

## A Report Review: Artificial Intelligence and the Future of Teaching and Learning by

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**Abstract:** This review provides an insightful overview of "Artificial Intelligence and the Future of Teaching and Learning," a policy report by the United States Department of Education. Keywords such as Artificial Intelligence (AI) development, policy-making, ethics, equity, collaboration, and human-centric approach are emphasised throughout. The review highlights the report's comprehensive analysis, actionable recommendations, and emphasis on inclusive policy-making processes. It underscores the significance of understanding AI's multifaceted nature, its potential to enhance education, and the importance of safeguarding privacy and equity. Practical examples and case studies are discussed, along with recommendations for aligning AI with educational goals. Overall, the review positions the report as a valuable resource for policymakers, educators, and technology developers, guiding them toward responsible AI integration in education.

**Keywords:** artificial intelligence, education policy, policy recommendations, inclusive policy-making, learning outcomes

## INTRODUCTION

This recently published report policy, a collaborative effort that brings a comprehensive and holistic understanding of AI development and policy in the United States, incorporates insights from diverse stakeholders which include government, educational leaders, researchers, policymakers, technology developers, advocates and funders, community members and organisations, and most importantly learners and their families/caregivers. It ensures ethical and equitable AI systems, having been written based on the listening sessions held by the Department of Education. The report provides

clear advice through actionable recommendations, empowering leaders to address the challenges and leverage the opportunities presented by AI in education effectively.

In general, the report consists of eight chapters. Chapter one highlights the importance of creating fair rules involving various people to ensure AI in education helps everyone equally and brings good results. Chapter two discusses that AI is not just one thing but a mix of different technologies like machine learning and natural language processing while guiding educators to a useful list of AI terms. Chapter three acknowledges that AI can improve teaching and learning through personalised feedback and adaptive systems. Chapter four highlights how AI supports teachers in learning activities through "Always Center Educators" (ACE) in AI to prioritise humanistic teaching values. Chapter five discusses that AI-supported formative assessments can save teachers time by automating grading, enabling them to focus on assisting students. Chapter six emphasises that researchers and developers are focused on prioritising context as a traditional challenge in AI. Chapter seven discusses an intensified focus on understanding and incorporating various contextual factors influencing learning. Chapter eight highlights the immediate and long-term goals included in AI research and development (R&D) for education.

### **AI POLICY MAKING IN EDUCATION**

Digital technologies, especially artificial technology (AI) have been massively devised, rapidly developed, and extensively utilized in various aspects of life. The education field (especially language learning) is benefiting from the arrival of AI and producing a specific domain of educational technology, unaware that educators are at new risks. A sharp rise of interest and concerns about this "automation based on associations" machine resulted in the development of guidance for educational technology, in which the Department was required to work closely with all constituents, from educational leaders to learners and their families. This report is the cornerstone of such an attempt, by realising key opportunities, preventing and mitigating the emergent risks, and also tackling unintended consequences of AI in education.

Chapter one emphasises the importance of developing AI policies and practices inclusively and collaboratively, with input from diverse stakeholders. It also lies in its comprehensive approach to building ethical and equitable policies for AI in education. The report covers various aspects of AI in education, from the ethical challenges it poses to the need for policies that address these challenges. The report also references key documents and guidelines, such as the Blueprint for an AI Bill of Rights and the European Commission's ethical guidelines, which provide a framework for policymakers and educators to ensure that AI is used in a way that benefits society.

From this chapter, readers can get a clear picture of the importance of policies that prioritise human agency, privacy, and equity while harnessing AI's potential to improve learning outcomes. It can be implied that stakeholders must develop AI policies that can protect the users regarding their privacy and provide AI systems that are ethical and equitable. An AI education policy can also teach students about the ethical considerations surrounding AI, such as bias and fairness, along with the

potential consequences of using AI in academic contexts (Chan, 2023). Government and stakeholders might use five core principles which are proposed “beneficence, non-maleficence, autonomy, justice and explicability” which is referred to by most national policies on AI to develop AI policies (Floridi & Cowls, 2022). However, the chapter is relatively brief and does not go into depth on the specific strategies or approaches for building ethical and equitable AI policies. It also does not provide concrete examples or case studies to illustrate the principles being discussed.

Chapter two provides a helpful overview of the different components, types, and subfields of AI, as illustrated in Figure 3 (see the report p.11). It also acknowledges that AI is not a single, monolithic concept but rather an umbrella term for a range of modelling capabilities. This chapter also references a useful glossary of AI terms for educators, which can help readers better understand the terminology. From this chapter, readers can also broaden their perspectives about what AI is and understand that AI in education offers significant potential but requires careful consideration of its capabilities, limitations, and ethical implications to maximise benefits and mitigate risks effectively. As AI offers significant potential when properly used, it can extend human capabilities and possibilities of teaching, learning, and research (Popenici & Kerr, 2017). However, the explanation of the different AI concepts and components needs to be more elaborated so it can be more detailed and comprehensive. This chapter also does not delve into the specific applications of AI in the context of teaching and learning.

### **AI IMPLICATIONS IN LEARNING, TEACHING, AND ASSESSMENT**

The COVID-19 pandemic has delivered unexpected wrought in the teaching and learning process. Digital technology, especially AI, has been presenting various enormous supporting answers to ease the limitations brought upon it. This policy report analysed that learning from the unforeseen situation, the challenges that teachers experience must be well-addressed and AI must focus to support this critical issue. This phenomenon was reported in many journal researches, such as one by a Slovakian researcher, Strbo (2020), who confirmed that there was a massive change in teaching, from traditional to online, that teachers were encouraged to adapt by applying the new digital skills to continue full-fledged teaching.

Chapter three of the policy report provides a comprehensive overview of integrating AI into education, covering various aspects such as adaptivity, intelligent tutoring systems, and expanding AI-based adaptivity. It also provides practical examples, such as AI-based tutoring and intelligent tutoring systems which can help the readers illustrate how AI can support learning principles effectively. Further, readers can highlight the potential of AI to enhance learning experiences and be aware of the challenges and limitations associated with AI in education. Highlighting the statement, AI technologies have positive effects on enhancing learning experiences (Chiu, 2023). However, we can be more aware of biases in AI systems, be critical to ensuring data privacy, and recognise the limitations of AI models.

However, the chapter provides some technical terms and concepts that might be challenging for readers unfamiliar with AI or educational theories, such as “Edtech”, “adaptivity”, “Intelligent Tutoring System”, and “meta-analysis”, potentially hindering comprehension for certain audiences.

Moreover, while the chapter discusses theoretical aspects and potential benefits of AI in education, it provides limited guidance on practical implementation strategies for educators or policymakers. In addition, the chapter lacks visual aids. Incorporating visual aids such as diagrams or charts could enhance understanding, especially for complex topics like AI models and adaptivity.

Chapter Four reports that AI does not only provide teachers with recommendations of inclusive learning and work choices for students, but also helps teachers to reflect, plan, and improve their practice. The policy explained that it is necessary to set forth “Always Center Educators” (ACE) in AI to succeed with AI as an enhancement in learning and teaching. Practising ACE in AI means keeping a humanistic view of teaching in front and centre. To do this, teachers must decide which loops of AI they fall into. The report cited to adapt the adaptivity loops research finding by Alevan et Al. (2016) to draw a visualisation of three loops AI related to teachers' activities: moment-to-moment decisions during immediate work of teaching, their planning and teaching reflections for professional development, teachers' participation to design, select and evaluate AI-enable technologies for classroom use and teachers' convenience. This practice aligns with reflective practice as part of teacher research that Sali and Damar (2022) promoted for a better teaching and learning process. They are also convinced that employing active learning works best with this practice.

The report also mentions that even though AI is supposed to support and enhance teachers' professional development, it leaves some challenges for increased teacher surveillance and students' privacy protection. In the report, the Department warns that despite the broad equity challenges of avoiding algorithmic discrimination through the four foundations of human in the loop, equity, safety, and effectiveness, as well as evaluation of AI models, there is no chance to expect AI models to respect cultural responsiveness. Zhang & Aslan (2021) argued in their studies that AI governance is intended to be a universal and globally enforceable framework, which is unfortunately not fully engaged with the challenge of cultural differences or explored the implications of cultural diversity to the human rights approach in their works. The factual implications of AI advancement have raised urgent concerns and critical initiatives to address AI ethics, privacy, and cultural responsiveness which are now massively investigated by many researchers worldwide.

Aiming to enhance teaching practices while keeping educators at the forefront of educational innovation, this chapter explores the ideal concept of teaching and learning integrating with the use of AI by providing a general explanation and is supported by some graphics. The report also cited some recent studies from prominent scholars, while empirical data were adapted into the report. In addition to that, the report covers research questions and possible research gaps that may occur in the field. However, no practical real examples and guidance of good teaching using AI could be found in this chapter. Readers must attempt to independently explore and seek more information from other external sources for this matter.

Chapter five discusses AI-enhanced formative assessments which may have the potential to save teachers' time (e.g., time spent on grading), allowing the instructor to spend more time engaged in

helping students. Using educational technology, especially AI models and enabled AI systems, formative assessment has been used to give feedback to improve teaching and learning, by focusing on the people engaged with formative assessments: students, teachers, school leaders, families/caregivers, and others who support learners. It does not only mean a test or a measurement but also is a part of useful reflective practice which can change the teaching course. This aligns with Torres-Goens and Farley (2017) who found that students' performance and their own role in learning are positively impacted by reflective practice. All contexts of learning processes strengthen instructional practices through the intertwining nature of reflection of all.

The report further explains three key areas of opportunity in supporting formative assessment using AI systems and models, and also key recommendations in such issues. The three key areas of opportunity are measuring what matters, improving help-seeking and help-giving, and advocating for teachers and students to be strongly involved in designing feedback loops. Meanwhile, the key recommendation is to harness assessment expertise to reduce bias. In her book, Hamilton (2018) argued that although using formative assessment data using digital technology, especially AI, is considerably uneasy and unnatural for most teachers, it is the most powerful way to improve teacher practice and students' learning. At the end of the chapter, only a few detailed practical examples of the use of AI in the assessment are conveyed.

#### **A HUMAN-CENTRIC APPROACH FROM RESEARCH TO POLICY EVALUATION**

The exploration of AI's implications in education, as outlined in the preceding chapters, underscores the transformative potential of technology in reshaping learning, teaching, and assessment practices. From leveraging AI for adaptive tutoring systems to enhancing formative assessment processes, the discourse has traversed the realms of theory and practical application. However, as we transition to the next phase of examination, it becomes imperative to delve deeper into the research and development (R&D) landscape surrounding AI integration in education.

Chapter six explains research and development (R&D) and offers a comprehensive examination of the implications of integrating artificial intelligence (AI) into education. It emphasises the importance of involving various education stakeholders in shaping policies and strategies for AI integration. Supported by the Blueprint for an AI Bill of Rights, the chapter emphasizes the crucial role of humans in AI systems, particularly in instances of system failures. This framework addresses the pressing challenges to democracy posed by technology, data, and automated systems, highlighting the potential threats to civil rights and democratic values (Blueprint for an AI Bill of Rights, 2022) (White House Office of Science and Technology Policy, n.d.). Renz and Vladova (2021) shed light on the resurgence of interest in human-centred AI within educational technologies. They underscore the critical imperative for AI systems to centre on the requirements, values, and experiences of learners and educators.

Furthermore, the chapter emphasises aligning AI models with a shared vision for education, prioritising educational goals over technological determinism. It highlights the need for designing AI

systems based on modern learning principles, with a specific focus on equity and customization to cater to diverse learners and local communities. This perspective resonates with the ethical concerns raised by Akgun & Greenhow, (2022) in their work on AI in K-12 education, particularly regarding student and teacher privacy, informed consent, autonomy, and fairness. These ethical considerations are crucial for the responsible integration of AI systems in educational settings.

One notable aspect of this chapter is the specific recommendations for policy action, such as prioritizing the inclusion of humans in the loop, strengthening trust, and directing R&D efforts towards addressing context and enhancing trust and safety. By calling attention to factors like learner variability, cultural assets, and instructional resources, the chapter underscores the importance of contextual considerations in AI development for education. Moreover, it highlights the pivotal role of educators in building trust and promoting AI literacy among teachers, reinforcing the significance of educator involvement in AI-enabled system development and implementation. This aligns with the argumentations by Siau and Wang (2018) who emphasizes the importance of collaboration and communication in nurturing and maintaining continuous trust in AI.

Nevertheless, a potential area for improvement in this chapter is perceived by the absence of concrete examples or case studies to illustrate the practical application of the recommendations. While the document provides valuable insights and recommendations, the absence of specific examples diminishes its practical relevance for education leaders and policymakers. As highlighted by Micallef and Newton (2024) pairing abstract concepts with concrete examples can significantly improve understanding. In the context of AI integration in education, providing real-world case studies or examples could bridge the gap between theory and practice, offering educators and policymakers actionable insights into implementation. By illustrating the practical application of aligning AI with policy objectives and human priorities, stakeholders can better navigate the complexities of AI integration in educational settings.

## **IMPLEMENTING RECOMMENDATIONS FOR ETHICAL AND EQUITABLE INTEGRATION**

Chapter seven delves into further recommendations mentioned in the previous chapter of the report, which offers a comprehensive exploration of the intersection between artificial intelligence (AI) and education, presenting a roadmap for leveraging AI while upholding ethical and equitable principles. The document meticulously outlines recommendations derived from stakeholder consultations, focusing on aligning AI advancements with educational priorities and principles.

At the heart of this chapter lies a thorough analysis and clear articulation of recommendations. The document adeptly navigates the potential benefits of AI in education, ranging from personalised learning to adaptivity and support for diverse learners. It emphasises the critical importance of aligning AI models with educational goals, ensuring that AI serves as a tool to enhance learning outcomes rather than detracting from them. Moreover, the text underscores the important role of educators, students, and families in the decision-making process, fostering a collaborative approach to integrating AI into

educational settings. This emphasis on stakeholder involvement resonates as a key strength, as it ensures that AI implementation remains grounded in the realities and needs of the educational community. Building AI systems that address diverse needs necessitates an inclusive design approach, achievable only through collaborative efforts with stakeholders from all backgrounds, including educators and students (Roshanaei et al., 2023).

## **CONCLUSION**

The policy report we have reviewed has set an example for other governments and establishments to produce guidance and canon in AI integration in education policy making. It should foster and promote human agency, privacy, and equity while harnessing AI's potential to improve learning outcomes and prioritise users' privacy. It is necessary to put forth ACE in AI to succeed with AI as an enhancement in learning and teaching. AI does not only provide teachers with recommendations and work choices for students but also helps teachers to reflect, plan, and improve their practice. AI is supporting and enhancing teachers' professional development. Opportunities lie in measuring important aspects, enhancing support systems, and involving teachers and students in feedback loop design, fostering collaboration and effective learning experiences.

Overall, some prevalent potentials make this report favourable to read, along with its adversities. The report is presented with detailed information in such a structural manner, by including some visuals. Supported by related theories, it listed many research gaps that invite the readers to explore further. Having intrigued the readers to learn more about AI in education, a good level of English reading literacy is required. Packed information with considerably long sentences might challenge non-native English speakers and lower-level English to digest the contents. This adversity is just one of the following points. The report also lacks detailed strategies for building ethical and equitable AI policies, does not include any practical examples for the practitioners to relate to, and doesn't discuss specific applications of AI in teaching and learning.

Nevertheless, "AI in Education" remains a significant contribution to the discourse on the role of AI in shaping the future of education. Its emphasis on informed policy and collaborative efforts underscores its importance in guiding the ethical and equitable integration of AI into educational systems. By providing a roadmap for leveraging AI while safeguarding human agency, the document serves as a valuable resource for education leaders, policymakers, and technology developers alike. As the educational landscape continues to evolve, "AI in Education" stands as a beacon, guiding stakeholders toward a future where technology enhances learning outcomes while upholding ethical principles and equity.

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