Center for Universal Education at BROOKINGS

RECOMMENDATION BRIEF

A NEW DIRECTION FOR STUDENTS IN AN AI WORLD: PROSPER, PREPARE, PROTECT

Recommendations to mitigate risks and harness the benefits of generative AI for students

A yearlong study by the Center for Universal Education at the Brookings Institution finds that, given the current trajectory of generative artificial intelligence (AI) and its implementation and use, the potential risks to students overshadow the benefits. But it is not too late to bend the arc of AI use to enrich, rather than diminish, student learning and development. The report, "A new direction for students in an AI world: prosper, prepare, protect" offers a framework for action for all actors, from schools to companies and governments to families. This document includes the report's recommendations and identifies which stakeholders are best placed to enact each recommendation.

Prosper, prepare, protect

Our proposed framework rests on three pillars—Prosper, Prepare, and Protect. Each pillar is discrete yet equally vital, but all three must work in concert to ensure that AI supports children's flourishing, safeguards their well-being, and equips them to meet the challenges of tomorrow.

PROSPER: Recommendations under the Prosper pillar focus on **transforming** teaching and learning experiences so that children and youth can thrive as learners, professionals, citizens, and human beings in a world where AI increasingly permeates every dimension of their technological, vocational, civic, and personal lives.

PREPARE: Recommendations under the Prepare pillar focus on **building** the knowledge, capacity, and structures for ethical and effective AI integration, ensuring that schools develop clear AI visions with dedicated resources, organized adoption processes, and measurable evaluation criteria to track implementation success.

PROTECT: Recommendations under the Protect pillar include **safeguarding** students' privacy, safety, emotional well-being, and cognitive and social development through ethical AI tools that enhance learning while fostering emotional development, strong relationships, and productive struggle.

To seize this opportunity, we all have a role to play, from governments to technology companies to families to civil society organizations. The table below identifies which actors are best placed to lead and support each recommendation. However, this may differ by context, as government, education systems, and others have different purviews and structures across the globe.

RECOMMENDATIONS BY ACTOR

Click any recommendation to view its full description.

= Leading role to play
= Supporting role to play

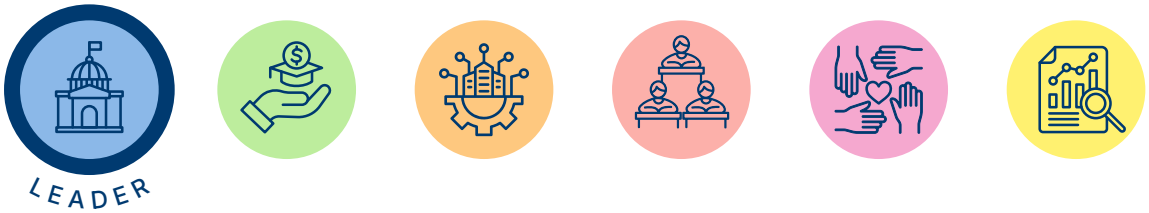
	Governments	Education funders	Technology companies	Education systems	Civil society organizations	Families, caregivers, and community actors	Researchers and academics	Students
PROSPER								
1 SHIFT EDUCATIONAL EXPERIENCES IN SCHOOLS ↗		✓	✓	●	✓		✓	✓
2 CO-CREATE EDUCATIONAL TOOLS WITH EDUCATORS, STUDENTS, PARENTS, AND COMMUNITIES ↗	✓		●	●	✓	✓		✓
3 USE AI TOOLS THAT TEACH, NOT TELL ↗		✓	●	✓		✓	✓	✓
4 CONDUCT RESEARCH ON CHILDREN'S LEARNING AND DEVELOPMENT IN AN AI WORLD ↗		✓		✓	✓		●	✓
PREPARE								
5 PROMOTE HOLISTIC AI LITERACY FOR STUDENTS, TEACHERS, PARENTS, AND EDUCATION LEADERS ↗	●		✓	●	✓	✓		✓
6 PREPARE TEACHERS TO TEACH WITH AND THROUGH AI ↗	✓			●	✓			
7 PROVIDE A CLEAR VISION FOR ETHICAL AI USE THAT CENTERS HUMAN AGENCY ↗	●			●	✓	✓		✓
8 EMPLOY INNOVATIVE FINANCING STRATEGIES TO CLOSE THE AI DIVIDE ↗	●	✓	✓	✓				
PROTECT								
9 BREAK THE ENGAGEMENT ADDICTION AND DESIGN PLATFORMS THAT ARE CENTERED AROUND POSITIVE MENTAL HEALTH FOR CHILDREN AND YOUTH ↗	●	✓	●	✓	✓	✓		✓
10 ESTABLISH COMPREHENSIVE REGULATORY FRAMEWORKS FOR EDUCATIONAL AI ↗	●	✓		✓	✓			
11 PROCURE TECHNOLOGY THAT PROTECTS STUDENTS' PRIVACY, SAFETY, AND SECURITY ↗	✓	✓	✓	●				
12 SUPPORT FAMILIES TO MANAGE CHILDREN'S AI USE AT HOME ↗		✓		●	✓	●		✓

We encourage everyone to choose at least one recommendation—and preferably several—to which they can dedicate time, resources, and attention, and then take concrete steps to advance them.

PROSPER

1 SHIFT EDUCATIONAL EXPERIENCES IN SCHOOLS

WHO CAN TAKE ACTION:



Key actions to achieve this recommendation

Click any action to view its full description.

- *Craft new pedagogies that are AI-aware, AI-assisted, and, when necessary, AI-resistant.*
- *Develop students' core learning capacities.*
- *Develop students' knowledge and understanding, through interdisciplinary frameworks.*
- *Support students' social and civic development.*
- *Foster students' motivation and agency, including through real-world learning.*

Perhaps one of the most important steps enabling students to prosper in an AI world is to shift education experiences away from the transactional task completion that characterizes learning in so many schools worldwide. There is no shortage of ideas on how to shift what David Tyack and William Tobin call "the grammar of schooling," namely the central structure of most education systems (Tyack and Tobin 1994). Schooling models that focus on meaningful practice and deeper learning have been advanced for decades, even centuries, worldwide. These range from community-based learning circles to vocational exploration that integrates academic learning (Dewey 1916; Freire 1970; Krishnamurti 1953). Today, many of these approaches have the added benefit of being supported by emerging learning science. For example, students learn better when they feel they belong, when they get a chance to practice and apply what they learn, and when they are focused and emotionally invested in what they are doing in school (Cohen 2022; Darling-Hammond et al. 2020; Immordino-Yang and Damasio 2007).

Many of the harms identified here—particularly the risks to students' learning—originate largely from attempting to overlay transformative technology onto educational structures that have, at their core, remained largely unchanged since the late nineteenth century (Tyack and Tobin 1994). As one secondary school student described it, the core student schooling experience is "memorize, recite, forget," year after year. While AI should not drive educational change, it lays bare weaknesses in current systems and provides education systems with a strong motivation to reform their purposes and processes.

Schools and extracurricular and out-of-school programs can coordinate efforts to help young people retain and develop their humanity as individuals and as members of their communities. This includes identifying when and how AI should, and should not, be integrated into teaching and learning experiences.

Education systems, governments, families, students, civil society organizations, technology companies, funders, and researchers all have a role to play in helping young people have learning experiences that help them develop the knowledge, competencies, and skills they need to thrive in an AI world.

National and multi-country initiatives that help education systems learn from each other on how to shift teaching and learning practices can play an essential role in accelerating these shifts. Existing initiatives can be funded to deepen or expand their work, including focusing on the four areas of learning below. In some cases, new initiatives will need to be established where existing efforts fall short. To build momentum, insight, and sustainability, these national or multi-country initiatives can involve an array of actors involved in supporting education alongside education systems.

> To shift educational experiences in schools, **craft new pedagogies that are AI-aware, AI-assisted, and, when necessary, AI-resistant.**

Technology is not pedagogy. The introduction of AI into classrooms, no matter how powerful, does not in itself constitute instruction or innovative pedagogy. Critical cognitive skills like deep reading, critical thinking, and Level 3 and 4 writing are hard to teach and resist simple technological solutions. While AI-assisted pedagogies can deepen students' engagement with these areas, AI cannot support these skills unless the instructional practices around them are improved first. This includes understanding effective reading-writing connections, building classroom environments that support collaborative writing, addressing the needs of diverse learners, and resisting reductive practices tied to high-stakes testing. Research continues to show that motivation, formative feedback, and access to adequate resources are all crucial, and these cannot be outsourced to machines (Graham 2019).

Teachers can identify what aspects of teaching and learning are most vulnerable to automation or distortion by AI. For example, they can distinguish between tasks where AI can scaffold learning—such as drafting, idea generation, or revising writing—and those that demand human interaction, ethical judgment, and the cultivation of learner identity. These insights should guide AI-assisted decisions (e.g., leveraging AI for feedback or modeling writing techniques) and AI-resistant choices (prioritizing human dialogue, peer collaboration, and cultivating students' own voice). This strategic approach leverages AI to unlock new educational possibilities rather than simply accelerating existing practices (Delphi panelist).

Ultimately, teachers can craft pedagogies that are both robust in the face of technological change and expansive in their vision of human learning. AI should be an ally in this work—not as the driver of learning, but as a tool in the hands of skilled teachers who understand how learning truly happens (Delphi panelist).

> To shift educational experiences in schools, **develop students' core learning capacities**.

Around the world, children need experiences in and out of school that support the development of a range of foundational skills essential for learning. These skills, often described as a suite of brain processes, include things such as self-control, working memory, selective attention, and cognitive flexibility (Diamond 2013). Children develop these skills starting from the moment they are born up until and through early adulthood. These skills can be taught, improve with practice, and are essential for children's cognitive, social, and emotional development. They help children succeed in school and life, from learning to read to addressing unexpected challenges, and from seeing other people's perspectives to solving problems (Diamond 2013; Galinsky 2024).

The potential risk, that poor AI use may undermine these foundational learning capacities, can be mitigated through shifting teaching and learning experiences, including employing the actions in the Box 1 below.

BOX 1

Strategies to support students' core learning capacities

Playful and interactive learning activities. Educators can help students develop core learning capacities by incorporating playful and interactive pedagogical approaches into their regular lessons. For the early years, this can include strategies such as students practicing reading to each other, with one student listening (and not interrupting), then asking a question after the reader is done. This helps children develop their self-control, attention, and working memory. Collaborative storytelling, where children play together, including taking on roles in a pretend scenario (such as playing grandma cooking at home), helps develop cognitive flexibility. From the Tools of the Mind intervention in the U.S., to group play and physical activity in China, to cards and table top games in Spain, there are a wide range of ways educators can incorporate these activities into their regular lessons (Diamond and Lee 2011; Bodrova and Leong 2007; Bai et al. 2022; Vita-Barrull et al. 2023). As children grow, these skills develop further. Once-in-time tests that ask students to recall information are much less helpful in developing these essential capabilities than when educators ask students to engage in ethical dialogue, debates (including switching sides midway through), or when students undertake tasks that require them to plan, monitor, and adapt their work (Alexander 2018; Immordino-Yang 2025).

School phone bans with a pedagogical exception. Cell phones provide a host of distractions to young people and can interfere with children's attention. With the integration of AI into virtually all technology platforms, including social media, the ongoing call to limit student cell phone use in schools will continue to be important. Many school systems have already instituted limited student cell phone use, including "bell-to-bell" phone bans that ensure young people spend time interacting in person during mealtimes and breaks (Economist 2025). However, for low-resource schools, including those without science labs or access to other technology, phones may be the one access point where educators can provide useful technology-based learning opportunities, including learning about AI. In these contexts, limiting student phone use throughout the day, except for legitimate pedagogical use, when sanctioned by educators, is helpful for students social as well as academic development.

> To shift educational experiences in schools, **develop students' knowledge and understanding, through interdisciplinary frameworks.**

Education systems must recognize the humanities and social sciences as essential foundations for developing critical thinking and ethical reflection; students in particular need frameworks for making sense of acquired knowledge through the exploration of ideas and ethical deliberation. An integrated humanities approach can blend the rigor of mathematics, science, and engineering with interpretive and contextual insights from humanistic inquiry. As part of this, STEM can be taught from a humanities perspective. For

example, when students construct machine learning models, they can simultaneously examine how biased data perpetuates community harm; when studying computer science, they can engage substantively with questions of fairness and technology's societal implications. By situating STEM learning within social, historical, and ethical contexts, education prepares students not merely as AI users but as critical thinkers capable of interrogating AI's underlying assumptions while developing information and media literacy as essential competencies across all disciplines (Delphi panelists).

This integrated curriculum spanning all grade levels cultivates versatile individuals through systematic incorporation of literature, philosophy, linguistics, culture, and ethics into technical subjects. For example, a biology unit on biomedical engineering could integrate structured debates about genome editing with CRISPR or genetic modification of foods, wherein students apply classical philosophical frameworks—Stoicism, Aristotelianism, utilitarianism, nihilism, pragmatism, or existentialism—to evaluate the ethical dimensions of biotechnological possibilities (Delphi panelist).

BOX 2

Strategies to support students' knowledge and understanding, through interdisciplinary frameworks

Use philosophy to understand the difference between *can* and *should*. Students learn what *can* be done through scientific method and subjects like math, science, and history. Equally important—especially in an AI-driven world—is grappling with what *should* be done. As Klein et al. observe, AI "models make words but people make meaning" (1). Philosophy, alongside other humanities disciplines, is uniquely positioned to guide this work. Integrating philosophical approaches fosters ethical, reflective, and deliberative thinking, with ripple effects that strengthen learning across subjects (Education Endowment Foundation 2016). Helping young people make sense of their knowledge in an AI world is essential.

Multimodal approaches to learning. AI has the potential to transform teaching and learning through multimodal approaches. While most instruction worldwide remains heavily text-based, research in the learning sciences, including from professor Heng Luo of Central China Normal University, shows that integrating text, images, speech, gesture, simulation, and embodied interaction significantly enhances comprehension, retention, and transfer (Luo 2023; Arifin et al. 2024). AI can facilitate these diverse ways of engaging with material, thus aligning with Universal Design for Learning principles that reduce learner variability by supporting diverse student needs (CAST, n.d.). Innovators from India to the U.S. are experimenting with AI-enhanced VR to bring biology and chemistry concepts to life (Hale et al. 2025; Luo et al. 2021; Rahimi et al. 2025; fotonVR2025), while others provide historical figure chatbots for student interaction (Muncey 2025). Students, too, are finding creative applications, using AIto generate podcasts from class notes or create personalized quizzes for test preparation.

To shift educational experiences in schools, **support students' social and civic development.**

An important purpose of schools in an AI-infused world is to help young people learn to live together. Across virtually every country in the world, schools are one of the most prevalent social institutions where children can meet others, in person, outside their immediate family and neighborhood. The role of schools in helping children develop empathy, respect, and tolerance, among other essential social capabilities, is an important counterbalance to the growing polarization of online discourse and interactions. Leaders worldwide have for many years argued that education should help people understand others, build a sense of shared humanity, and develop the skills to collectively achieve shared goals (Delors 1998). The actions in Box 3 can help advance this.

BOX 3

Strategies to support students' social and civic development

Youth-led civic learning in and outside of school. Civic learning helps students develop the knowledge, beliefs, and behaviors needed to participate in civic life (Winthrop 2020). Schools and their communities can actively curate opportunities for civic learning that help young people develop civic knowledge and mindsets and practice civic behavior. This can include inviting students to make a contribution in a range of spaces in and out of school, such as identifying and solving a problem at school, making a piece of art for their neighborhood, speaking at a community event, participating in a discussion on difficult topics with neighbors, and joining a community improvement organization (Raine et al. 2025). Students can identify when AI extends their abilities—such as mapping local vegetation for a park project or practicing question-and-answer responses for a presentation. But AI cannot do these activities for students. Civic learning can also provide opportunities for students to work collaboratively, connect with others, and advance their social interaction and development.

Civic games and simulations. Well-designed games and simulations can be an effective strategy to support students' civic learning and foster social connection and development. These range from offline experiences like Model United Nations, a program schools around the world use to role-play United Nations-style debate and deliberation, to AI-enriched online experiences (Jesuit and Endless 2018). Game designers can collaborate with young people in harnessing AIto advance online civic learning games and simulations, including those currently used by educators such as online government role plays or games helping young people learn about relationships, communication, and collaborative action (Rivers and Bertoli 2024; iThrive Games 2025; European Union 2025).

> To shift educational experiences in schools, **foster students' motivation and agency, including through real-world learning.**

Perhaps one of the most important roles of education systems in a world of rapid AI advancements is to foster students' internal motivation to learn alongside their ability to proactively navigate their own learning journey. One way to mitigate the potential risk of AI increasing students' passivity and self-efficacy is to encourage them to set and pursue a meaningful goal—that is, to foster their agency. Student motivation, engagement, and agency are interrelated, shaped by the environments they are in, and can change

quickly with a shift in context (Reeve et al. 2022). Learning experiences that connect to students' interests and provide students with some measure of choice and control can help boost their motivation and engagement and give them a chance to develop agency (Anderson and Winthrop 2025). While there are many ways to boost student motivation, engagement, and agency—including the pedagogical approaches discussed above—experiential learning opportunities that help connect student learning to real-world issues and the world of work are especially well suited for doing this.

BOX 4

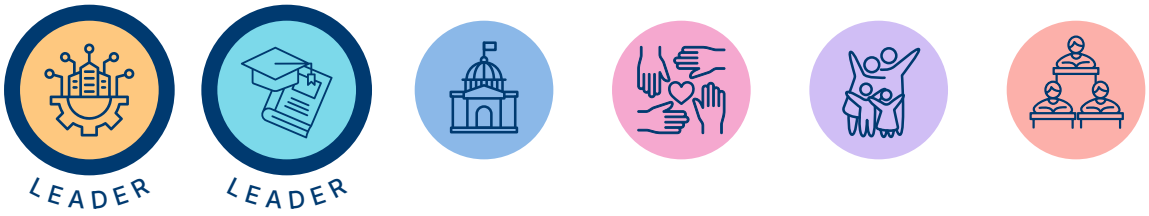
Strategies to support students' motivation and agency, including through real-world learning

AI-supported experiential learning. A wide range of teaching and learning approaches can help foster student motivation, engagement, and agency. These can include project-based and career-connected learning approaches. In these types of experiential learning experiences, AI can be a helpful tool for students: assisting in identifying problems in their school or community and developing and implement a solution. Rather than offloading learning, students' use of AI in this scenario extends it—whether primary school students leverage AI to improve trash collection or secondary school students use it to develop a new product or business (Pandit et al. 2025; Riverside Learning Center 2025; Johansen 2018). Students can work together in groups on projects that are connected to local business, civil society, or governments. Online experiential learning simulations that are powered by AI have the potential to provide students opportunities to practice real-world skills from job interviews to pitch sessions for aspiring entrepreneurs (Mollick et al. 2024). This can provide students with opportunities to exercise their initiative and creativity in the context of real-world industries. Examples include entrepreneurship training programs around the world, like those supported by Junior Achievement, using AI agents to give secondary school students the opportunity to practice describing the product or service they have created as if they were pitching to an investor. Students receive real-time feedback and can repeatedly run through the simulation prior to presenting their ideas to business leaders in real life (JA Worldwide, n.d.).

Student evaluation of AI. Student agency can be further fostered by giving students the opportunity to evaluate their own use of AI. Students can run "light-touch" classroom audits, and document when AI improves productive struggle versus when it increases cognitive offloading. This information can then be shared with school leaders to inform policies and practices around AI use.

2 CO-CREATE EDUCATION AI TOOLS WITH EDUCATORS, STUDENTS, PARENTS, AND COMMUNITIES

WHO CAN TAKE ACTION:



Key actions to achieve this recommendation

Click any action to view its full description.

- ↗ *Establish teacher-tech co-design hubs.*
- ↗ *Involve students and parents in AI decisionmaking and design.*
- ↗ *Support local language and community AI initiatives.*

AI companies whose products are designed wholly or in part for education must move beyond what one educational AI engineer describes as "superficial" consultations with educators, students, and families to deeply engage users in co-creating these products. This is especially true for companies that develop educator- and learner-facing tools. This collaborative approach supports educator and student buy-in and trust. It helps educational AI tools align with research-based learning practices that enhance rather than undermine essential teaching and learning experiences across diverse contexts and populations. This approach also addresses the persistent critique of many educational technology products: that they are simply old wine in new bottles—outdated pedagogical approaches in technically sleek packaging (Chen et al. 2025). By working together to co-create use cases and designs that leverage AI's potential for powerful agentic teaching, these educational AI products can better serve students and their teachers. This can include the approaches below:

> To co-create AI tools, **establish teacher-tech co-design hubs.**

In interviews, teachers expressed frustration that "AI is being done to us, not with us," and evidence suggests that successful AI companies meaningfully engage educators and other stakeholders from the earliest stages (Cukurova 2025). One approach that teacher organizations and unions, technology companies, governments, and researchers can take is to establish co-creation hubs in each major education jurisdiction so teachers (together with technologists) help lead the design of AI tools with the support of governments and researchers. The examples in Box 5 demonstrate the diversity of approaches these hubs can take.

BOX 5

Teacher-tech co-design hubs

Netherlands National Education Lab AI (NOLAI). NOLAI is a government-funded program that supports a university, teacher union, schools, and an ed-tech company collaboration on AI and education. Housed at Radboud Universiteit in the Netherlands, it brings together schools, teachers, ed-tech companies, and researchers to develop AI tools and use cases, test them in schools, and evaluate their impact (Radboud Universiteit 2025, Turner 2022). Key elements include:

- Government funding for a 10-year period (2022–2032) allows the lab to plan long-term and finance prototype educational AI products
- Joint purpose: All stakeholders collaborate to improve primary and secondary education identifying where AI can help
- Co-creation of projects: Research questions developed collaboratively between teachers, school leaders, researchers, and business
- Joint oversight through a steering group representing education, academia, and business, with government advice through a program council
- Evaluation and shared knowledge: academics are involved throughout, and findings will be shared with schools and businesses

Public-private partnership for US National Academy for AI Instruction. OpenAI, Microsoft, and Anthropic pledged $23 million to the American Federation of Teachers to open a free training center, the National Academy for AI Instruction in New York City, for teachers and school staff to learn AI responsibly and ethically (Kelly 2025; Microsoft Source 2025; Scragg 2025; Singer 2025b). Key elements of the center include:

- Joint leadership from union leaders and public/private stakeholders
- Free in-person and online training with pathways to credentials and continuing education credits
- Two-way communication enabling teachers to inform students how tech companies develop AI for students
- Tool agnostic: The Academy introduces multiple AI tools, including those from funders and other companies

To co-create AI tools, **involve students and parents in AI decisionmaking and design.**

Education systems can involve students and parents in how to best use and roll out AI in education. In many classrooms, teachers are learning about AI use alongside students. Young people especially, if given the chance, have meaningful contributions to make on how AI is used well to support their learning, creativity, and connection (Rithm Project 2025; Center for Digital Thriving 2025). Some strategies for systematically partnering with students are included in Box 6.

BOX 6

Involving students and parents in AI decisionmaking and design

Student AI Councils. Creating AI councils within education jurisdictions can serve as mechanisms for embedding student voice in the co-design of AI tools to ensure their relevance, inclusivity, and pedagogical soundness before adoption. Council members could help develop AI policies for education jurisdictions or schools. Students on the council could also play an important role in vetting AI products before purchasing. Their participation can enhance alignment with real classroom needs and foster a sense of shared accountability. These councils could also provide early detection of misuse risks while cultivating AI literacy and civic engagement among youth. They could convene short design sprints where students collaborate with teachers, developers, and policymakers to test AI tools for usability, accessibility, and cultural context; incorporate student feedback into procurement and pilot decisions; and document lessons learned and share them through an open repository to guide future procurement and implementation of AI tools.

Student and parent representation on technology committees. Where schools and school districts have technology committees, student representatives from both the primary and secondary levels, as well as family members, should serve as members of these committees.

To co-create AI tools, **support local language and community AI initiatives.**

Technology companies, governments, civil society organizations, researchers and communities can help include marginalized communities' and countries' voices in AI development, adoption, and integration. This is one important way to ensure that AI tools remain accessible, support digital equity, and do not perpetuate harmful biases. AI adoption must begin with listening; this means employing co-design processes with a focus on underserved communities, thereby allowing schools to develop applications reflecting their specific contexts, values, and educational needs rather than importing external solutions (Bozkurt et al. 2024; Weaver 2022; Ruiz et al. 2024; Delphi panelists).

Governments and technology companies can support civil society, researchers, and communities to develop a global network of local language initiatives to share information, resources, and advance the field. Important strategies to do this are investing in community-driven datasets, training multilingual models on representative samples, providing linguistic expertise for expanding machine translation capabilities, and offering access to scholars who guide data collection, verify accuracy, and identify resources (Okolo and Tano 2024). Several initiatives across Africa demonstrate how this can be done, as seen in Box 7 below.

Additionally, technology companies themselves can play a critical role in ensuring greater linguistic equity. For example, BERT (Bidirectional Encoder Representations from Transformers) is a widely used open-source multilingual AI language model originally developed by Google. It understands words by examining their complete context—reading both what comes before and after each word simultaneously. This bidirectional approach makes BERT particularly effective at understanding meaning across different

languages with varied grammatical structures and word orders. Several initiatives, some of which are profiled in Box 7, have recognized the potential of transformer-based architectures, such as BERT, to support African language and Asian language natural language processing, particularly in contexts where local language training data are scare.

BOX 7

Local language and community AI initiatives

Ghana Natural Language Processing (Ghana NLP) identified that most African languages are either absent from or poorly represented in systems such as Google Translate. To address this gap, Ghana NLP developed ABENA ("A BERT Now in Akan"), a transformer model fine-tuned from multilingual BERT(mBERT) and adapted for Twi/Akan, a major Ghanaian language also spoken in Togo and Côte d'Ivoire. ABENA represents one of the first BERT-family models for a Ghanaian language, while Ghana NLP also focuses on improving datasets and methods optimized for low-resource settings (GhanaNLP 2025).

Masakhane, a pan-Africa, community-driven research collective, promotes collaboration and capacity building in African language natural language processing. Its community of researchers across the continent co-develops datasets, fine-tunes multilingual transformer models such as mBERT and XLM-RoBERTa, and publishes research that advances African-language processing (Masakhane, n.d.).

Beyond sub-Saharan Africa, regional transformer projects demonstrate the adaptability of BERT-family architectures to underrepresented languages. Two examples are IndicBERT for Indian languages and SEA-LION for Southeast Asian languages. These models, typically trained from scratch or fine-tuned from multilingual BERT, aim to produce tools that better capture linguistic and cultural nuances than English-centric models, thereby mitigating bias and improving inclusion in AI systems (Pava et al. 2025, 14).

Not all language initiatives need to use BERT-family architecture. Lesan.ai, based in Ethiopia, does not use the BERT encoder-only architecture, rather it applies machine translation techniques to expand access for underrepresented languages. Its system supports bidirectional translation among English and widespread Ethiopian and Eritrean languages such as Amharic and Tigrinya (Lesan, n.d.).

3 USE AI TOOLS THAT TEACH, NOT TELL

WHO CAN TAKE ACTION:

Key actions to achieve this recommendation

Click any action to view its full description.

↗ *Incorporate child-optimized approaches to their products.*

LLMs typically operate through a simple prompt-response structure whereby the AI generates a complete answer in a single automated step (Wan et al. 2024), inducing passivity and cognitive offloading that undermines learning for many students. This design limitation is not inherent to all AI applications in education.

> To use AI tools that teach, not tell, **technology companies can incorporate child-optimized approaches to their products.**

While many ed-tech companies may design AI tools drawing on vetted content and the science of learning and child development, general purpose AI technologies like LLMs are often not optimized to advance children's learning. Fortunately, several technically feasible design strategies could help AI better support children's development and learning. Technology companies, especially those with student-facing tools, can use the approaches in Box 8.

BOX 8

Child-friendly product design

"Antagonistic" design. AI companies can design "antagonistic" AI tools and systems that compel users to confront their assumptions, build resilience, and develop healthier relational boundaries with AI technologies. These models may prove particularly beneficial in educational settings. Rather than consistently validating student choice, as current sycophantic AI tools often do, antagonistic models can be trained to challenge, critique, and productively disagree with users. This approach pushes students toward greater self-reflection and higher quality standards while strengthening their ideas and arguments and mitigating potential harm to their judgment, socialization, and resilience (Cai et al. 2024).

Progressive disclosure. AI models can be designed to utilize "progressive disclosure." This technique, borrowed from User Design Experiences in online learning, involves showing only essential information and gradually introducing more complex features or explanations as the user progresses or requests

them (UXPin 2025). Information is presented in smaller chunks so that complex information is more easily digestible and involves users in an iterative process of learning (Burns 2023b). If done well, this can help scaffold learning.

Explainable AI (XAI). Progressive disclosure can be combined with XAI techniques to help users understand how AI makes decisions (DiPaola et al. 2024). For example, a math tutoring platform using XAI would not simply give the answer "42" to the question, "What is 15 + 27?" Instead, the platform would explain its reasoning: "I broke this into parts: 15 + 20 = 35, then 35 + 7 = 42." The student can then follow the steps and understand the method rather than just accepting the answer. XAI helps build what Turner et al. (2022) call "calibrated trust"—appropriate skepticism and reliance on AI-generated responses based on understanding rather than blind faith or complete rejection. When students can see how an AI system arrived at an answer, they can better assess its validity, identify potential biases, and make informed decisions about when to follow or override its suggestions based on the AI's strengths and limitations.

Cognitive Forcing Functions (CFF). CFF strategies encourage analytical engagement with AI-generated content by requiring users to pause and reflect before receiving assistance (Buçinca et al. 2021). For example, a writing tutoring program might first ask students to identify three areas for improvement in their essay before providing feedback. This approach maintains students as the primary cognitive agents, enhancing their metacognitive and analytical skills through reflection rather than passive acceptance of AI-generated answers.

4 CONDUCT RESEARCH ON CHILDREN'S LEARNING AND DEVELOPMENT IN AN AI WORLD

WHO CAN TAKE ACTION:

Key actions to achieve this recommendation

Click any action to view its full description.

- *Prioritize research that surfaces AI risks and how to mitigate them.*
- *Focus on research that understands how to leverage AI to benefit children's learning and development.*
- *Include research that centers teachers.*
- *Prioritize research on AI in low-resource settings, including examining system dynamics.*
- *Use a variety of research approaches.*

There is an urgent need for high-quality research to track children's learning, well-being, and development in an AI world. As teaching and learning practices shift, including with AI use, the education community will need to regularly produce and use evidence on AI's influence on students' cognitive, affective, motivational, and emotional states. Research should be grounded in student experience, rigorously examine the potential risks and benefits of AI, and be shared in usable forms for practitioners and policymakers. When benefits and harms are identified, research must also illuminate the mechanisms driving those effects, moving beyond documenting outcomes to understanding why and how AI produces particular results for children (Deng et al. 2025).

Research should focus on how to help students prosper in an age of AI, including real-time evidence development to help inform current AI practices before norms are entrenched. Below are some ways researchers and funders can help develop the knowledge base that can enable governments, education systems, and technology companies to mitigate AI's risks and maximize its benefits, including important areas to research.

> To conduct research on children's learning and development, **prioritize research that surfaces AI risks and how to mitigate them.**

There is a need to carefully track and investigate the risks associated with AI, including those raised in this report across children's cognitive, emotional, and social development, including the risks of diminishing trust and increasing dependence. The education community needs to better understand the extent of these risks: how and under what conditions children are most susceptible. For example, further research is needed to understand how social chatbots can help individuals address social challenges and to identify the conditions that may lead to unhealthy engagement, such as overuse, dependence, or reduced human socialization (Franze et al. 2023). But most importantly, there is a need to better understand how

to effectively mitigate these risks. What designs, levers, interventions, practices, norms, and policies are effective in reducing or eliminating the risks children face?

> To conduct research on children's learning and development, **focus on research that understands how to leverage AI to benefit children's learning and development.**

Alongside better understanding the risks of AI and how to mitigate them, there is a need for research that uncovers the specific use cases, approaches, and contexts in which AI can be used to expand children's learning and development, including the benefits identified in this report. Which students (e.g., neurodivergent or L2 learners) benefit from AI use? Under what conditions, with what designs, and through what types of implementation does AI help students expand their understanding, develop their skills, build their connections to others? For example, therapeutic interventions have advanced to a degree of sophistication whereby their responses are virtually indistinguishable from those written by humans (Zao-Sanders 2025; Heinz et al. 2025; Hatch et al. 2025). Research on how these increasingly available interventions could help address the youth mental health crisis students who lack regular or immediate access to mental health professionals is warranted (Heinz et al. 2025; Mahari and Pataranutaporn 2025).

> To conduct research on children's learning and development, **include research that centers teachers.**

Teachers, whose experiences with AI have thus far been underexamined, should play an integral role in this research so the education community can gather a fuller sense of how AI impacts the entirety of the student learning process. Teachers are central to research on how to use AI—and what supports they need—to enrich student experiences and strengthen motivation, engagement, and agency. Researchers from the University of Oulu argue that teachers can also serve as models for AI training, feed data to the AI system (for example, lesson plan ideas), and determine assessment criteria (Celik et al. 2022). This participation also has the added effect of helping teachers better understand AI itself and its role in learning.

> To conduct research on children's learning and development, **prioritize research on AI in low-resource settings, including examining system dynamics.**

To develop and apply effective AI in education in the most challenging environments, educators require context-specific research that examines AI interventions within specific contexts, cultures, and education systems. The effects of AI innovations are often incremental and may not completely visible by the end of a project or initiative. To truly capture the impact of AI on children's learning and well-being, funders of AI initiatives can support research that extends beyond the lifespan of particular projects, especially when funding operates within fixed or predetermined time periods. This research must concentrate not only on the intervention itself but also on the systems and stakeholders that influence whether learning gains transfer and persist over time (Burns 2020, 50).

> To conduct research on children's learning and development, **use a variety of research approaches.**

A variety of research approaches is needed, from real-time actionable insights to longitudinal studies, to address the range of questions on how to help children prosper in an age of AI. Box 9 outlines some of these approaches.

BOX 9

Diverse research approaches to study AI and education

Produce practical, usable research grounded in students, teachers, and parents' lived realities. Educators and AI practitioners need research to inform their decisions, yet may often eschew it because they view research as lacking practical utility and disconnected from the lived experiences of those implementing and receiving interventions. To address these issues, researchers can embrace a "utilization-focused" approach wherein research is designed for specific users rather than a general audience, and primary intended users are involved in the research design and process (Patton 2008). By including student, teacher, and parent perspectives, expertise, and experiences, research findings produce deeper, more nuanced insights than external studies alone, leading to more compelling and coherent explanatory narratives. This ultimately makes the research more evidence-based, humanistic, and usable to decisionmakers, practitioners, and educators (Burns 2020 50–51).

Rigorously assess AI's impact on children now through immediate prospective research. The social media experience demonstrates why urgency is critical. As Bernstein (2022) notes, by the time research on social media's effects on children became widely available, platform business models had already been built around engagement-maximizing algorithms, users had developed dependency patterns, billions in revenue streams were at stake, and regulatory efforts faced entrenched resistance and significantly higher implementation costs. The AI landscape still remains malleable. Companies with products children access continue experimenting with design features, users have not yet formed fixed usage patterns, and fundamental questions about AI's impacts on children remain open (Bernstein 2022). Researchers must document and disseminate what is known about AI's effects on children's learning and well-being now, while evidence can still inform design decisions, policy frameworks, and educational practices before harmful patterns become embedded in both technology and behavior. The window for preventive action is narrow (Bernstein 2022, 2025). Children are in critical developmental periods where cognitive, social, and emotional capacities are being formed. Interventions that shape AI's role in education today can prevent the need for far more difficult and costly remediation efforts later.

Examine whether general-purpose and companion AI platforms should be researched and regulated similarly to drug trials. Many prescription drugs are available and widely used even though researchers and doctors may not fully understand the exact mechanisms by which they produce their effects. Governments might consider whether AI technologies used by virtually all primary and secondary students should be studied in similar ways to pharmaceuticals, that is, through a series of clinical trials that produce risk-benefit analyses and public labeling of proven harms to student learning or well-being. As part of this, researchers and education systems could continuously monitor these applications to assess whether new warnings should be added or whether access should be limited for students of certain age groups or with particular neurological or affective conditions (Delphi panelist).

Create evidence-based pilot programs and impact demonstrations. Greater research on AI in education can generate opportunities to develop pilots, sandboxes, proofs-of-concept, and action research initiatives in partnership with research institutions. Such efforts can demonstrate measurable impact, accelerate the translation of evidence into practice, and determine which models of AI work under what conditions (Joel Mitchell, personal communication, August 29, 2025). These pilots should aim to identify the tipping point at which investment in AI leads to measurable positive impacts on problems facing low-resource countries. Educators and policymakers in sub-Saharan Africa interviewed for this

study emphasized the importance of demonstrating how strategic AI investments can address systemic educational challenges such as teacher shortages, infrastructure gaps, and inadequate learning tools across different cohorts and demographics. Beginning iteratively with small-scale approaches may provide essential proofs of concept before scaling. Establishing mechanisms for systematic evaluation and evidence-based expansion enables the creation of frameworks that balance innovation with prudent resource management, creating pathways from promising pilots to sustainable, large-scale AI initiatives in education.

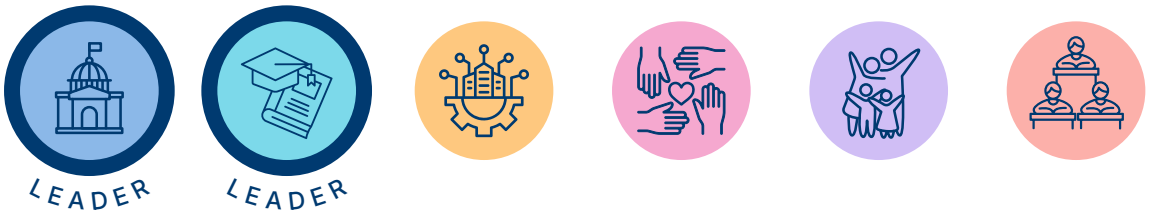
Produce rigorous, empirical, and longitudinal research on AI in education. AI is in urgent need of rigorous and longitudinal research. Indeed, most educators are implementing practices without the benefit of empirical evidence. Such research can involve properly isolating variables, measuring actual learning outcomes, considering long-term impacts, exploring innovative instructional designs, and providing sufficient detail for replication (Trabelsi 2025).

Consider the Bradford Hill criteria for student emotional well-being research. Researchers can apply the Bradford Hill criteria to study the impact of AI on students' emotional well-being. These widely respected scientific principles assess the strength of evidence for causal relationships between variables. They are particularly valuable for determining whether exposure to a risk factor, such as an AI companion bot, determines adverse outcomes, especially in contexts in which randomized controlled trials are difficult or impossible to implement (Lembke 2023).

PREPARE

5 PROMOTE HOLISTIC AI LITERACY FOR STUDENTS, TEACHERS, PARENTS, AND EDUCATION LEADERS

WHO CAN TAKE ACTION:



Key actions to achieve this recommendation

Click any action to view its full description.

- *Adopt holistic AI frameworks.*
- *Create or adopt guidelines for AI literacy.*
- *Support systemic AI literacy approaches.*
- *Support peer-to-peer AI literacy.*
- *Include families and communities in AI literacy.*

One of the most important steps to prepare education systems to harness AI in a way that will help learners prosper is to cultivate holistic AI literacy skills of the adults and children within education systems. Developing AI literacy skills does not require teachers or students to spend extensive time on screens. Rather, it can include in-person discussion and reflection alongside some practice and exploration of AI tools themselves.

TeachAI, a global coalition of educationalists, defines AI literacy as the knowledge, skills, and attitudes associated with how AI works, including its principles, concepts, and limitations, as well as how to use AI (TeachAI 2025). Participants in this study emphasized the need for "holistic" AI literacy, which empowers learners to "engage with, manage, create, and design AI systems while understanding the ethical, social, and cognitive implications of their use" (European Commission and OECD 2025). With this framework in mind, governments and education systems can provide guidance to educators on what students should know and be able to do in order to be considered AI literate.

> To promote holistic AI literacy, **adopt holistic AI frameworks.**

There is no shortage of holistic AI frameworks that governments and education systems can draw upon. Education systems and governments can look to other countries who are embracing holistic AI approaches and rolling them out nationally. For example, the government of China requires that students receive at least eight hours of AI education a year beginning at age six and outlines four key areas of AI literacy (cognition, skills, thinking, and values), with students in lower grades focused on awareness of

AI while students in higher grades focus on creating and problem-solving with AI (Australian Government Department of Education 2025).

There are also a wide range of useful holistic AI literacy frameworks developed by global networks, universities, and civil society organizations that are used by education jurisdictions around the world. The AI Literacy Framework for Primary and Secondary Education, developed jointly by the Organisation for Economic Co-operation and Development (OECD) and European Commission with support from Code.org and an expert group of international educators, researchers, and technologists, approaches AI literacy broadly; as cited above this framework includes learning how AI works, from understanding the ethics to how to harness its power in problem solving (European Commission and OECD 2025). There are multiple teacher professional development offerings; The International Society for Technology in Education and Association for Supervision and Curriculum Development (ISTE+ASCD) offers AI courses, and UNESCO's Guidance on Generative AI outlines holistic teacher competencies (ISTE 2025; Miao and Holmes 2023).

To promote holistic AI literacy, **create or adopt guidelines for AI literacy.**

Education systems can prioritize holistic AI literacy guidance. While many countries operate highly decentralized educational systems, both centralized and decentralized approaches can successfully implement AI literacy frameworks. Countries with centralized systems, such as China and Estonia, have implemented comprehensive national AI literacy guidelines that provide consistent standards across all schools (Asian College of Teachers 2025, e-Estonia 2025). In Singapore, teaching on AI's uses, risks, limitations, and ethical considerations is embedded across different school subjects, along with instruction on verifying online information and understanding data security and privacy (Ang 2024).

Countries with decentralized education systems have also established effective national frameworks. India, despite significant state-level autonomy in education, developed national AI literacy guidelines through the National Education Policy 2020 and the Central Board of Secondary Education, which introduced AI as a subject for students in grades 9–12 and created an AI Facilitator Handbook for educators (Ahuja et al., n.d.; Mehra 2020).

There remains a compelling advantage to establishing centralized national guidelines that define AI literacy. Without coordinated national involvement, students may receive vastly different levels of AI literacy preparation depending solely on their geographic location, creating inequitable educational outcomes in an increasingly AI-dependent society. National guidelines can ensure consistent foundational knowledge while still allowing for local adaptation to meet specific regional needs and contexts.

To promote holistic AI literacy, **support systemic AI literacy approaches.**

In the interest of deep AI literacy, education systems can integrate these approaches across grades/levels and the curriculum, rather than confining it to isolated courses or particular disciplines such as computer science (DiPaola et al. 2024, 8; European Commission and OECD 2025; Dhar 2025). A growing number of secondary schools and higher education institutions are adopting this comprehensive approach, which helps students encounter these concepts throughout their learning experiences.

Implementation can reflect developmental appropriateness, beginning with playful and offline learning opportunities for young children that introduce foundational concepts through age-appropriate

experiences. As students mature, they can progressively experiment with AI systems, building both technical familiarity and critical understanding through hands-on engagement. This scaffolded approach recognizes that meaningful AI literacy develops over time and requires repeated encounters across contexts.

To promote holistic AI literacy, **support peer-to-peer AI literacy.**

Students can play a powerful role in AI literacy with their peers. Education systems can train student facilitators to develop and deliver short sessions to their peers on a range of topics related to AI use, their education, and well-being. For example, sessions could address prompt hygiene, verification habits, when not to use AI, debates on ethical uses of AI, and strategies for switching from AI to human help. Peer-led AI literacy normalizes responsible, inquiry-based use of generative tools while easing teacher capacity gaps. It transforms AI from a passive technology into shared learning grounded in reflection and accountability.

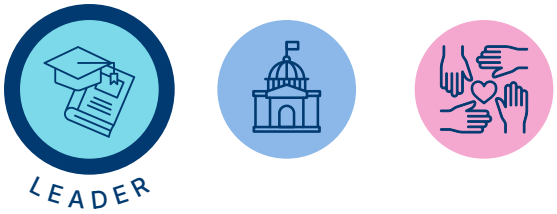
To promote holistic AI literacy, **include families and communities in AI literacy.**

Education systems can work with families and caregivers to extend AI literacy skills and guidance from school into home environments. This requires training school administrators and teachers in effective family engagement approaches that center families as active partners and provide space to co-create solutions (Winthrop et al. 2021). Through intentional communication, trust building, and understanding of diverse belief systems, teachers can learn about caregivers' perceptions of children's technology use and establish shared guidelines for responsible AI engagement. Such partnerships can create consistent messaging about healthy relationships with technology and authentic human connection (Delphi panelist).

AI literacy will be especially useful if it extends beyond students to encompass the entire school community. Principals, teachers, students, and parents can all develop an understanding of how algorithms shape their daily lives and acquire the capacity to critically interrogate the systems operating around them (Dhar 2025). This shared literacy creates a foundation for informed decisionmaking about AI integration while fostering the collective critical consciousness necessary to navigate an increasingly algorithm-mediated educational landscape. India's "AI Samarth" initiative exemplifies this approach by providing AI literacy for students, teachers, and parents, thereby fostering a greater sense of shared understanding and alignment around AI and education across the entire school community (Central Square Foundation 2025).

6 PREPARE TEACHERS TO TEACH WITH AND THROUGH AI

WHO CAN TAKE ACTION:



Key actions to achieve this recommendation

Click any action to view its full description.

- ↗ *Integrate AI literacy into pre-service teacher preparation.*
- ↗ *Support teachers in teaching with AI through in-service professional development.*

As ISTE correctly notes, "there are no AI literate students without AI literate teachers" (ISTE 2024). The integration of AI into education demands a fundamental transformation in how we prepare and support educators. Teacher pre-service or preparation programs globally have historically lagged in modeling effective technology integration (Burns 2023a). Teachers require comprehensive guidance in order to navigate the proliferation of AI education tools, develop expertise in productive and ethical AI integration, and master the delicate balance between leveraging AI's capabilities and preparing students to use these tools while preserving authentic student learning and agency. Education systems and civil society can support this transformation across pre-service preparation—the education and preparation a person receives before becoming a teacher—and in-service professional development—the support and training current teachers receive.

> To prepare teachers, **integrate AI literacy into pre-service teacher preparation.**

Teacher pre-service preparation programs can integrate AI literacy throughout their curricula through the following approaches:

- Provide practical experience integrating AI into classroom instruction rather than limiting preparation to theoretical AI literacy knowledge, enabling future teachers to develop essential confidence and self-efficacy in AI implementation (Park 2023)
- Develop comprehensive understanding of AI's dual nature in education by helping pre-service teachers recognize how AI can both support and potentially harm children's learning and development, while building a repertoire of use cases and instructional activities that strengthen students' abilities to perceive, remember, form concepts, solve problems, imagine, and reason (American Psychological Association 2025a)
- Emphasize metacognitive skill development to prepare future teachers to cultivate students' awareness of when and how to use AI tools responsibly without compromising students' cognitive development (Bozkurt et al. 2024)
- Establish new graduation requirements and instructional models that require faculty in teacher training institutions to develop their own capacity for modeling ethical, responsible, and effective AI integration,

addressing current uncertainties about appropriate AI use in teaching and learning (Weiner et al. 2024; Burns 2023a)

> To prepare teachers, **support teachers in teaching with AI through in-service professional development.**

In-service training for practicing teachers, also known as continuing professional development, can also support teachers in teaching with AI and can be strategically designed and implemented through:

- Differentiated and sustained professional development that precedes and accompanies AI implementation. This professional development should strengthen teachers' content knowledge so they can verify AI outputs. It should also enhance teachers' pedagogical content knowledge to seamlessly blend content, teaching strategies, and AI technology into high-quality learning experiences.
- Instructional approaches that help teachers balance and navigate the complex relationship between AI use and pedagogical choices. Teachers need to recognize that different instructional methods create varied opportunities for cognitive offloading. They may need guidance on selecting appropriate strategies and titrating AI use to maximize learning benefits across diverse pedagogical approaches that include both direct instruction and learner-centered methodologies (Hill et al. 2022).
- Curriculum-aligned activity design that employs AI meaningfully while preventing opportunities for students to offload cognitive work or replace genuine effort with AI-generated outputs.
- Collective professional learning communities organized by subject area and grade level, ensuring professional development remains consistent with standards and policies, grounded in current research on effective AI use, and supported by ongoing follow-up to improve implementation fidelity and transfer of learning (Burns 2023a).

A number of education systems are incorporating AI into teacher training curricula. In Singapore, for example, by 2026, the National Institute of Education will offer training in AI in education to all undergraduate, post-graduate, and in-service teachers (Kai 2022).

Students can also be involved in teacher professional development. For example, training programs can develop student mini-labs, where teachers bring draft activities and students test them for clarity, temptation to over-offload, and inclusion. This provides teachers with rapid feedback before lessons go live.

7 PROVIDE A CLEAR VISION FOR ETHICAL AI USE THAT CENTERS HUMAN AGENCY

WHO CAN TAKE ACTION:

Key actions to achieve this recommendation

Click any action to view its full description.

↗ *Create a solid policy.*

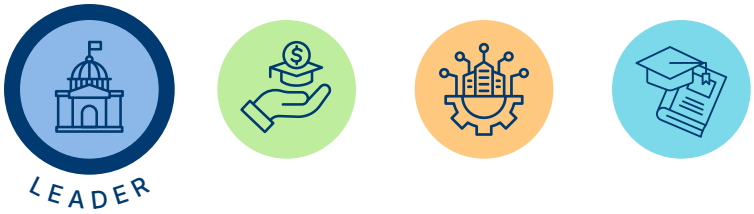
Thinking and learning are not tasks to be outsourced to AI—they are how students build their identity, agency, and dreams. While AI offers speed and fluency, it cannot experience wonder, wrestle with doubt, or choose values. Education systems can help students see that struggling to find their own words and pursue their own questions is what makes learning meaningful and life worth living (Delphi panelist). They can do this by developing a clear vision for how AI can be used to help ethically advance human agency.

> To provide a clear vision for ethical AI use that centers human agency, **first create a solid policy.**

Education systems from the school level on up can develop and broadly disseminate this vision either through creating new policies or incorporating the vision into existing relevant guidance and policies. Educational policies can encourage students to use AIto expand their ability to explore and learn—processes that require critical thinking and personal engagement rather than cognitive offloading. For example, in the U.S., the Washington Office of Superintendent of Public Instruction has issued guidance on using AI in K–12 schools that promotes a human-centered approach. This guidance states that good AI use “always starts with human inputs and inquiry, and always concludes with human reflection and edits.” It notes that AI should be used to empower students to actively participate in their education, not replace student development (Washington Office of the Superintendent of Public Instruction 2024, 14). Studies show that when schools or universities have AI policies, teachers and students are more likely to use AI (Gallup and Walton Family Foundation 2025; Xiao et al. 2023).

8 EMPLOY INNOVATIVE FINANCING STRATEGIES TO CLOSE THE AI DIVIDE

WHO CAN TAKE ACTION:



Key actions to achieve this recommendation

Click any action to view its full description.

- *Promote equitable access to AI infrastructure through innovative financing for education.*
- *Use regulatory license requirements to drive private sector support for school connectivity.*
- *Develop options for equitable distribution of AI tools.*
- *Prioritize AI access for girls and other marginalized groups.*

Designing for equity is often a political choice involving prioritizing access to quality learning, deliberately directing resources to marginalized communities, and developing locally tailored initiatives. To do this, governments, educational systems, funders, and technology companies can embrace inclusion, justice, and equity, embodying what Leandro Folgar Ruétalo, vice president of innovation at Universidad Católica del Uruguay, describes as "equity extends to all human beings." This ensures that all students can meaningfully participate in AI transformation. Rather than using readiness criteria that exclude marginalized communities, this approach requires supporting underresourced education systems, schools, and communities through targeted policies and strategic resource reallocation (Delphi panelist). There are a range of strategies that can help advance this priority.

> To employ innovative financing strategies to close the AI divide, **promote equitable access to AI infrastructure through innovative financing for education**.

Many education systems lack the funds or funding to adopt and implement AI in education initiatives. Given the closure of and cuts to many bilateral aid agencies, governments in the Global South find themselves even further behind in terms of funding and traditional funding models may be insufficient for AI and digital infrastructure transformation.

These governments will need to explore different options to diversify AI funding, which may include innovative approaches that create sustainable educational infrastructure while building local capacity and ownership. One strategy for achieving this diversification is to draw on financing mechanisms already used in broader education contexts (Patrinos and Tanaka 2024). Innovative Financing for Education (IFE) is an umbrella term that encompasses new sources of funding, new actors, and new ways of sharing costs, risks, and responsibilities between private and public actors to provide more funding for education. IFE involves a number of alternative financing methods, many of them grounded in market-based and private sector mechanisms (Avelar et al. 2020, 4). These approaches can be adapted to support AI infrastructure in education.

BOX 10

IFE for AI infrastructure

Public-private partnerships (PPPs) are formal arrangements between government and private organizations to jointly finance and deliver services. Technology companies have a long history of such partnerships with governments. One of the most well-known educational technology PPP may be Intel Teach, through which Intel trained millions of teachers globally to integrate technology into lessons and cultivate students' critical thinking, problem-solving, and collaboration skills.

These PPPs continue in the age of AI, with companies voluntarily providing money, tools, and services to schools (Singer 2025c). For example, Google committed $1 billion to AI education, digital well-being, job training, and AI research for U.S. students. The company is making advanced AI tools, including a new Guided Learning mode, free to students and providing U.S. secondary schools with Gemini For Education (Pichai 2025). It plans to expand its AI for Education Accelerator to over 100 colleges and universities and create an online hub for AI education resources. In India, OpenAI partnered with the Association for Reinventing School Education to introduce AI tools and training to K–12 educators (Economic Times 2025). These PPPs must be carefully structured so they are not simply marketing and customer capture strategies but rather prioritize authentic educational objectives developing learners' critical thinking about AIs (Singer 2025a).

Such partnerships can extend beyond tech companies to include schools, pairing, for example, well-resourced international or private schools in capital or large urban centers with local low-resource government schools. In such arrangements, government school teachers work alongside or receive coaching from private school teachers on AI use and private schools may make computer labs or laptop carts available to students from government schools as part of after-school programs. Teachers from low-resource schools could adapt AI tools for offline use and share their adaptations through open toolkits.

Blended financing mechanisms combine government funds, private investment, philanthropic donations, and development aid to leverage each capital type and reduce individual risk. This mechanism attracts new sources of private capital directed towards initiatives that advance development goals, mitigate risk, and generate potential financial returns.

Build-Operate-Transfer (BOT) models involve private entities in constructing and operating educational infrastructure before transferring ownership to the public sector. As the name suggests, there are three parts to a BOT: **Build** (design and develop the infrastructure), **Operate** (run, maintain, and monitor the system), and **Transfer** (after a fixed period, typically 30 years, transfer ownership so that the host can sustain without outsourcing).

BOT models have been successfully implemented in other government sectors and public infrastructure projects (Patrinos and Tanaka 2024). However, it is difficult to find examples of BOTs involving educational technology—typically, one of the letters, usually "T" for transfer, seems to be missing. Nonetheless, sub-Saharan African policymakers interviewed for this study advocated for BOTs as a possible infrastructure provision model. This approach allows educational institutions to access immediate infrastructure improvements while spreading costs over time and ultimately gaining full

ownership without requiring substantial upfront capital investment, thus moving beyond traditional "charity-based" interventions toward sustainable business models that create mutual value for private partners and educational institutions.

Results-Based Financing (RBF) links payments to verified achievement of measurable outcomes rather than funding activities or inputs. In the case of social and development impact bonds, one form of RBF, social investors provide up-front capital and assume financial risk traditionally borne by governments. By making disbursements contingent on predefined targets, education stakeholders can be incentivized and supported to strengthen systems that support the achievement of learning outcomes (Gustafsson-Wright et al. 2017). Though seemingly not common in terms of educational technology, RBF approaches are increasingly common in education.

One example of an RBF is the Sierra Leone Education Innovation Challenge (SLEIC), a three-year $18 million partnership between the Government of Sierra Leone and the Education Outcomes Fund, with implementing partners such as Rising Academies, Save the Children, and Street Child working across 325 public primary schools with approximately 134,000 children to boost literacy and numeracy outcomes.

SLEIC exemplifies results-based financing (also called outcomes-based financing) because payments are contingent upon attaining specified results rather than simply delivering predetermined inputs or activities and the financing structure ensures that money is spent only on activities proven to have an impact. The model explicitly encourages partners to innovate—several, for example, use digital tools such as WhatsApp and SMS/phones for teacher coaching. It also employs rigorous independent evaluations and caps per-child costs at $36 to support future scalability. Results published for Year 2 show statistically significant learning gains in math and English, with payments tied to these verified learning outcomes (Education Outcomes Fund 2024)

> To employ innovative financing strategies to close the AI divide, **use regulatory license requirements to drive private sector support for school connectivity.**

Governments can use creative license requirements to support bridging the AI divide. South Africa exemplifies this by strategically leveraging its regulatory authority to mandate enhanced educational connectivity through telecommunications licensing requirements and spectrum allocation conditions, making school Internet access a fundamental prerequisite for operators to maintain their licenses. It accomplishes this through two main mechanisms:

- Mandatory School Discounts (E-rate): All licensed Internet providers must offer schools at least a 50% discount from regular Internet prices. This isn't optional; it is a legal requirement that covers everything from Internet access to equipment and phone calls to tech support. Companies that fail to comply can be fined by the South African government (Independent Communications Authority of South Africa, n.d.).
- Connection Quotas (Universal Service Obligations): In exchange for operating licenses, or in order to buy radio spectrum from the government, all telecommunications companies are assigned specific

numbers of schools they must connect to the Internet. Recent spectrum license holders must connect over 18,500 public schools nationwide along with hospitals, clinics, and police stations within a certain radius of schools. These renewable licenses include specific metrics for school infrastructure development, evolving from basic computer provision to comprehensive digital infrastructure and connectivity (Independent Communications Authority of South Africa 2021; Ellipsis 2025).

Governments can go even farther and mandate that Internet and mobile service providers offer simple, comprehensible connectivity plans for education systems or provide credits to teachers and students individually at fixed or subsidized rates. These requirements will enable people to access basic connectivity options that support their educational goals with ease and at an affordable cost (West 2023).

> To employ innovative financing strategies to close the AI divide, **develop options for equitable distribution of AI tools.**

Governments can also help reverse the large and growing AI divide by pursuing creative pathways for deploying AI to marginalized communities.

BOX 11

Strategies for equitable distribution of AI tools

Strategic Infrastructure Deployment: Governments can consider deploying tiered infrastructure solutions that accommodate varying technological capacities within education systems. This might include offline or low-bandwidth AI tools, such as local language models embedded directly within school devices, so that technical limitations do not become barriers to educational access and opportunity (Delphi panelist).

Government-developed AI platforms: To limit both reliance on for-profit technology companies and save money in licensing fees, governments can build their own AI platforms and tools for education systems, as the government of Indonesia has done. In South Africa, the Department of Basic Education has overseen the development of digital content for South Africa's national curriculum. The content is completely accessible, is hosted on Department of Basic Education servers ("DBE Cloud"), is device-agnostic (mobile, tablet, and computer), and can be accessed for the equivalent of two South African cents per day (Burns and Santally 2019, 51).

Open-source AI models: School districts in resource-constrained contexts can embrace open source AI tools to scale equitable and quality access to advanced AI capabilities, provided appropriate technical support structures are in place. South Africa can serve as an exemplar in how to leverage open-source technologies, given its established leadership in open education through institutions such as the South African Institute for Distance Education and successful initiatives including Siyavula and OER Africa (Burns and Santally 2019). Open-source libraries such as TensorFlow, PyTorch, and Hugging Face Transformers, along with repositories like GitHub, provide accessible resources for implementing these AI capabilities.

Deploy alternative mechanisms for expanding Internet access: While regions like sub-Saharan Africa

are achieving greater and more affordable Internet access, there remains a persistent and multifaceted (geographic, economic, and gender-based) Internet divide. To address this challenge, governments can invest in both policy and technical solutions. For example, governments can lease unused fiber optic cable or "dark fiber," invest in resource virtualization or satellite-based Internet, build government-owned public education networks, levy a tax to create Universal Service Funds, and/or use "white spaces"—wireless technology that utilizes unused television and radio frequencies to provide wireless broadband connections. Countries such as Malawi, South Africa, Namibia, Nigeria, Tanzania, and Zambia have expanded Internet access through various combinations of these initiatives (Burns and Santally 2019).

> To employ innovative financing strategies to close the AI divide, **prioritize AI access for girls and other marginalized groups.**

The AI divide is multifaceted, with girls particularly disadvantaged in terms of AI use (Economist 2024). Technology companies, funders and governments can begin to address this divide by funding implementation of the nonbinding Global Digital Compact (GDC), a comprehensive multi stakeholder framework adopted in 2024 that establishes principles and actions for an open, secure digital future. The GDC commits governments and non-state actors to bridging the digital divide, fostering data privacy, combating misinformation, and establishing international AI governance.

The GDC calls for gender equality and the meaningful participation of all women and girls in digital spaces to attain the United Nations' Sustainable Development Goal 5 (achieving gender equality and empowering all women and girls). It advocates eliminating barriers impeding girls' access to technology and AI, greater female leadership in technology decisions, mainstreaming gender perspectives into digital connectivity strategies, countering technology-facilitated gender-based violence, and developing data standards designed to prevent bias, discrimination, and human rights violations.

PROTECT

9 BREAK THE ENGAGEMENT ADDICTION AND DESIGN PLATFORMS THAT ARE CENTERED AROUND POSITIVE MENTAL HEALTH FOR CHILDREN AND YOUTH

WHO CAN TAKE ACTION:

Key actions to achieve this recommendation

Click any action to view its full description.

- *Require online products to meet safety standards.*
- *Stress test AI platforms for safety.*
- *Employ advisory boards to ensure safeguards are in place to protect children from harms.*
- *Engage students in developing safeguards.*
- *Shift financial incentives from engagement to utility.*

As AI capabilities rapidly advance, developers of student-facing AI systems can prioritize ethical considerations and implement comprehensive strategies that safeguard student well-being while harnessing educational benefits.

To break the engagement addiction, **require online products to meet safety standards.**

Governments can require online services that children access, including AI, to meet standards that protect children's safety and well-being. Technology companies designing AI products used by children can follow guidelines put out by child development specialists, such as the "Children and AI Design Code" developed by the 5Rights Foundation. These and other groups describe a clear distinction between products developed for children and those for adults. The American Psychological Association warns that manipulative design can interfere with "the development of healthy real-world relationships" (American Psychological Association 2025a). Governments can require technology companies which students access to develop products for children that meet criteria like those put forward in the Children and AI Design Code below.

BOX 12

AI safety standards for children

1. ***"Developmentally appropriate.*** *The AI system is designed and operated to account for children's differing needs and vulnerabilities at different ages and stages of development by design and default.*

2. ***Lawful.*** *The AI system complies with applicable local, national, regional, and international law, rules, and regulations across all domains, including, but not limited to, children's rights, data protection and privacy, child exploitation and abuse, illegal and harmful online content, anti-discrimination laws, consumer protection, intellectual property, health and safety, and education.*

3. ***Safe.*** *The AI system does not create or amplify risks to the wellbeing or the physical, mental, and emotional safety of children, including privacy and security risks.*

4. ***Fair.*** *The AI system treats children and their data fairly and creates outcomes that are just and equitable for children.*

5. ***Reliable.*** *The AI system functions as expected. Performance and outcomes remain robust over time, including in unexpected or harsh conditions, or when atypical data is introduced....Humans can intervene to take control if required.*

6. ***Provide redress.*** *It is easy for children and those who represent their interests to report concerns and to seek actionable and effective recourse and remedy...It is easy to appeal both in-app and without logging in. Emerging concerns or extreme incidents are swiftly and effectively addressed, including by providing an easily reachable human contact.*

7. ***Transparent.*** *Stakeholders (including children) have access to adequate and accessible information to have a reasonable understanding of what the AI system does, its impacts, the measures taken to account for the capacities and needs of children, and the efficiency of these measures...*

8. ***Accountable.*** *A continuous chain of human and organisational responsibility is established across the whole AI system's value chain and lifecycle...*

9. ***Uphold rights.*** *The AI system upholds children's rights...[as per the United Nations Convention on the Rights of the Child]...including their right to life, to participate, and to protection. Inherent in children's right to life is their right to be fully realised as individuals, including meeting their need for agency, connectedness, and purpose. The AI system prioritises children's best interests and takes account of their voices and opinions"* (5 Rights Foundation 2025, 21-22).

To break the engagement addiction, **stress test AI platforms for safety.**

One important way technology companies can help ensure AI products and systems are designed to protect children's safety and privacy is to engage in robust testing prior to release. Such testing can include the approaches in the box below.

BOX 13

Strategies to stress test AI platforms for safety

User testing: AI systems can undergo thorough and continuous user testing to determine how actual users interact with a system under normal conditions. User testing examines usability, functionality, user experience, and whether the system meets intended use cases. It can identify and mitigate potential unintended consequences and negative impacts before widespread release.

Technical or ethical checks: This may include limiting inappropriate content exposure, disallowing harmful academic or personal suggestions, enforcing usage breaks to prevent over-dependence, monitoring for signs of social withdrawal, and ensuring AI interactions support rather than replace human relationships and learning experiences (Mahari and Pataranutaporn 2025).

Inclusion of safety features: Such features could include parental controls that allow parents to link to their children's AI accounts, set limits on time and what children can see, and receive notification if their child's online behavior suggests potential self-harm (OpenAI 2025c).

Red teaming: Red teaming is the comprehensive, methodical probing of an AI system through sustained, coordinated efforts by skilled professionals who simulate real-world adversarial attacks using the full spectrum of techniques available to actual attackers. Once they identify these vulnerabilities, they go about fixing them (Hao 2025).

> To break the engagement addiction, **employ advisory boards to ensure safeguards are in place to protect children from harms.**

Technology companies whose products are used by students can create advisory boards that include "scientists, youth, ethicists, health professionals, and other stakeholders who are primarily charged with the protection of adolescents" (American Psychological Association 2025a).

> To break the engagement addiction, **engage students in developing safeguards.**

Students can co-draft default settings for time limits, logging, and nudges that push learners back to human help when tasks cross a difficulty threshold. Students can participate in safeguarding privacy, safety, and data ethics when schools procure or deploy AI tools by becoming "privacy stewards." Such participation can build institutional transparency and trust, help schools translate technical policy into accessible language, empower students as informed digital citizens, and strengthen compliance through bottom-up accountability. To do this, schools can first select and train a small team of student "privacy

stewards" in basic data rights, vendor transparency standards, and digital wellbeing principles. These stewards would then be provided with vendor one-page checklists summarizing district or school practices on data use, retention, and sharing. Student privacy stewards would beta-test AI applications under consideration for purchase and flag privacy concerns or questions for district purchasing officials for consideration.

To break the engagement addiction, **shift financial incentives from engagement to utility.**

Investors and funders can help break the engagement addiction by shifting how they measure success. Current financial incentives for child-facing technology platforms often reward companies for time spent on the platform regardless of what young people are doing (Sindermann et al. 2024). For example, in 2022, social media companies earned $11 billion from advertisements to children under eighteen (Raffoul et al. 2023), tracking clicks, time spent, and advertisement impressions—metrics focused on "engagement" rather than impact on users. From a profit-maximizing perspective, it makes little difference whether a teenager spends an hour on a social media or AI platform learning cooking skills or an hour learning about self-harm (Mishra 2025).

This "time on platform" metric extends beyond social media to AI companions and educational technology. AI friends, whether embedded in social media or standalone products, are designed to maximize engagement rather than quality of experience. Even ed-tech products face these perverse incentives. One ed-tech company leader reported that integrating AI into their product nearly halved the time teachers needed to generate administrative reports—a clear win for educators—yet faced board criticism for declining user engagement. Seth Reynolds, an education leader at EY-Parthenon, argues that traditional ed-tech success measures must be updated to include metrics that assess impact (Seth Reynolds, personal communication, September 22, 2025). These might include alternative measures, including duty of care approaches (discussed below) and digital well-being indicators (OECD 2021).

10 ESTABLISH COMPREHENSIVE REGULATORY FRAMEWORKS FOR EDUCATIONAL AI

WHO CAN TAKE ACTION:

Key actions to achieve this recommendation

Click any action to view its full description.

- *Adopt a whole-of-government approach to educational AI.*
- *Require regulation by design.*
- *Enact comprehensive AI-specific legislation.*
- *Establish technical standards and independent auditing requirements.*
- *Employ "duty of care" laws.*
- *Update national data sovereignty laws to protect user data.*

As AI becomes integrated into education systems, education experts, teachers, and at times students themselves advocate for regulatory frameworks ensuring that AI is implemented equitably, responsibly, ethically, and in educationally valid ways. Such frameworks would align AI governance with existing legal protections for student rights and privacy, allowing innovations to advance learning without undermining fundamental safeguards.

Countries have different governmental structures and legal systems, requiring flexible regulatory approaches. The following options offer both different examples of regulation as well as distinct implementation mechanisms that can be adapted to various contexts.

> To establish comprehensive regulatory frameworks for educational AI, **adopt a whole-of-government approach to educational AI.**

Governments can embrace a whole-of-government approach that coordinates AI policy across sectors, aligns multiple legislative frameworks, balances competing interests like innovation and regulation, and manages complex cross-sectoral issues (Miao and Holmes 2023).

This comprehensive strategy can involve establishing a national body to lead cross-sectoral coordination and align frameworks with existing legislation on data protection, Internet security, and citizen data security while assessing whether current regulations require adaptation for AI-specific issues. It balances regulation with innovation by promoting cooperation among companies, educational institutions, and public agencies to develop trustworthy models, encouraging open-source ecosystems for sharing computing resources and datasets, and fostering practical AI applications for public good.

This approach also establishes principles for assessing and categorizing AI efficacy, safety, and security before deployment and throughout system life cycles, using risk-based classification mechanisms similar to the European Union Artificial Intelligence Act (EU AI Act) that range from strict regulations banning unacceptable-risk applications to general regulations for lower-risk systems (EU Artificial Intelligence Act 2024). It mandates laws protecting users' personal information and combating unlawful data storage, profiling, and sharing, while enforcing age limits for AI applications primarily designed for adults, which pose substantial risks to children including exposure to inappropriate content and manipulation (Miao and Holmes 2023, 20–21).

> To establish comprehensive regulatory frameworks for educational AI, **require regulation by design.**

Governments can require technology products to meet safe and ethical design standards through regulation by design (RbD). RbD employs a more narrow focus than the whole-of-government approach mentioned above. It integrates regulatory objectives directly into technical design specifications rather than applying them through compliance checks (Mahari and Pataranutaporn 2025, 3). AI designers and developers comply by translating legal requirements into technical elements embedded in system code, pursuing goals that include promoting ethical AI use, student well-being, effective governance, accuracy, transparency, legal protections, autonomy, justice, safety, security, and explainability for developers, users, and society as a whole.

The European Union has pioneered RbD through the GDPR, resulting in technology companies doing business in the EU designing products with stronger embedded privacy protections. While RbD faces challenges including reduced individual autonomy, "consent fatigue," and at times a lack of flexibility, for student-facing AI applications, RbD can transform AI systems into inherently safer platforms by shifting responsibility for safety directly to developers rather than to users (in the case of education, educators, students, or parents) (Prifti et al. 2024). Embedding protections reduces reliance on after-the-fact enforcement mechanisms while transforming safety compliance from an external constraint into an intrinsic feature that can facilitate trust without impinging on innovation (Mahari and Pentland 2024).

> To establish comprehensive regulatory frameworks for educational AI, **enact comprehensive AI-specific legislation.**

Governments can develop legislative frameworks that directly address AIto establish clear requirements and accountability mechanisms that are distinct from broader regulatory coordination or design-level interventions. The EU AI Act, mentioned previously and passed in 2024, provides a model of AI-specific legislation countries can adopt. The Act sorts AI applications into four risk levels–minimal, limited, high, and unacceptable—with corresponding regulatory requirements. Under the EU AI Act, eight practices threatening safety and rights are prohibited, including harmful manipulation, social scoring, and unauthorized biometric recognition; furthermore, the act mandates conformity assessments for high-risk systems and establishes oversight mechanisms to enforce compliance (European Commission 2024). Such purpose-built legislation sets binding legal requirements from the outset instead of adapting existing laws designed for pre-AI technologies.

> To establish comprehensive regulatory frameworks for educational AI, **establish technical standards and independent auditing requirements.**

Rather than relying solely on prescriptive legislation or design mandates, governments can develop minimum safety standards against which AI systems used in education are independently audited. In the U.S., the National Institute of Standards and Technology, a federal agency within the Department of Commerce that develops measurement, standards, and technology, could establish and oversee such audits.

To ensure compliance with auditing standards, the federal government could employ various mechanisms ranging from restrictive to incentive-based approaches, including prohibiting federal funding recipients from purchasing unaudited AI systems, requiring audits as a condition for federal funding, providing additional funding for districts that purchase audited systems, creating safe harbor legal protections for compliant educational AI tools, withholding funds from school districts experiencing problems with unaudited systems, or funding post-deployment audits (DiPaola et al. 2024, 5).

Each approach involves different trade-offs between enforcement of certainty and flexibility, but at a minimum, education authorities can ensure that schools and the regional and district jurisdictions in which they operate have access to audit standards, results, and information about their educational implications to support informed procurement decisions.

> To establish comprehensive regulatory frameworks for educational AI, **employ "duty of care" laws.**

A "duty of care" represents a legal and ethical obligation requiring individuals or organizations such as schools to take reasonable steps to prevent foreseeable harm to students' safety or well-being. Governments can impose duty of care laws on technology companies so that student-facing products are designed based on what is best for minors (defined as anyone under the age of 18) as opposed to what is best for the technology company (Bernstein 2025). When governments impose duty of care laws on technology companies, these mandates establish liability to ensure safety and exercise care in design implementation. For minors, this obligation specifically addresses preventing harms, including compulsive use, anxiety, depression, eating disorders, and predictable emotional harm (Bernstein 2023, 2025).

The UK pioneered this regulatory approach in 2020, asserting that technology companies had moral and legal responsibility in terms of how their products affected minors (Department for Science, Innovation and Technology et al. 2022; Haidt 2024). One example of an action incorporated under a duty of care framework involves technology companies setting privacy protections set to the highest default standards (Haidt 2024, 232–233). When applied to social media platforms, duty of care laws typically restrict data collection and use practices, mandate these default privacy protections, and prohibit algorithms that push harmful content to children.

Duty of care frameworks are now expanding beyond social media and could be extended to AI companion platforms (Bernstein 2025). Several U.S. states have already begun such implementation. Vermont prohibits using personal data or designing products that result in predictable emotional harm or compulsive use (Vermont Act No. 63 2025). North Carolina goes further by imposing a duty of loyalty that specifically prevents AI bots from creating emotional dependence (Bernstein 2025).

> To establish comprehensive regulatory frameworks for educational AI, **update national data sovereignty laws to protect user data.**

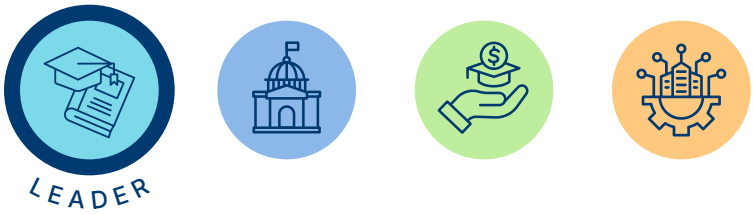
AI companies have exploited weak data protection laws in low- and middle-income countries, extracting valuable data resources while building trillion-dollar valuations (Dosunmu 2025). Concerned about one-way flows of economic benefits to "hyperscalers"—companies that provide large-scale cloud computing, networking, and data store—Global South governments can follow the examples of India, Nigeria, Vietnam, and South Africa and update their data sovereignty laws to require local data storage and greater control before permitting AI deployments or data center construction (Dosunmu 2025).

Data sovereignty enables nations to protect their citizens' privacy, ensure security, and foster local digital economies by controlling data generated within their borders. Unlike traditional AI solutions hosted on hyperscaler platforms under foreign jurisdictions like the U.S. Clarifying Lawful Overseas Use of Data (CLOUD) Act, sovereign AI keeps data within national borders for both storage and processing, eliminating exposure risks through shared services (Broadcom 2025). This approach facilitates compliance with frameworks like GDPR while enabling governments and education systems to select solutions matching their specific requirements (Letort and Linask-Goode 2025).

Miao and Holmes (2023) advocate for stronger national data ownership frameworks that regulate AI providers and prevent exclusive exploitation by tech companies, ensuring mutual benefit from citizen-generated datasets used commercially. Supporting these data sovereignty principles, the Frequency platform offers an open-source infrastructure built on the Decentralized Social Networking Protocol, an open-source standard, which like HTML, is application agnostic. This platform enables all users to control their data through portable digital identities, prioritizing consent and eliminating platform lock-in (Frequency 2025; DSNP.org. 2025).

11 PROCURE TECHNOLOGY THAT PROTECTS STUDENTS' PRIVACY, SAFETY, AND SECURITY

WHO CAN TAKE ACTION:



Key actions to achieve this recommendation

Click any action to view its full description.

- *Use child-friendly procurement criteria.*
- *Incentivize technology companies through certification to design products supporting the learning sciences and children's well-being.*
- *Adopt a no-regret approach.*

Large education systems wield significant influence over technology companies' privacy practices through their substantial purchasing power. They can leverage this influence for student privacy, safety, and security by only purchasing platforms, tools, and systems that conform to data protection and privacy principles.

To protect privacy, safety, and security, **use child-friendly procurement criteria.**

Schools can use child-friendly criteria, like those described in Box 14, to make procurement decisions. Students can be empowered to support this procurement process. For example, within a school, a group of students might be trained to read vendor privacy summaries and flag concerns in plain language. These concerns can be assessed as the school makes final procurement decisions, ensuring student involvement in procurement due diligence.

BOX 14

Child-friendly procurement criteria

A growing number of education organizations and safety experts, most notably the Learning Accelerator (2025), recommend that schools only purchase and use technology products that conform to the following guidelines:

Technology products that apply *privacy by default*. Privacy by default ensures that the strictest privacy settings are automatically applied to users by default, requiring them to take action to reduce their privacy protection (Newman 2021).

Chatbot platforms that employ safety features. These controls direct AI on how to respond to a user

and "receive notifications when the system detects their teen is in a moment of acute distress." While far from perfect, such controls are an important step in ensuring student safety on online platforms (Hill 2025).

Tools that prevent data scraping and that charge a fee to or block AI systems from accessing school websites. Strict access controls and pricing can discourage or block AI "crawlers" from accessing student portals, learning management systems, or platforms with student-generated content. This gives institutions greater control over protecting student information from AI training datasets and alerts them when AI systems attempt to access student content (Allen and Newton 2025).

Tools with solid data encryption and security standards that ensure that only data necessary for the function of the platform are collected (Learning Accelerator 2025).

Tools with transparent data policies that outline how users' personal data are collected, stored, shared, and deleted. This can include clear plans for how to address data breaches, ensure that data are kept no longer than needed for its intended purpose, and permanently delete student data when they are no longer needed (Learning Accelerator 2025).

Tools that allow schools to keep ownership of student or teacher data and to delete that data when appropriate (Learning Accelerator 2025).

Tools that continuously update privacy policies to identify areas for improvement and adjustments and to guide procurement. This can allow education systems to verify compliance with privacy and security standards and ensure that educational technology vendors maintain data privacy practices (Learning Accelerator 2025).

Guardrails that protect student data. Education systems can access open-source libraries that allow schools to easily add guardrails or technical controls to AI systems to protect student privacy, safety, and well-being. For example, Hugging Face's Chatbot Guardrails Arena stress-tests LLMs and privacy guardrails to prevent sensitive data leaks. Nvidia built NeMo Guardrails, an open-source toolkit for adding programmable guardrails to LLM applications. Guardrails AI offers similar open-source functionality. LangChain provides a guardrails library on Github that helps organizations quickly integrate guardrails into operations (McKinsey & Company 2024).

> To protect privacy, safety, and security, **incentivize technology companies through certification to design products supporting the learning sciences and children's well-being.**

Education systems, governments, and families could all use their purchasing power to make child-friendly certification of AI products meaningful. To do this, consumers need clear signals to identify which products are optimized for children and meet child-safety standards. This can be accomplished by certifying products as well as certifying product developers.

BOX 15

Product certifications

Product certification and criteria. Anyone purchasing AI products and tools for education can use some of the existing product certifications often run by nonprofits to guide their purchases. Consumers (families, education systems, governments) can consult certifications (often run by nonprofits) and criteria for AI products to help guide their choices. The table below includes a few examples of certifications, frameworks, guidelines, and criteria that can help schools purchase AI products that promote students' safety and well-being.

ORGANIZATION	FRAMEWORK NAME	SAMPLE CRITERIA
Digital Promise *(Digital Promise 2025)*	Responsibly Designed AI (product certification)	• Public privacy policy • Public data security policy • Documentation of bias mitigation processes • AI-generated content is labeled • Allows educators/users to override AI decisions
National Education Association *(NEA 2025)*	Vetting AI Resources: A Guide for Educators	• Human-centered approach • Evidence-based effectiveness • Ethical and transparent practices • Accessibility and equity • Professional development and support • Privacy, security, and accountability
Imagine Learning *(Imagine Learning 2025)*	Essential AI Tool Vetting Checklist for Educators	• Serves a legitimate instructional purpose • Handles student data and privacy transparently and in compliance with regulations • Is equitable and free from harmful bias • Is accessible to all students • Has support and oversight processes in place
Southern Regional Education Board *(Southern Regional Education Board 2025)*	AI Tool Procurement, Implementation, and Evaluation Checklist	• Aligns with instructional goals and complements existing curriculum • Intentionally mitigates biases • Complies with best practices in security, ethics, and data use • Allows human oversight • Proven to be effective • Is easily distributed and used

Researchers and foundations can help support new certifications where gaps exist. For example, the non-profit Common Sense Media's assessment of AI tools could be expanded to serve more families and schools (Common Sense Media, n.d.).

Developer certification. Certifying products can be challenging when technology changes so rapidly. But one way to improve the design of AI tools is to help the developers better understand children's learning. As one engineer in a technology company shared with researchers, "We know how technology

works, but we don't know how kids work." Technology companies that make products used by children can require that their developers and designers be trained on child development, the science of learning, and essential educational principles. Appropriate training can be developed in partnership with researchers, universities, and governments; where relevant training exists, it can be adapted for different use cases (LearnLab 2025).

To protect privacy, safety, and security, **adopt a no-regret approach.**

"No regret" actions are strategic proactive decisions that yield risk management benefits regardless of how future scenarios unfold. Education systems can borrow this approach from other fields that have successfully employed it and implement pre-emptive measures to protect their technology and AI systems. The potential upside of "no regret" approaches is significant while their downside is minimal because they provide positive outcomes even when assumptions and fears do not materialize (Chorev and Predd 2025). One example of a "no regret" action is a comprehensive audit of every technology vendor and digital tool in an education system. Such action would reveal precisely what student data is collected, how it is used, stored, and accessed. Such an audit would identify potential safety vulnerabilities, enable informed decisionmaking, position schools for regulatory compliance, and respond more quickly to data breaches or cyberattacks because they are responding from a position of knowledge versus ignorance.

12 SUPPORT FAMILIES TO MANAGE CHILDREN'S AI USE AT HOME

WHO CAN TAKE ACTION:

Key actions to achieve this recommendation

Click any action to view its full description.

- *Support students to inform families about AI use in schools.*
- *Provide families and children with safety information.*
- *Limit screen time, including AI use.*
- *Students can talk with peers.*

Families, civil society organizations, and children themselves have an important role to play in helping children stay safe and healthy with their home technology use. At home, parents and caregivers face the double burden of having to help their children learn and grow in both the physical and virtual worlds. Many technology companies with student-facing products outsource a large share of the responsibility for keeping children and youth safe to busy families. Today, some of the most prominent ways in which caregivers are involved in the discussion on AI and children's well-being is from parents whose children have been victims of online harm and abuse (Chatterjee 2025). In addition to technology companies making safe products and governments enforcing safety standards, as discussed above, others can play a role.

> To manage children's AI use at home, **support students to inform families about AI use in schools.**

Students themselves can communicate this information. For example, students may host quarterly forums with the school community that explain what tools are in use, what data flows where, and how to opt out of data sharing where possible. Education systems can prioritize this transparent sharing, including sending basic information home and integrating it into regular family-facing communication.

> To manage children's AI use at home, **provide families and children with safety information.**

Civil society organizations and associations that interface with and support families and children can all play a role in sharing information on how to protect children from online harms. Groups such as parent networks, student groups, pediatrician associations, religious leaders, and sports teams with coaches all have a role to play. There are a wide range of family- and student-facing materials that include things like protecting children's data, spotting deep fakes, avoiding cyber bullying and sexual exploitation, treating gaming and shopping addition, limiting exposure to violence and graphic content, and being aware of extortion tactics with AI (see Box 16).

BOX 16

Family-facing AI safety information

Examples of AI safety material for parents

Parents' Ultimate Guide to Generative AI
Common Sense Media explains how AI works, how teenagers are using it, and its key risks and benefits; the guide offers parents practical advice for talking with children and youth and guiding safe use (Common Sense Media 2024).

The Safe AI for Children Alliance: A Comprehensive Guide to AI Risks to Children
The Safe AI for Children Alliance explains the various risks that AI poses to children—from exposure to harmful content, data exploitation, and online grooming to psychological effects, algorithmic bias, and long-term existential threats—and presents a call for urgent action by parents, educators, policymakers, and society to protect and prepare the next generation (Safe AI for Children 2024).

A Guide to Cyber Safety for Kids at Every Age
The Singapore government provides parents with clear explanations and checklists of how to help keep children safe in an online world, including privacy settings, discussions to have with children, and behavior shifts parents themselves can make (Infocomm Media Development Authority 2025).

Artificial Intelligence for Children: Toolkit
The World Economic Forum informs parents and guardians about key factors to consider when purchasing AI-powered products to help them make safe and informed choices (World Economic Forum 2022).

AI and Education: A Guide for Parents
HP México explains how AI can enhance children's learning through personalized interactive tools while emphasizing the crucial role of parents in balancing technology use with supervision and age-appropriate guidance (HP 2025).

To manage children's AI use at home, **limit screen time, including AI use.**

Families and students can talk about screen time and the trade-offs that come with extensive screen time use such as in-person connection, exercise, and sleep. They can engage children in conversations to discuss why AI friends and LLMs are not actually children's companions like their in-person friends. Together, caregivers and children can develop a plan for limiting screen time at home and review the content of children's online interactions. And because parents and caregivers are children's primary educator in life, parents and caregivers can model healthy, responsible technology use.

To manage children's AI use at home, **students can talk with peers.**

Students can talk with their peers about what seem to be good and bad uses of AI. They can support each other in balancing real and online world time and interactions, as well as join student-led organizations and networks that focus on how to lead healthy and safe lives in an online world. Students can join existing youth advocacy groups or start their own if they cannot find one in their community.

BOX 17

Student led, peer-to-peer AI discussion

Student Groups Addressing AI Safety

Design It For Us 2025 AI Policy Platform

Design It For Us is a youth-led organization that aims to ensure that artificial intelligence systems are developed and governed with safety, transparency, meaningful youth participation, educational preparedness, and human-centered labor policies so that young people's rights and well-being are protected in the AI era (Design It For Us 2025).

Youth in AI

Youth in AI is a youth-led nonprofit based in Africa that empowers young people to become creators, researchers, and ethical leaders in AI by offering education, mentorship, innovation labs, and community building across more than 15 African countries (Youth in AI 2025).

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