and Education: Artificial Intelligence*, 3, 100076. <https://doi.org/10.1016/j.caeai.2022.100076>

- Manokara, K., Lim, L., Lim, Z. Y., & Westgate, E. C. (2025). The elite global citizen: How wealth shapes cosmopolitan identity and charitable intentions. *European Journal of Social Psychology*, 55(1). <https://doi.org/10.1002/ejsp.3114>
- Ministry of Education, Culture, Sports, Science and Technology (MEXT). (2023). *Global citizenship education 2030: Strategic framework*. Government of Japan.
- Ng, W. (2021). New digital technology in education: Conceptualizing professional learning for educators. *Educational Technology & Society*, 24(2), 1–14.
- Ng, D. T. K., Leung, J. K. L., Chu, S. K. W., & Qiao, M. S. (2021). Conceptualizing AI literacy: An exploratory review. *Computers and Education: Artificial Intelligence*, 2, 100041. <https://doi.org/10.1016/j.caeai.2021.100041>
- Nurhaliza. (2025). Integration of AI in education systems: Addressing learning quality gaps in remote areas. *Journal of Artificial Intelligence Research*, 1(1), 21–31.
- Organization for Economic Co-operation and Development OECD. (2023). PISA 2022 Results (Volume I): *The State of Learning and Equity in Education*. PISA, OECD Publishing, Paris. <https://doi.org/10.1787/53f23881-en>
- Owoc, M. L., Sawicka, A., & Weichbroth, P. (2021). Artificial intelligence technologies in education: Benefits, challenges and strategies of implementation. In M. L. Owoc & M. Pondel (Eds.), *Artificial intelligence for knowledge management (AI4KM 2019)* (IFIP Advances in Information and Communication Technology, Vol. 599). Springer. https://doi.org/10.1007/978-3-030-85001-2_4
- Ravšelj, D., Keržič, D., Tomaževič, N., Umek, L., & Brezovar, N. (2025). *Higher education students' perceptions of ChatGPT: A global study of early reactions*. *PLOS ONE*. <https://doi.org/10.1371/journal.pone.0315011>
- Ribble, M. (2021). *Digital citizenship in schools: Nine elements all students should know* (3rd ed.). International Society for Technology in Education.
- Robinson-Pant, A. (2023). Literacy: A lever for citizenship? *International Review of Education*, 69(1–2), 15–30. <https://doi.org/10.1007/s11159-023-09998-6>
- Santamaría-Cárdaba, N., Gajardo, K., Cáceres-Iglesias, J., & Ortega-Quevedo, V. (2024). Global education and critical thinking: A necessary symbiosis to educate for critical global citizenship. *Open Education Studies*, 6(1), Article 20240010. <https://doi.org/10.1515/edu-2024-0010>
- Sibanda, O. S. (2023). Exploring government transparency as a path to open government. In *Public sector communication in the digital age* (253–269). Springer.
- Stewart, A. J., Plotkin, J. B., & McCarty, N. (2021). Inequality, identity, and partisanship: How redistribution can stem the tide of mass polarization. *Proceedings of the National Academy of Sciences*, 118(50), e2102140118. <https://doi.org/10.1073/pnas.2102140118>
- Sukolrat, M., & Kajornatthapol, P. (2024). Developing Supplementary Curricula to Foster Public-Mindedness Through Service-Learning and Community-Based Learning for Undergraduate Students at Tak Special Economic Zone Institute. *International Journal of Environmental Sciences*. 10(4), 1019–1026. <https://doi.org/10.64252/cbder855>
- The Asia Foundation. (2023). *Education reform: In Thailand principals are “black box” between national policymaking and kids in the classroom*. <https://asiafoundation.org/education-reform-in-thailand-principals-are-black-box-between-national-policymaking-and-kids-in-the-classroom/>
- UNESCO. (2021). *Reimagining our futures together: A new social contract for education*. UNESCO Publishing.
- UNESCO. (2022). *Global citizenship education: Topics and learning objectives*. UNESCO.
- UNESCO. (2023a). *Advancing education: Evolving assessments with AI*. <https://unesdoc.unesco.org/ark:/48223/pf0000387554>
- UNESCO. (2023b). *Global citizenship education: Preparing learners for the challenges of the 21st century*. UNESCO Publishing.
- UNESCO. (2024). *Artificial intelligence in education*. <https://www.unesco.org/en/digital-education/artificial-intelligence>
- Walther, C. (2025, March 1). AI is changing how we learn: The new role of human teachers. *Forbes*. <https://www.forbes.com/sites/corneliawalther/2025/03/01/ai-is-changing-how-we-learn-the-new-role-of-human-teachers/>
- Wang, S., Christensen, C., Cui, W., Tong, R., & Yarnall, L. (2023). When adaptive learning is effective learning: Comparison of an adaptive learning system to teacher-led instruction. *Interactive Learning Environments*. <https://doi.org/10.1080/10494820.2023.2201863>
- Webster, J. (2025). Defining digital citizenship and digital citizenship education: A Delphi study. *Journal of Research on Technology in Education*, Advance online publication. <https://doi.org/10.1080/15391523.2025.2536564>

- Wei, L., Hindman, D. B., & Zeng, D. (2022). Digital inequality: The evolving landscape of digital access and participation. *Telecommunications Policy*, 46(5), 102308. <https://doi.org/10.1016/j.telpol.2022.102308>
- Williamson, B. (2021). Meta-edtech. *Learning, Media and Technology*, 46(1), 1–5. <https://doi.org/10.1080/17439884.2021.1876089>
- Wongsuwan, P., & Makpa, P. (2025). Educational inequality in Thailand: A structural analysis within the framework of the Sustainable Development Goals (SDGs). *VISITSILP Journal of Arts and Culture*, 2(2), 37–53.
- World Economic Forum. (2024). *Shaping the future of learning: The role of AI in education 4.0*. https://www3.weforum.org/docs/WEF_Shaping_the_Future_of_Learning_2024.pdf
- Zhai, X., Wang, Y., Liang, L., Wang, K., Pei, F., & Fu, E. Y. (2025). Personalized e-learning resource recommendation using multimodal-enhanced collaborative filtering. *Knowledge-Based Systems*, 319, Article 113605. <https://doi.org/10.1016/j.knosys.2025.113605>