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Request for Information: Development of a 2025 National Artificial Intelligence Research and Development Strategic Plan

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Submitter Information

Organization: Carnegie Learning

General Comment

See attached file(s)

Attachments

Carnegie Learning - RFI for AI R and D strategy



May 28, 2025

Strategic Focus on Education for AI Leadership

Response from Carnegie Learning (www.carnegielearning.com)

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Carnegie Learning, a Pittsburgh-based developer of curriculum and services for K-12 schools in the United States has over 25 years of experience applying artificial intelligence to education. We are active participants in advancing the state of the art in using AI in education through our own research and partnerships with non-profit organizations. We welcome the opportunity to provide input for the 2025 Development of a National Artificial Intelligence Research and Development Strategic Plan (Docket ID No. NSF-2025-OGC-0001)

The United States' ability to sustain global leadership in Artificial Intelligence depends not only on technological innovation, but on our capacity to educate a generation capable of working with, understanding, and guiding AI systems. Education is the linchpin of a national AI strategy.

While AI originated in efforts to model human cognition, its modern evolution has prioritized performance over process. Today's large-scale models routinely exceed human capabilities in specific domains, not by mimicking human thinking, but by leveraging scale, speed, and data. This may be sufficient for many industrial and scientific applications. In education, however, it is not enough.

To responsibly integrate AI into classrooms, models must be designed to understand how students learn, struggle, and reason, not just to produce correct answers. They must support teachers, adapt to developmental pathways, and provide feedback that cultivates deeper thinking. This requires research not only on AI performance, but on how AI systems interact with pedagogy, curriculum, and human motivation.

To meet this moment, federal AI R&D investments must prioritize five foundational areas: curriculum adaptation, core domain innovation, teacher empowerment, translational research partnerships, and the development of next-generation assessments.

1. **Curricular Adaptation for AI Integration:** AI can now perform many of the tasks traditionally assigned to students. When assignments focus solely on completion, students aware of AI's capabilities may outsource rather than engage. Federal initiatives should invest in research exploring how curriculum must evolve in response to this shift, emphasizing skills that cannot be easily offloaded, such as critical thinking, metacognition, creativity, and argumentation. These competencies empower students to work with AI tools productively and ethically, rather than bypass the learning process.
2. **Focus on Crucial Domains:** Students' post-pandemic performance in core academic domains, especially mathematics and English, has reached a crisis point. AI will not reverse these trends unless we reimagine both what is taught and how it's taught. In math, greater

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emphasis on data literacy, statistics, and probabilistic reasoning will help students understand and interact with AI models. In English, research should explore AI as a collaborative writing partner, helping students strengthen argumentation, organization, and revision strategies rather than replace original thinking. Federal R&D programs should prioritize AI applications in these domains as national learning gaps continue to widen.

3. **Empowering Teachers with AI:** Fund a large-scale R&D effort to create educator-specific AI assistants (co-pilots) to support lesson planning, formative assessment creation, grading, and differentiation. Couple this with a national teacher training initiative on AI tool use. Teachers play a critical role in helping students find meaning and purpose in their learning. As AI capabilities continue to grow, this role becomes even more essential, not less. Educational AI programs should be designed not to replace teachers, but to augment their expertise, equipping them with powerful tools and insights. Our vision is to use AI to give teachers superpowers, enabling them to engage students more deeply, respond more effectively to individual needs, and unlock new levels of instructional impact.
4. **Bridging Research and Practice:** Education research is often conducted in isolated academic labs and fails to influence day-to-day instruction. AI offers a unique opportunity to close that gap. By instrumenting AI-powered software, researchers can observe patterns in instruction and learning at scale. Future federal programs should foster deep partnerships between academic researchers and educational software providers, ensuring research insights are translated into practical tools, and software platforms are continuously improved through real-world evidence.
5. **AI Enhanced Assessments:** Establish an NSF-led research and prototyping initiative focused on next-generation assessments enhanced by AI. These should prioritize formative and performance-based tasks that assess student skills in interpretation, creativity, reasoning, and communication—areas where traditional testing falls short. Key areas of investment should include:
 - AI-assisted scoring and feedback for open-ended and multimodal responses (e.g., writing, speaking, problem explanation).
 - Bias detection and explainability research, ensuring AI scoring models are transparent, fair, and aligned to instructional intent.
 - Design tools for educators to author new forms of assessments that integrate with AI-enhanced learning environments.
 - Integration pilots that embed AI-driven formative assessments into instructional platforms used in real classrooms.

By focusing on authentic assessment, this initiative will help AI improve—not undermine—how we measure student understanding.

For any questions, please contact:

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