



# A “Blueprint in Action” Memo:

*Investing in Research & Innovation*

Building the Federal R&D Infrastructure for  
the AI Age

Cameron Benham, Erin Mote, and Harshvardhan Upadhyaya



**Alliance For  
Learning  
Innovation**

## About the “Blueprint in Action” Series

This memo is a part of a series diving deeper into the recommendations outlined in the [Blueprint for the Future of the Federal Role in K-12 Education Research and Development \(R&D\)](#). Developed in collaboration with InnovateEDU, the LSLN Network, and a [task force](#) of over 150 stakeholders in the field, the blueprint and corresponding [report](#) respond to federal changes impacting education R&D. The task force asserts that the federal government should play a significant role in supporting education R&D by:

→ **Investing in research & innovation:** Funding high-potential, high-impact R&D, and supporting the development and scaling of educational tools and approaches.

→ **Empowering state and local innovation and improvement:** Partnering with state and local leaders to implement evidence-based solutions that improve student outcomes.

→ **Collecting and measuring what matters:** Gathering and publishing high-quality data on the state of education and effective improvement strategies.

## Introduction

The United States stands at a pivotal moment for education research and development (R&D). Artificial intelligence (AI) is already transforming classrooms and workplaces. It is not merely an adoption technology that enhances existing systems; it is an arrival technology, much like electricity or the internet, that is fundamentally reordering how we work, learn, and live. Its pervasive and transformative nature bypasses traditional adoption cycles, creating a new economic and social reality by automating cognitive tasks, personalizing experiences at scale, and giving rise to entirely new industries and research demands. Yet while technology accelerates, the federal R&D system has not evolved to keep pace. This disconnect presents an urgent call to respond to a call for evidence and infrastructure for the education sector to both meet the moment and support classrooms, parents, students, and educators.

This memo outlines a path forward, informed by our work leading the [EDSAFE AI Alliance](#) and [InnovateEDU](#), to restore the nation’s education R&D capacity and leadership so they align with the demands of an AI-enabled age. Building off the proposed recommendations in our white paper with The Study Group, [Opportunity at Scale: The Case for Public Infrastructure for AI in Education](#), we propose three pillars of reform:

1. Building a federal interagency-agenda for education R&D that establishes infrastructure and coordination across agencies;
2. Positioning AI literacy as a foundational skill for workforce readiness; and
3. Developing the infrastructure to research, test and benchmark, and scale AI tools that are safe and effective. By strategically leveraging federal R&D, we can cultivate an adaptive, skilled workforce, strengthen economic prosperity, bolster national security

through enhanced intelligence and defense capabilities, and ultimately foster human flourishing by empowering individuals to engage in more creative and meaningful work.

### Challenge and Opportunity

Despite the rapid progress in generative AI capabilities in education since its emergence in 2022, the U.S. education R&D system has remained isolated, underfunded, and poorly prepared to keep pace. [Decades of underinvestment and fragmentation](#) have weakened our ability to guide responsible generative AI adoption in classrooms, prepare current and future workers, and maintain global technological leadership.

AI is entering our classrooms, often without evidence-backed research or established best practices. Recent data from the Center for Democracy and Technology (CDT) found that [85% of teachers](#) and [86% of students](#) report using AI tools, yet [fewer than half](#) have received any training or guidance on their use. Only [33 states](#) have established AI education frameworks or guidance. The result is a fragmented educational landscape that varies by district or state. It mirrors the broader challenges in federal education R&D that has hindered progress for improved student outcomes: rapid innovation without shared standards, oversight, or infrastructure.

Similarly, the workforce is undergoing a profound shift as AI automates tasks once done by early-career workers. “AI-exposed” occupations—jobs whose core tasks can be done by Large Language Models (LLMs), such as software developers, analysts, customer service support, or administrative assistants—have seen a [13% decline](#) in employment since 2022, even as employment for older and less AI-exposed workers has remained stable or grown. [Only 30% recent college graduates](#) were able to find jobs in their field, the most constrained job market in 5 years. This is not simply a story of job loss, but of automation and displacement reshaping entry-level pathways, depreciating existing skills, and accelerating demand for more analytical, adaptive skills. Recent [layoffs across industries](#), from law to marketing and finance, illustrate how AI is increasingly automating tasks once reserved for entry-level workers. For the first time in decades, college graduates now face [higher unemployment rates](#) than non-college graduates, undermining the long-held assumption that earning a college degree leads to greater economic opportunity and mobility.

Despite this diffusion, there is a lack of rigorous, shared evidence on whether these tools improve learning. Some of the most [promising studies](#) suggest that AI can augment educators’ effectiveness by supporting feedback, lesson planning, and adaptation. However, [emerging research](#) is equally clear that when AI tools attempt to replace human judgment or automated instructional tasks, outcomes decline sharply. This evidence gap is not a failure of educators or developers—it reflects the absence of a federal R&D infrastructure capable of rapidly generating, validating, and sharing high-quality evidence at scale. The U.S. federal

education R&D infrastructure currently lacks a coordinated mechanism to test AI tools across diverse settings, monitor their effectiveness, and translate research into practice.

The AI-driven reconfiguration of work will reward durable skills in reasoning, collaboration, creativity, and discernment—capabilities that cannot be easily replaced by AI or automation and require intentional research to investigate. AI literacy is no longer a digital skill; it is a [foundational competency](#) for learning and participating in a 21st-century economy. Nations such as [China](#), [Singapore](#), [South Korea](#), and the [United Kingdom](#) are investing in AI education, national education research infrastructure, teacher training, and aligned instructional materials. Meanwhile, the U.S. risks ceding both educational opportunity and global economic competitiveness without strategic, systematic federal investments in AI education R&D.

All of this is possible and has been done before. Just as the [post-World War II federal R&D system](#) secured America's scientific leadership and technological superiority, today's and future investments must secure its leadership in the age of AI.

## Plan of Action

### **Recommendation 1: Build an Interagency Agenda for Federal Education R&D**

While [America's AI Action Plan](#) establishes a promising path forward, its success hinges on developing a complementary, robust education research agenda. This requires cultivating the knowledge and capacity within federal agencies to enable effective interagency collaboration toward shared R&D goals.

To prepare current and future learners for an AI-infused economy, the U.S. must establish a federal meta-agenda for education R&D that coordinates across agencies, strengthens public infrastructure, and aligns innovation with workforce readiness. The agenda must meet the needs of educators and communities across the U.S., in alignment with the Secretary of Education's [priority to promote evidence-based literacy](#) and the Trump Administration's focus on [gold standard science](#).

A modern federal public R&D agenda for AI in education, modeled on past science and defense R&D, requires more than coordination; it requires an infrastructure designed to answer urgent, field-defined research questions at the pace of technological change. As outlined in [EDSAFE AI Alliance's white paper](#), the U.S. needs a public R&D system capable of producing the full spectrum of evidence defined under the [Every Student Succeeds Act](#) (ESSA): rapid-cycle pilots, quasi-experimental designs, short randomized trials, and long-term longitudinal studies. Today, that system no longer exists in the U.S. But imagine if it did.

This infrastructure would provide shared resources, such as secure data environments, model testbeds, open synthetic datasets, and evaluation frameworks to accelerate discovery while scaling practices that are responsible and effective.

### *Key Actions*

- **Create a robust federal public infrastructure for AI in education.** Congress and the Administration should establish and fund a cross-agency initiative, led by the Department of Education's Institute of Education Sciences (IES), the National Science Foundation (NSF), and the Department of Labor (DOL), to design and maintain a shared infrastructure for responsible AI R&D in education. This infrastructure should include:
  - **Secure, interoperable data systems** that protect privacy while enabling large-scale education and workforce development research.
  - **Large-scale synthetic data sets** built on the National Assessment of Educational Progress (NAEP) previously administered data and outcomes, including assessment items.
  - **Transparent and actionable evaluation testbeds** to assess AI tools for ethics, safety, and efficacy before large-scale classroom deployment. These testbeds should support rapid-cycle evaluations, quasi-experimental designs, and short-term randomized controlled trials of AI tools, enabling validation and evaluation across [ESSA's Tiers of Evidence](#).
  - **AI Centers of Excellence** modeled on the [Agricultural Cooperative Extension System \(CES\)](#) and aligned with the [White House's proposed AI Centers of Excellence](#), to bridge research and practice through regional hubs that train educators, translate evidence, and scale effective innovations that are tailored to that region's needs.
  - **Systematic incident databases** with detailed technical tracking (model architectures, safety measures, root causes, timelines, and demographics) and anonymous whistleblower reporting mechanisms are essential for identifying AI failure patterns.
  - **Integrated Resource Allocation** with the National AI Research Resource for Education (NAIRR-Ed) to share research, best practices, and synthetic datasets with the education field.
- **Coordinate across federal agencies to unify R&D priorities.** The Departments of Education, Labor, Energy, and Commerce, alongside the NSF, should align AI investments, workforce readiness, and data modernization through a shared framework, consistent with the White House [Office of Science and Technology Policy's \(OSTP\) FY27 R&D Priorities](#). This coordination would:
  - **Establish joint funding programs** that unify AI literacy research and workforce training and study the economic and social mobility of those programs.
  - **Support specialized Career and Technical Education (CTE) programs** in data science, computer science, machine learning, robotics, quantum, and AI ethics.

- **Expand fellowships and scholarships** to attract and retain workers in AI education and research fields.
- **Ensure all federally funded education R&D projects reflect interoperability, privacy, and cybersecurity data standards.**
- **Define a national education R&D agenda with research questions** focused on areas such as:
  - “When does AI augment educator practice versus automate it?”
  - “Which instructional or administrative tasks benefit from AI assistance?”
  - “How do AI tools impact student engagement, reasoning, critical thinking skills, social-emotional skills, and long-term student mobility outcomes?”
  - “How can AI support students with disabilities while improving access, engagement, and outcomes?”
  - “What are the best practices for maximizing the impact of AI tools while maintaining student privacy and protecting users’ social and emotional well-being?”

## **Recommendation 2: Position AI Literacy as Workforce Readiness**

AI is transforming industries and redefining the skills required to enter the workforce. While the White House is making strides to invest in [registered apprenticeships and invest in future workforce talent](#), most education and training systems are not yet designed to prepare learners for an AI-infused economy.

A [significant gap exists](#) between the workforce’s AI demands and recent college graduates’ AI literacy, leaving them largely unprepared for the realities of their careers. While a [vast majority of students](#) report using AI tools academically, this usage often doesn’t translate into the critical, ethical, and practical understanding that employers desperately seek. This disconnect creates a nationwide AI literacy deficit, where many entry-level positions that once served as training grounds are diminishing as automation absorbs foundational tasks, leading to displacement. Consequently, new entrants to the workforce are expected to possess AI fluency that their formal education has not provided, exacerbating the challenge of securing employment and highlighting a critical failure to align higher education curricula with the technological fluency required for economic competitiveness.

According to a 2025 [Gallup/Telescope study](#), nearly all Americans (99%) use at least one AI-enabled product weekly (e.g., virtual assistants, navigation apps, social media), yet a majority (64%) are unaware of their AI use. At the same time, 61% say they want more control over how AI is used in their lives, and only 13% feel they have a great deal of control. The gap between widespread use and limited understanding underscores the urgency of building AI literacy as a core competency for both learning and workforce readiness.

AI literacy is not only essential for learning today—it is also the [gateway skill](#) for training current and future workers in an AI-infused economy. Building AI fluency and AI readiness ensures that every learner—from K-12 students to mid-career professionals—can discern, question, and safely and efficiently utilize AI tools and systems in their respective fields. This includes expanding opportunities in both emerging technology fields and skilled trades, which are increasingly powered by AI-driven tools, robotics, and data synthesis systems.

To align training with evidence, federal AI literacy efforts must be grounded in research on effective AI use, particularly the growing consensus that AI enhances learning when it complements human expertise rather than replaces it.

### *Key Actions*

- **Prepare and support educators.** Expand funding for teacher preparation and professional learning programs to embed AI literacy across disciplines. Regional hubs or AI Centers of Excellence can unify higher education, community colleges, industry, labor, and community organizations, and school districts to co-create AI literacy instructional materials and training for incoming and current educators, ensuring they are prepared to educate their students about AI safely and effectively. By leveraging the AI Centers of Excellence, these training programs will be aligned with regional needs and integrate community-based projects. These AI Centers of Excellence could be embedded into the [Regional Educational Laboratories](#) and/or [Comprehensive Center Programs](#) within the IES.
- **Allow for Short-Term Pell Grants to be used for workforce reskilling pathways.** Newly expanded Short-Term Pell Grants should be made available for AI literacy and reskilling programs. The recently enacted “[Workforce Pell](#)” expansion allows federal aid to support 8-15 week programs that lead to industry-recognized credentials in high-skill, high-wage fields. Prioritizing AI-related credentials within this window could help close the AI skills gap and strengthen economic readiness and competitiveness.
- **Link AI literacy to workforce and trade pathways.** The Departments of Education, Labor, and Commerce should align AI literacy efforts with Career and Technical Education (CTE) programs, registered apprenticeships, and [Workforce Innovation and Opportunity Act](#) (WIOA) grants. Employers can also be incentivized through grants or philanthropic investments to develop paid apprenticeships and internships in AI-related and AI-enabled skilled trades, with the AI Centers of Excellence serving as conveners for these partnerships and helping coordinate local industry needs with education and training programs.
- **Strengthen the AI talent pipeline.** Consistent with the White House’s initiative to expand [registered apprenticeships](#) and aligned with [OSTP’s FY27 R&D Priorities](#), the NSF should expand scholarships, fellowships, and workforce transition programs to attract and retain workers in AI-related education, research, and skilled-trade fields. These

pipelines could be integrated into the AI Centers of Excellence, ensuring that AI literacy and workforce initiatives reach every community and are tailored to meet their specific needs.

### **Recommendation 3: Develop Tools and Infrastructure**

To ensure that the U.S. education system and workforce keep pace with rapid advancements in AI, federal R&D must invest not only in ideas but also in tools, data, and public infrastructure that enable innovation to be safe, transparent, and scalable. The ability to test, evaluate, and improve AI systems in real educational contexts is essential to both public trust and international competitiveness.

Accelerating research requires federally supported testbeds embedded in real-world educational environments. These testbeds can serve as a model infrastructure, where new tools can be safely piloted, rapidly evaluated, iterated, and scaled. They can enable quasi-experimental designs, short-term randomized controlled trials, continuous monitoring, and researcher-practitioner partnerships that generate usable evidence far faster than traditional research timelines. Without these testbeds and the ability to run rapid-cycle studies, the U.S. cannot determine whether AI tools meaningfully improve learning at the current pace of technological innovation.

#### *Key Actions*

- **Launch a “National AI Research Resource for Education (NAIRR-Ed)”**. Modeled after the [NSF’s National AI Research Resource Pilot](#), NAIRR-Ed could democratize access to high-quality research tools, providing secure cloud computing, synthetic educational datasets, and open-source models to promote AI innovation in teaching and learning while addressing privacy and security concerns related to education research involving minor data. An entity like this could also be housed within a broader ARPA-like entity, such as the one that would be authorized in [the NEED Act](#). This shared resource would:
  - **Support philanthropic organizations, higher education institutions, and state education agencies** participating in AI research;
  - **Enable the development of adaptive, [Universal Design for Learning \(UDL\)](#)-aligned AI tools** that meet the needs of every learner;
  - **Foster accessible participation** in a shared and open ecosystem; and
  - **Produce and disseminate** rapid evidence on the effectiveness of AI tools, including guidance on when augmentation improves learning and when automation harms it.
- **Leverage synthetic data for safe, privacy-preserving research and testing**. The Department of Education and the NSF should fund the creation of synthetic, open-source datasets that enable responsible experimentation without exposing sensitive student information. Synthetic data enables researchers and vendors to test and validate AI tools

under realistic conditions, ensuring compliance with regulations such as the [Family Educational Rights and Privacy Act](#) (FERPA) and the [Children’s Online Privacy Protection Act](#) (COPPA). Furthermore, these datasets should be standardized, interoperable, and aligned with vetted frameworks, such as the [Common Education Data Standards](#) (CEDS), to enable consistent, comparable analysis across agencies.

- For example, we propose creating a "digital twin" synthetic dataset for the National Assessment of Educational Progress (NAEP) to expand research access while protecting student privacy. Current data restrictions limit the scientific community's ability to analyze national trends. Instead of traditional redaction, which reduces data quality, the Department should use modern generative AI to create synthetic data that statistically mirrors real student performance and problem-solving behaviors, without containing any record of an actual student. This approach decouples research utility from privacy risk, allowing policymakers and researchers to uncover insights from complex data—including how students interact with digital tools—without navigating the security bottlenecks of restricted-use licenses. A pilot program could rigorously test this synthetic data against real results, ensuring it supports valid policy decisions before a wider public release.
- **Use the AI Centers of Excellence to develop innovative AI tools.** Utilizing the AI Centers of Excellence would enable rapid-cycle, user-centered research on AI tools, in partnership with local industry partners, higher education institutions, and community organizations. Additionally, AI tools developed by the AI Centers of Excellence should be built in alignment with the Universal Design for Learning, the [Learning Sciences](#), and gold-standard science to ensure they are universally accessible, evidence-based, safe, and scalable. These Centers should operate as distributed evaluation testbeds, conducting structured rapid-cycle studies, collecting standard metrics, and publishing results openly and publicly to accelerate scaling and implementation.

## Closing

The path forward is clear and urgent. AI is redefining what it means to teach, learn, and work. The question is not whether the U.S. will adapt, but whether it will lead the world in innovation. By investing in a modern, transparent, and collaborative federal R&D system, the nation can build the infrastructure, human capital, and trust required to harness AI to improve learning, strengthen economic prosperity, and ensure the country remains poised to lead the world in scientific and technological innovation. Securing the nation's continued dominance and leadership in the AI age requires strategic investment championed by Congress and coordinated through executive action.

Through an interagency meta-agenda—a national commitment to AI literacy as a necessary workforce skill, along with actionable tools, data systems, and robust public infrastructure—

we can transform fragmented programs into a national strategy that prepares every learner for the opportunities of an AI-infused economy. Ultimately, the nation's leadership in the AI era will depend on its capacity to generate trustworthy evidence about how AI impacts learning and work. Without a federal system that can evaluate tools quickly, rigorously, and transparently, we risk adopting technologies that undermine rather than strengthen human potential.

If the 20th century was defined by America's leadership in industry, science, and technology, the 21st will be defined by its capacity to build an AI-ready research and development ecosystem that supports education and work, equipping current and future generations to lead and actively participate in a world transformed by AI.

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**Cameron Benham** is a Policy Associate at InnovateEDU.

**Erin Mote** is the CEO and Founder of InnovateEDU.

**Harshvardhan Upadhyaya** is a Project Associate at InnovateEDU.



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