TOPICAL POLICY BRIEF

How Policy Can Help Ensure the Proper Use of AI in K-12 Education

MIT Responsible AI for Social Empowerment and Education (RAISE) Initiative

Daniella DiPaola
Andrés F. Salazar-Gómez
Hal Abelson
Eric Klopfer
David Goldston
Cynthia Breazeal

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MIT Schwarzman College of Computing
MIT Washington Office
MIT RAISE Initiative Responsible AI for Social Empowerment and Education
MIT Open Learning
MIT media lab

aipolicy.mit.edu

AI Policy Brief: K12 Education

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I. Introduction – Promise and Perils

Artificial intelligence (AI) has the potential to significantly improve K-12 education if implemented appropriately – in ways that ensure its safe and equitable use. We use the term "AI" broadly to mean any technology that uses data to make predictions and decisions, or creates new content. AI offers great promise for students, teachers, and school administrators. Examples include: the personalization of learning through virtual chatbots (e.g., a ChatGPT-powered system such as *Khanmigo*) that provide K-12 students hints and clues tailored to where the child is in the learning process[1]; social robots that support children learning to read through predictive algorithms of vocabulary knowledge[2]; automated grading systems that allow teachers to use their time more effectively by providing detailed feedback and scoring based on a student's answers[3]; and predictive systems for school administrators that identify high school students at risk of dropping out[4].

Children have unique developmental needs and vulnerabilities, and AI should be integrated into schools in a way that enables kids to flourish while keeping them safe. Doing so should not displace or reduce the role of teachers, who play a critical role in students' education and social development.

There is little or no federal guidance on AI for K-12 education. Little systematic research at scale exists on how and when students learn better with AI, and states and school districts are left on their own in a "Wild West" of competing claims, with AI offering unverifiable allure and unknown risks. Nonetheless, states are creating an array of AI implementation recommendations and guidelines for K-12 education, with no consensus among them. Different states have different definitions and recommendations for topics as important as plagiarism and AI literacy[5]. Federal policies based on state-of-the-art research can help guide states and localities, while still leaving room for states and school districts to use AI in a way that meets their particular needs.

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[1]Bidarian, N. (2023, August 21). Meet Khan Academy's Chatbot Tutor | CNN business. CNN.
[2]Zhang, X., Breazeal, C., & Park, H. W. (2023, March). A Social Robot Reading Partner for Explorative Guidance. In Proceedings of the 2023 ACM/IEEE International Conference on Human-Robot Interaction (pp. 341-349).
[3]Metz, C. (2021, July 20). Can A.I. grade your next test?. The New York Times.
[4]Page, L., & Gehlbach, H. (2018, January 16). How Georgia State University used an algorithm to help students navigate the road to college. Harvard Business Review.
[5]Dusseault, B. (2024, March). New state AI policies released: Signs point to inconsistency and fragmentation | Center on Reinventing Public Education (CRPE), Arizona State University.

This table enumerates some of the major potential benefits and challenges of using AI in the classroom. Successful federal policy would make the benefits more likely and the harms less so.

Potential Benefits	Potential Harms
● Increase students' learning gains through personalized learning experiences. ● Complement instruction by teachers. ● Promote creative learning, designing, and making. ● Reduce barriers to access to advanced knowledge.	● Enable the collection of vast amounts of personal data, compromising privacy. ● Produce inaccurate, inappropriate, or harmful outputs. ● Favor certain learning approaches or abilities. ● Exhibit bias. ● Exacerbate inequities among school districts. ● Undermine the development of basic skills such as writing.

Beyond concerns related to weaknesses inherent in AI systems themselves, harms could result from the way AI is deployed. Are there ways AI can be used to maximize educational benefits and minimize potential detrimental effects, like the potential loss of needed basic, age-appropriate skills? How can educators and parents keep adapting as AI systems continue to improve, and as society and regulation adjust to AI's new capabilities?

II. The Federal Role

While pre-college education is primarily a state and local responsibility, the federal government has a critical role in shepherding AI into the classroom and ensuring its appropriate use. Many states and localities lack the expertise and capacity to design or enforce technical requirements for AI systems, even more so if AI systems are offered by just a small number of national suppliers. The federal government is more likely to have the wherewithal, both financial and human, to fund research, set technical standards, assist procurement, promote transparency, and provide guidance on many crucial aspects of AI in education. If the federal government plays its role properly, states and school districts will have the information and the funding they need to make their own decisions on exactly how to integrate AI into teaching and the curriculum.

We discuss five areas where increased federal activity is needed: research; standards development and auditing; procurement assistance; educational guidance; and AI literacy. We describe the federal role in fulfilling each of these needs and then offer steps the federal government could take to meet the challenge.

Research on AI in K-12 Education

The federal government has long been an important funder of research in critical areas likely to be neglected or underfunded by the corporate sector or others. Two broad research areas need much greater focus if AI is to be used safely and effectively in the

K-12 classroom. The first is research on AI systems themselves. AI systems need to be more accurate, less biased, less likely to output dangerous or offensive material, and less likely to compromise privacy, among other deficiencies, if they are to be entrusted with supporting the education of minors. [See issue brief on LLMs.]

Second, and equally important, much more research is needed to understand how the use of AI might affect teachers and students, and how to use AI to maximize its educational benefits. We understand too little to begin with about how students learn best, and far less about the impact of a new technology. AI is not a magical elixir that can be added to education with guaranteed positive results. Ongoing research, monitoring, and evaluation will be needed to understand how to use AI optimally. Research on how to most effectively deploy AI is needed in education as it is in other fields. The research, piloting, and monitoring will have to be done in a way that does not sacrifice children and their teachers as guinea pigs who are handed AI tools before we know how they would work best. One area of research should try to figure out how to help any children whose education has been harmed by using AI before its implications are sufficiently understood.

RECOMMENDATIONS: The Department of Education (ED) and the National Science Foundation (NSF) should create programs specifically to address the research issues discussed above. Funding for this research should be a budget priority, including funding for field research, especially at scale, to see how AI is actually being used in a diverse range of classrooms and the impacts of that use. The National AI Research Resource (NAIRR), now being piloted, should make computer time available for the research described above. However, it should be recognized that the NAIRR, even if fully funded, would not have adequate resources to help carry out major research projects.

ED and NSF will also need to take steps to ensure that the results of the research they fund are broadly *disseminated* and that their implications are clear to state education officials, school administrators, and teachers.

Technical Standards and Auditing

As in many areas of technology, the federal government has a key role to play in developing technical standards (and conducting the research needed to do so), even though private entities or other levels of government can decide which standards to adopt. Standards development is especially important in a field like AI – which is rapidly changing and largely dominated at the moment by a handful of companies (at least in terms of the broad platforms on which more targeted systems are built). And it is even more important when what's at stake is education – a largely public undertaking with enormous societal impacts. As noted in the section above, many of the AI "safety" issues that are central to education are of concern to AI users more broadly and are already a focus of federal standards-development work. As AI is incorporated into more systems, standards also will be needed to describe which AI tools should require auditing.

Standards can be effective only if they are actually followed; those using AI in K-12 education should not be left to rely on chance when it comes to how AI systems actually function in practice. An auditing ecosystem will need to be developed to ensure that AI systems perform as advertised, especially in terms of concerns such as accuracy, fairness, and privacy. [See main AI Policy Brief.] This is even more important for AI systems that will be interacting with children. Auditing itself requires the creation of technical standards – on what to test for, and how – and then trustworthy entities are needed to conduct the audits. Audits can be done before an AI system being deployed, or after, or both – with each type of audit having its strengths and weaknesses.

One possible approach would be for the National Institute of Standards and Technology (NIST), in collaboration with the ED and NSF, to develop standards and guidelines for auditing and red-teaming of AI designed to be used in K-12 education. States and localities could then decide whether to require that AI systems used in their school systems be audited, and that could be done in accordance with the federal standards (or something based on them). A federal, state, and/or local system – or a non-profit one – would need to be set up to certify auditors. We believe that auditing AI systems for pre-college education *must be performed by third parties*, not by those developing or selling the AI systems, to avoid conflicts of interest inherent in self-audits.

Privacy should be one aspect of AI that is audited. The issue is not only whether individuals, institutions, or companies could get access to identifiable data about an individual using the AI, but also whether data could be aggregated across different platforms. Third-party actors could also collect school data and combine it with other behavioral data from children's online presence. For example, an AI-driven tutor created by a large tech company might collect the full history of a child's interaction with the system to develop more effective personalized tutoring responses, then sell the information to a company focused on toy advertising. NIST already has a mandate to create AI privacy standards, but more attention is needed specifically about the privacy of minor children.

Regarding privacy, we can learn from existing federal initiatives designed to protect privacy, including the Children's Online Privacy Protection Act (COPPA) and the Children's Internet Protection Act (CIPA) – administered by the Federal Trade Commission and the Federal Communications Commission, respectively. These laws provide authority to issue guidelines or regulations for AI, but that has not happened. The Kids Online Safety Act (KOSA) could also be used as the basis for privacy regulations.

Developing an effective and reliable auditing ecosystem may be one of the most difficult and critical steps in ensuring that AI systems are appropriate for K-12 education. [See main AI Policy Brief.]

RECOMMENDATIONS: The White House has rightly made NIST the lead government agency for setting technical standards for AI. NIST needs more funding to carry out this

vital work. NIST should coordinate with ED and NSF to determine what specific standards may be needed for AI systems used in education.

There are a range of options the federal government could then use to try to ensure that audits are conducted, including (from strictest to more lenient):

- Prohibiting states and school districts that receive federal funding from buying or using AI systems that have not been audited in accordance with federal standards.
- Prohibiting federal funds from being used to buy or deploy AI systems that have not been audited in accordance with federal standards and/or requiring post-hoc audits as a condition of federal funding to buy or deploy AI systems.
- Providing additional funds when entities buy or deploy an AI system that has been audited in accordance with federal standards.
- Creating "safe harbor" legal standards for AI systems used in education that have been audited in accordance with federal standards. (This will be meaningful only if there is a functional liability regime to begin with – an issue that goes beyond education.)
- Withholding funds from school districts that have problems with AI systems that were not audited before purchase or deployment. (This may, though, create incentives not to report problems, or may penalize schools that are already financially strapped.)
- Providing funding for post-hoc audits after an AI system has been deployed.

We believe that there should be some federal requirements that set a minimum standard for auditing and safety for AI that could be used for K-12 education.

At the very least, ED should make sure states and school districts have access to any NIST auditing standards and results with information on the implications for education. Schools should not be using unaudited AI systems.

Procurement Assistance

Also, AI systems can be expensive, and poorer school districts in particular may not be able to afford them. The federal government should ensure that AI does not create a new "digital divide" because only the wealthiest districts can afford AI or appropriate AI. (As discussed in the next section, the federal government should also take steps to ensure that school districts, especially poorer ones, do not weaken education by over-reliance on AI or use AI as a way to displace teachers.) The federal government should also make sure that poorer school districts are not turned into guinea pigs, using donated equipment without adequate testing or thinking about its optimal use.

RECOMMENDATIONS: ED could establish a program (or use a current program) for competitive grants to states and/or school districts to fund the use of AI systems that meet adequate standards. (See section above on standards.) There is a clear

precedent for the federal government providing equitable access to technology for education, the universal service Schools and Libraries Program (E-rate)[6].

Those seeking grants should have to describe not only the kind(s) of AI systems that the money would be used for but also how that AI would be deployed and monitored. Any federal agency providing funding for AI should take steps to ensure that AI is not used to displace teachers. AI should be used to enhance teaching, not to reduce the number of teachers. ED and other agencies could require that the size of the teaching staff not be reduced at least during the life of the grant.

Educational Guidance

Drawing on the research discussed above, the federal government should offer guidance on the use of AI in education, teacher training and certification, and other aspects of AI in education (even though final decisions on when, where, and how to deploy AI will remain with states and localities). The federal government should also act as a convener, by itself or with associations of education professionals or others, bringing together school officials and teachers from around the country to discuss AI issues.

One key issue is determining when using AI constitutes a breach of academic integrity – when it is just "cheating." We do not think that AI use should be subject to broad bans, but rather that students should be taught when and how it is appropriate to use it as a tool. That will, of course, differ by grade level and subject. Generative AI such as ChatGPT can be a creative partner and help students better utilize time on their assignments. When students enter the workforce, using these tools will be commonplace.

However, there are cases in which AI should not be used. For example, in early education (typically defined as Pre-K to 3rd grade), while students are learning how to read and write, they should not be allowed to use AI in a manner that will interfere with them developing their own skills. As AI is introduced and permitted, students should practice using the tool in contexts when it is appropriate to do so, based on age-appropriate guidelines and the teacher's discretion, and understand the consequences if they misuse it.

Educators should clearly state when students can and cannot use AI for their assignments. We suggest that teachers not rely on AI tools to detect AI use on assignments, as these tools currently have a high rate of false positives.

RECOMMENDATIONS: ED and NSF should begin preparing materials that can guide states, school districts and teachers on AI education (see more on that below) and the use of AI in education. Any guidance should be updated regularly.

[6]https://www2.ed.gov/about/inits/ed/non-public-education/other-federal-programs/fcc.html

ED should consider creating a new office devoted solely to AI. While AI education and the use of AI in education need to be integrated with all other aspects of primary and secondary education, a separate office would not only highlight the importance and uniqueness of the AI issues, but might help attract a cadre of relevant technical experts to the department. ED and NSF should run grant programs to help fund the development of curriculum, educational materials, and teacher training programs related to AI.

ED and NSF, in collaboration with states and school districts, should develop metrics that could help assess the impact of AI in the classroom on learning gains and skills development. These should include metrics on the level of student engagement, and the impact on struggling and disenfranchised students.

AI Literacy

The federal government should develop guidelines not only for how AI should be used in K-12 education but also for what students should learn about AI itself. The goal should be to help school districts create an AI-literate generation so students can become effective citizens and productive workers in a world where AI will play a prominent role.

We define “AI literacy” to include educating students on the appropriate and productive use of AI. This encompasses gaining an understanding of how AI-powered technologies operate, their applications, how to create with AI and work with AI effectively and responsibly, and drawbacks and possibilities. AI literacy is relevant to many different course areas and AI literacy should be infused across the curriculum, instead of just in the computer science classroom.

For example, the appropriate use of generative AI could be addressed in arts classrooms, and the impact of AI on society could be taught in civics classrooms. The curriculum should clearly connect AI’s capabilities and these different subject areas. K12 students should learn about AI through learning-by-making experiences and responsible design practices[7], where appropriate.

For students to be AI literate, they need AI-literate teachers. Teachers should receive training on how to promote AI literacy and how best to use AI. The federal government, along with states, localities, and non-profits, should develop ways to certify qualified AI teachers.

The federal government should also issue guidelines on what students should know to be considered AI literate and should help create curriculum and assessment tools on AI literacy. Federal involvement in developing AI literacy standards and curricula for students is needed because states are setting curriculum regulations that often vary

[7] https://dayofai.org/

widely from each other. For example, West Virginia's guidelines[8] suggest that AI literacy is only a part of computer science and technical courses, while North Carolina[9] emphasizes AI literacy across all curriculum areas. U.S. students won't be equally trained in AI without a more cohesive approach across states.

RECOMMENDATIONS: ED and NSF should fund curriculum development on AI literacy – both for teacher training and for students. ED and NSF should also fund teacher training on AI literacy.

ED should update the national common core standards in digital literacy to encompass AI and create a new category of common core standards specific to AI literacy. Grants should encourage collaboration among non-profits, universities, teachers, and others in developing AI literacy curricula and professional development materials.

III. Concluding Thoughts

The beneficial use of AI in K-12 education will not happen automatically and should not be left to chance. The advent of AI raises, among other things, difficult questions about the pace at which AI should be introduced in the classroom that education officials at all levels will have to answer. How can a school find the proper balance – not holding back on AI so much that teachers and students are deprived, but not racing ahead so fast as to be saddled with AI systems that either become quickly obsolete, have serious flaws, or are used in ways that do more harm than good (before it's even clear how to evaluate that)?

Finally, while K-12 education raises some very specific issues about AI, education will be greatly affected by larger trends in AI and AI policy. Many concerns about AI systems in education – accuracy, bias, etc. – apply to many uses of AI to at least some degree. Steps needed to facilitate the proper use of AI, like the development of auditing and liability regimes, are especially important for education.

K-12 education should prepare children to be successful adults in their personal and professional lives. They should be prepared to be informed citizens, creative makers, and critical thinkers. AI's role in the education and training of students (and teachers) needs to be carefully considered and repeatedly iterated if we are to best serve the future of our children, their teachers, and our nation.

Authors

Daniella DiPaola is a Ph.D. student in the Personal Robotics Group at the MIT Media Lab; Andres F. Salazar-Gomez is a research scientist at MIT Open Learning; Hal Abelson is Class of 1922 Professor of Computer Science and Engineering; Eric Klopfer is Professor and Director of

[8]West Virginia Board of Education. (2024, January). Guidance, Considerations, & Intentions for the Use of Artificial Intelligence in West Virginia Schools | Virginia Department of Education.
[9]North Carolina Department of Public Instruction. (2024, January). North Carolina Generative AI Implementation Recommendations and Considerations for PK-13 Public Schools

the Scheller Teacher Education Program and The Education Arcade at MIT; David Goldston is Director of the MIT Washington Office; Cynthia Breazeal is the Dean for Digital Learning and a professor of media arts and sciences at the MIT Media Lab.

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