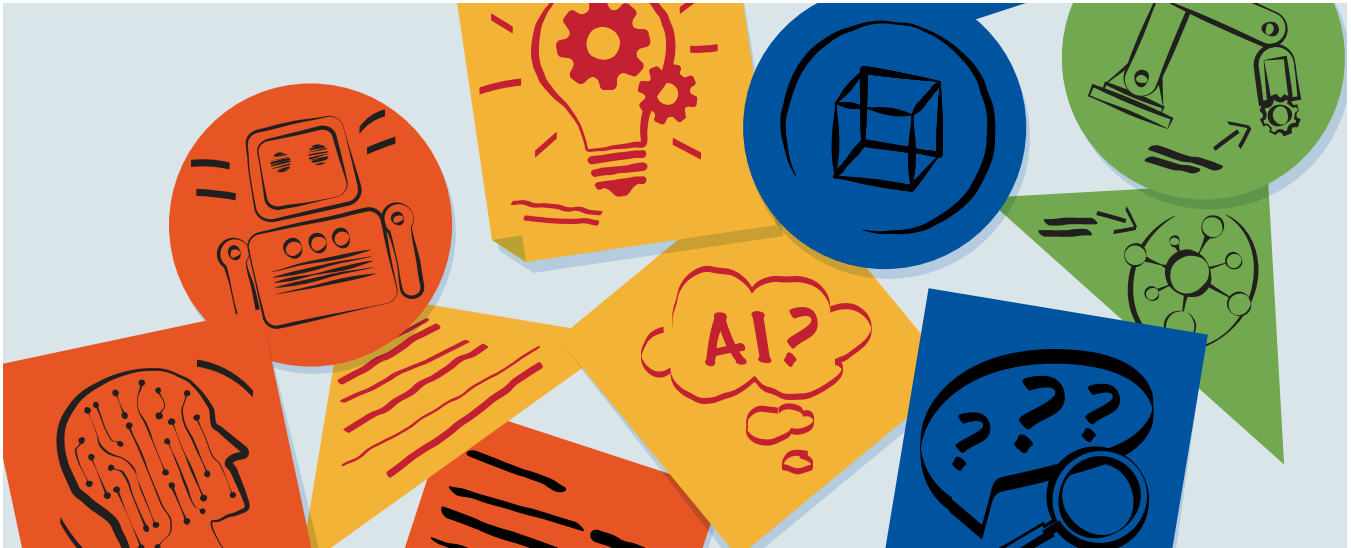




# Handout: AI and the Future of Teaching and Learning



This handout summarizes core messages in a recently released report by the US Department of Education, “AI and the Future of Teaching and Learning: Insights and Recommendations,” which is available at <https://tech.ed.gov/ai/>.

## Core Messages

The U.S. Department of Education (Department) is committed to supporting the use of technology to improve teaching and learning, and to support innovations throughout educational systems. This report addresses the clear need for sharing knowledge, providing supports, and developing policies for artificial intelligence (AI), a rapidly advancing class of foundational capabilities for recognizing patterns and automating actions which are being increasingly embedded in all types of educational technology systems. AI brings powerful opportunities to address education policy priorities, and we must address both anticipated risks and the possibility of unintended consequences.

## Defining AI in Schools

AI can be described as enabling two broad shifts from today’s use of technology in schools: (1) from capturing data to **detecting patterns in data** and (2) from providing access to instructional resources to **automating decisions** about teaching and learning processes. Compared to commonplace educational technology, detecting patterns and automating decisions marks an increase in the level of responsibilities a person may delegate to a computer system. The process of developing an AI system may lead to bias in how patterns are detected and unfairness in how decisions are automated. Thus, educational leaders must create policies to govern how AI is developed for and used in education.

## Key Insights

- **AI enables new forms of interaction.** Students and teachers can speak, gesture, sketch, and use other natural human modes of communication to interact with a computational resource and each other. AI can generate human-like responses, as well. These new forms of action may provide supports to students with disabilities.
- **AI can help educators address variability in student learning.** With AI, designers can anticipate and address the long tail of variations in how students can successfully learn—whereas traditional curricular resources were designed to teach to the middle or most common learning pathways. For example, AI-enabled educational technology may be deployed to adapt to each student’s English language abilities with greater support for the range of skills and needs among English learners.



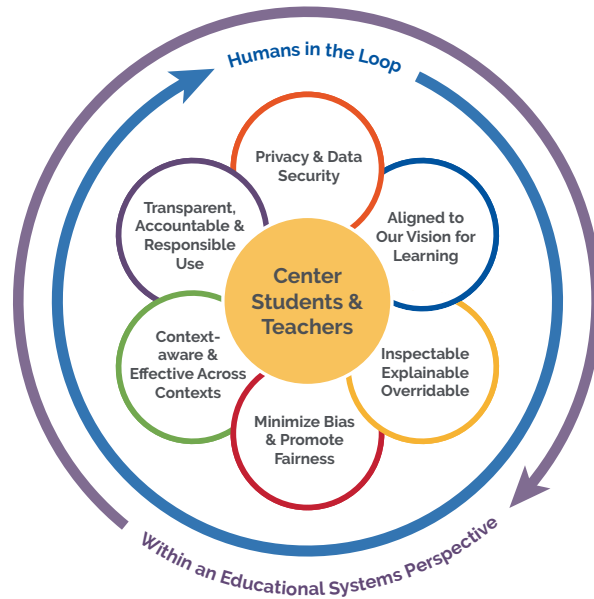
*We envision a technology-enhanced future more like an electric bike and less like robot vacuums. On an electric bike, the human is fully aware and fully in control, but their burden is less, and their effort is multiplied by a complementary technological enhancement.*



- **AI supports powerful forms of adaptivity.** Conventional technologies adapt based upon the correctness of student answers. AI enables adapting to a student’s learning process as it unfolds step-by-step, not simply providing feedback on right or wrong answers. Specific adaptations may enable students to continue strong progress in a curriculum by working with their strengths and working around obstacles.
- **AI can enhance feedback loops.** AI can increase the quality and quantity of feedback provided to students and teachers, as well as suggesting resources to advance their teaching and learning.
- **AI can support educators.** Educators can be involved in designing AI-enabled tools to make their jobs better and to enable them to better engage and support their students.
- **AI increases existing risks and introduces new risks yet to be considered.** AI increases risks already present in educational technology, especially data privacy and security. AI adds new risks of algorithmic discrimination due to unwanted patterns in existing data and unfair automated decision-making. For educational systems to benefit from the opportunities, the risks must be minimized and mitigated. The Blueprint for an AI Bill of Rights is sound starting place for investigating the potential risks in particular AI systems, especially when further elaborated with specific understanding of risks that may arise in educational settings.

## Recommendations

1. **Emphasize Humans-in-the-Loop.** We reject the notion of AI as replacing teachers. Teachers and other people must be “in the loop” whenever AI is applied in order to notice patterns and automate educational processes. We call upon all constituents to adopt Humans-in-the-Loop as a key criteria.
2. **Align AI Models to a Shared Vision for Education.** We call upon educational decision makers, researchers, and evaluators to determine the quality of an educational technology based not only on outcomes, but also based on the degree to which the models at the heart of the AI tools and systems align to a shared vision for teaching and learning. The figure below describes the important qualities of AI models for educators to consider.



3. **Design AI Using Modern Learning Principles.** Further, achieving effective systems requires more than processing “big data”—it requires more than data science. Applications of AI must be based on established, modern learning principles, the wisdom of educational practitioners, and should leverage the expertise in the educational assessment community around detecting bias and improving fairness.
4. **Prioritize Strengthening Trust.** Technology can help us to achieve our educational objectives only when we trust it. And our listening sessions revealed the ways in which distrust of artificial intelligence is natural. Because trust develops as people meet and relate to each other, we call for a focus on building trust and establishing criteria for trustworthiness of emerging educational technologies within the associations, convenings, and professional organizations that bring educators, innovators, researchers, and policymakers together.
5. **Inform and Involve Educators.** Going beyond receiving notice and explanation of the use of AI, educational leaders must prioritize informing and involving educational constituents so they are prepared to investigate how and when AI fits specific teaching and learning needs, and what risks may rise. Addressing data privacy is important, but strengthening trust requires more than data privacy: educators need AI systems that can be inspected, explained, and guide how humans can override recommendations generated using AI. The Office of Educational Technology can play a leading role in providing information and stimulating involvement, in concert with activities organized at all levels of the educational system.

6. **Focus R&D on Addressing Context and Enhancing Trust and Safety.** Research that focuses on how AI-enabled systems can adapt to context (diversity among learners, variability in instructional approaches, differences in educational settings) is essential to answering the question “Do specific applications of AI work in education, and if so, for whom and under what conditions?” We call upon researchers and their funders to prioritize investigations of how AI can address the long tail of learning variability and to seek advances in how AI can incorporate contextual considerations when detecting patterns and recommending options to students and teachers. Further, researchers should accelerate their attention to how to enhance trust and safety in AI-enabled systems for education.
7. **Develop Education-specific Guidelines and Guardrails.** Data privacy regulation already covers educational technology; further, data security is already a priority of school educational technology leaders. Modifications and enhancements to the status quo will be required to address the new capabilities alongside the risks of AI. We call for involvement of all perspectives in the ecosystem to define a set of guidelines (such as voluntary disclosures and technology procurement checklists) and guardrails (such as enhancements to existing regulations or additional requirements) so that we can achieve safe and effective AI for education.

## CONTACT



If you would like more information about the AI and the Future of Teaching and Learning report, contact [ed.tech@ed.gov](mailto:ed.tech@ed.gov) with questions. Please include OET AI Report in the subject line.

## WEBINAR



REGISTER for our webinar on June 13, 2023 at 2:30pm ET to learn more about the report and the Department’s vision for supporting information sharing and supporting policies for AI. Use the QR code to sign up.

