House Education Committee
Informational Meeting
Artificial Intelligence
April 22, 2026, at 10:00am, Carnegie Melon

10:00am Call to Order
Committee Member Introductions
Opening Remarks- Chairman Schweyer

10:10am Panel 1- University Perspective

Mr. Richard Scheines, Professor of Philosophy
Bess Family Dean, Dietrich College of Humanities and Social Sciences
Carnegie Mellon University

Dr. Ingo Witzke, Director of Mathematics Didactics *
University of Siegen

10:45am Panel 2- Certification Perspective

Dr. Lori Bailey, Ed.D., Assistant Dean of Enrollment, Technology, & Assessment
College of Education and Human Development
Temple University

11:20am Panel 3- National Perspective

Ms. Molly Gold, Education Project Manager *
National Conference of State Legislatures

Mr. Jonathan Butcher, Acting Director of the Center for Education Policy*
Heritage Foundation

11:50am Closing Remarks/Adjournment

Written Testimony:

Dr. Camille Dempsey, PennWest University

All times are approximate and include time for questions. Live streamed at www.pahouse.com/live

*Virtual

Carnegie Mellon University

Testimony
Prepared for the Pennsylvania House of Representatives Education Committee
By
Richard Scheines The Bess Family Dean of the Marianna Brown Dietrich College of Humanities and the Social Sciences Wednesday April 22, 2026

Welcome and Introduction

Good morning Chairman Schweyer, Chair Cutler and members of the Committee.

Welcome to Carnegie Mellon and thank you for the work you have undertaken to improve educational opportunities for Pennsylvania students. I am honored to have the opportunity to testify before you today on a topic so vital to the future of our Commonwealth.

My name is Richard Scheines. I am the Dean of the Dietrich College of Humanities and the Social Sciences. I joined the Carnegie Mellon faculty in 1990. My home department is Philosophy, but I have courtesy appointments in the Machine Learning Department and Human-Computer Interaction Institute in School of Computer Science.

I have been a passionate supporter of the university's commitment to advance the science of learning, and to translate its findings into making a concrete, positive difference in the lives of students from Kindergarten through Post-Secondary education. I also have the honor of serving as the faculty director of CMU's Simon Initiative. Named for Nobel Laureate Herm Simon, the Initiative brings together researchers from a host of disciplines along with practitioners to engineer the development and deployment of education technology to support K-12 to secondary and post-secondary learning and training. The Simon Initiative was launched over a decade ago, and among many milestones, in May 2019 released of over $100 million of learning science tools and resources in the OpenSimon Toolkit to help drive student success.

Carnegie Mellon has been at the forefront of the development of artificial intelligence to support students and teachers for over 70 years and the Commonwealth has been a vital partner in that effort. Support from Pennsylvania has helped build the facilities in which the fundamental advances in AI for education have been developed. The Commonwealth has also supported CMU's education technology spinouts that are bringing new powerful capabilities to students and teachers across the nation. Finally, and most importantly, the Commonwealth has facilitated and supported collaborations with Pennsylvania schools, districts, Intermediate Units and community colleges. Since Andrew Carnegie founded the Carnegie Technical Schools 125 years ago to educate the sons and daughters of steelworkers, strong partnerships with the schools in our city, region and state remain essential to our mission.

My testimony will focus on three key areas. The first is the urgency to meet this moment. The imperative that we effectively develop and deploy science-based learning tools to take advantage of the power of AI to support teaching and learning and to ensure that students and communities can thrive in

a world being rapidly transformed by the pace of innovation. Second, I will review CMU's approach to AI education and key initiatives that reflect our view on the future of education. Finally, building upon these two elements I will offer some recommendations to enable Pennsylvania's continued leadership at the forefront of innovation in education.

The Imperative to Meet the Moment

We are at critical inflection point with respect to AI and education. Advances in the development of Large Language Models have created an opportunity to realize the vision of personalized learning for every student and worker, and LLMs also have the potential to democratize access to learning by significantly reducing the cost of education technology. As I will highlight in my testimony, new AI based tools can create new ways to empower every teacher to be an innovator.

At the same time, AI breakthroughs are transforming our economy and the future of work in ways that make it imperative to adapt education from K-12 through workforce training. AI is expected to add $15 trillion to the global economy by 2030.[1] Generative AI is being adopted at a pace that exceeds any previous technology in history. For example, ChatGPT reached 100 million users faster (just 2 months) than any internet application in history. Six in ten business leaders expect AI to fundamentally transform their organizations.[2]

The average half-life of skills is now less than 5 years. In some tech fields, it has dipped as low as 2.5 years.[3] While the early focus of the impact of AI on work focused on white collar occupations, the rapid development of Physical AI—the integration of AI into physical systems through robotics and autonomy--is already impacting work in construction and manufacturing.

This scale of innovation and impact demands new approaches to education. The average student today will change careers between three and seven times in their working life. On average skills learned in school or in training programs will be outdated within two to three years. Strategies and investments to advance AI for education thus need to focus on the imperative building lifelong learning.

As we seek to advance and harness the power of AI to address this transformative moment, it will also be vital to ground these efforts in a recognition of the enduring elements central to successful education. Our communities must inspire and support individual students, empower great teachers, and support vibrant schools as the backbone of our educational system.

Carnegie Mellon's Approach to AI Education

Carnegie Mellon's initiatives in AI education are anchored in a recognition of those three enduring elements. Three core principles guide our application of AI to learning science.

First, we embed learning science from the ground up in our AI applications.

Many current applications of AI in education focus on automating or accelerating teaching tasks—such as auto-grading or generating instructional videos. However, these outputs often replicate the limitations of our existing education system: grades that fail to guide learning or motivate students, and videos that

look polished but aren't grounded in principles that enhance learning. This is just producing more "widgets and gadgets."

Instead, we integrate proven learning science principles and empirical findings into how AI performs key educational functions. As a result, our AI outputs are not only faster to produce but are also far more effective in promoting meaningful student learning.

AI can only transform education if we build from what we know works, rather than starting from scratch. Consider how early MOOCs scaled lectures without demonstrating any significant improvements in learning or motivation.

Second, we use learning engineering to continuously improve AI designs based on data.

Many educational AI tools are evaluated only on user perception—what teachers or students think works. However, research shows that these perceptions can be misleading or too vague to guide meaningful refinement. As a result, innovation efforts often fail to yield lasting improvements.

We take a different approach. Using our learning engineering methods and tools, we build AI applications that not only start strong but also get better over time through continuous data-driven iteration. The goal is to create a sustainable, repeatable process for enhancing AI's impact on outcomes. Techniques like cognitive model discovery, iterative refinement, and automated A/B testing allow us to optimize AI tools based on real student data.

Third, we make powerful, research-based innovation accessible to everyday educators.

In fields like coding or writing, AI tools now help non-experts generate high-quality work. We apply that same idea to education. Our goal is to empower K–12 teachers, instructional designers, and college faculty—regardless of their expertise in learning science or engineering—to harness AI tools that embody those skillsets. With the right support, any educator can become a designer and tester of effective educational innovations.

The goal of this work is not to impose a standard curriculum. Rather it is to provide access to tools that enable teachers, schools, and districts to adapt and enhance their curricula.

A Review of Some Critical CMU Science of Learning Initiatives

The times demand strategies that advance the science of learning across the education and workforce training continuum. That has been a central feature of Carnegie Mellon's efforts to deploy accessible AI based education tools. I will highlight initiatives in three key areas.

Building the Pipeline: Educational Outreach in K-12

Carnegie Mellon has invested to create a comprehensive set of initiatives to support K-12 program delivery and teacher training. CMU's **CS Academy** is a free computer science curriculum designed to engage middle- and high-school students in learning Python programming. Since its launch in 2019, CS

Academy has reached over 600,000 students nationwide, including over 80,000 students in Pennsylvania, and been used by thousands of teachers. Our goal is to expand access to CMU's ability to design rigorous, accessible learning experiences and cultivate strong partnerships with educators and school systems to scale and sustain education models that align with local needs.

AI4K12 initiative is a national effort to integrate AI education into K-12 classrooms across the United States. The initiative–cofounded by a CMU faculty researcher–has set national guidelines for K-12 AI education with a focus on perception, representation and reasoning, learning, natural interaction and societal impact. AI4K12 has also developed a suite of AI teaching resources and convened AI leaders in various disciplines to advance AI uptake for the K-12 audience.

CMU's AI **Scholars program** is a free, four-week immersive experience for rising high school seniors to explore AI with CMU experts in the field. Students benefit from project-based learning, career exploration opportunities, and have a chance to use their newly acquired AI skills for the betterment of humanity.

CMU's Eberly Center for Teaching Excellence & Educational Innovation recognizes that college students bring varied AI experience to the classroom. Utilizing rigorous research testing and classroom feedback, the Center has developed a suite of instructional modules to help students establish a baseline of AI competency. CMU researchers are working with K-12 educators to develop a module series specifically for K–12 students.

Advancing Tools to Address Critical Learning Gaps

Evidence clearly demonstrates that highly effective tutoring and mentoring are powerful resources for improving student outcomes. AI based tools have the potential to expand access to quality tutoring for every student. In addition, AI education tools are demonstrating particular effectiveness to address the impact that gaps in math skills have in enabling students and workers to succeed in STEM fields and careers.

Carnegie Mellon researchers pioneered the development of cognitive tutors to enable students to close learning gaps in algebra, geometry, and programming. The CMU spinout, **Carnegie Learning**, has developed the technology which is now in use in over 4,500 middle and high schools across the nation. Recent research in Carnegie Mellon advanced the capability to reduce the cost of tutors to $500 while retaining the high impact outcomes of closing gaps in math capabilities.

The **Personalized Learning Squared (PLUS) project**, a collaborative effort among CMU, Carnegie Learning the right student at the right time, ultimately serving thousands of middle school math learners and helping to meet the needs of the 16 million children on a tutoring waitlist nationwide.

Recently Carnegie Mellon University and the Gates Foundation announced the launch of **Learnvia**, a new national nonprofit focused on transforming student success and workforce development on a national scale. Learnvia is enabled by a historic $55 million philanthropic investment from the Gates Foundation and is laser focused on improving student performance in the gateway math courses that are vital to STEM degrees and many workforce training certificate programs.

Learnvia addresses this challenge by combining free, AI-enabled courseware with support for evidence based instructional practices that is grounded in decades of CMU learning science research. Learnvia has already reached over 60 community colleges and four-year institutions across the nation including the Community College of Allegheny County, Philadelphia Community College, and Point Park University.

Applying the Science of Learning for Rapid Occupational Training

In addition to the focus of Learnvia on training programs in the trades and nursing, Carnegie Mellon has advanced the application of science of learning breakthroughs to accelerate occupational training. One initiative in this area was work undertaken by CMU's Manufacturing Futures Institute to utilize advanced augmented reality technologies to support the training of welders.

Collaboration with community colleges and the services are also advancing rapid occupational training capabilities through the application of machine learning and AI. The Sail program is an online learning platform that provides college and university instructors with job-focused technology courses created by Carnegie Mellon that are project-based, collaborative, and use real-time feedback. This cutting-edge conceptual and experiential learning system teaches students in the way they learn best, so they're ready to contribute to the world's most important technological problems. Courses focus on cloud computing, data science, and AI/ML, which are proven to lead to certifications and jobs. The Sail program is involved with over 40 community colleges.

Building upon the Sail program CMU has developed certificate-based programs to support rapid technical training for soldiers and sailors. The AI Technicians program developed for the Army AI Integration Center is a one-year certificate program building AI Engineering capabilities for soldiers, some with limited technical backgrounds. Similarly, CMU is piloting a 6-week certificate program for the Navy to rapidly train sailors to support the operation of robotic systems. These programs, which also build upon CMU's research in designing data-based learning capabilities, have the potential for application to industry training as well.

Recommendations on the Path Forward

Pennsylvania is well positioned to be a leader in realizing the potential for AI to truly enhance learning for students and workers and empower teachers. I offer three recommendations to build upon the programs and initiatives already taking root across Pennsylvania.

Pennsylvania Can Lead the Nation in Tackling the "Math Skills Gap" Challenge.

The ability to succeed in gateway math courses impacts students and workers pursuing two-year, four year and graduate degrees as well training programs ranging from the trades to nursing. Advances in AI capabilities can empower institutions and teachers to integrate tools flexibly within their curricula and address this challenge so that it will not be a barrier to career success.

Focus on policies that support AI for Education across the education and workforce development continuum.

Advanced AI tools are demonstrating the capability to improve learning outcomes in K-12, secondary and post-secondary education and increasingly in supporting advanced training programs. Creating the environment to accelerate deep collaborations among educational institutions at all levels, Intermediate Units industry and community-based partners will be essential to scale these efforts and ensure access to all students and workers across the Commonwealth. These partnerships should also enhance the capacity to support robust teacher training.

Strong Federal and State Partnerships are Necessary to Support the Data Infrastructure and Evaluation Programs.

The foundation for advances in AI tools for education have depended upon federal support for research and the development of the infrastructure that enables data informed learning models. Continued investment in research and an alignment of infrastructure capabilities to support robust evaluation of AI education programs.

Conclusion

Thank you again for your leadership in supporting education, the opportunity to testify and for holding this vital hearing at Carnegie Mellon.

The accelerating pace of AI development and adoption may likely create the most profound transformation in the nature of careers and work in history. Years of collaboration and investment in research and deployment give us the capacity to also harness AI to meet these challenges and maintain the core character and strength of student-centered learning that has been at heart of our educational system.

Carnegie Mellon is prepared to continue and deepen collaborations across Pennsylvania to meet this moment.

Reference Notes

1. *Forbes* "Top AI Statistics and Trends" February 6, 2026
2. World Economic Forum "Future of Jobs Report" 2025
3. *Harvard Business Review* "Reskilling in the Age of AI" September-October 2023

Written Testimony **April 13, 2026**

Prof. Dr. Ingo Witzke
Director of Mathematics Education
University of Siegen, Germany

Homepage: https://www.uni-siegen.de/fb6/didaktik/personen/ingo-witzke/

Thank you for the opportunity to contribute to this important discussion on artificial intelligence (AI) in teacher preparation and higher education.

Artificial intelligence is rapidly transforming education. From the perspective of my team and me, AI represents a significant opportunity to enhance teaching and learning, provided it is implemented thoughtfully, responsibly, and based on evidence. The key challenge is not whether AI will be used in education - but how it will be shaped pedagogically and systemically.

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1. AI as an Opportunity – With Clear Preconditions

Our research and development work in Germany - particularly in the projects **KIMADU (North Rhine-Westphalia, https://kimadu.de)** and **KI@school (Bavaria, https://www.bildungspakt-bayern.de/projekte-ki-at-school/)** - involves **collaboration with over 40 schools**. These projects provide real-world testbeds for AI-supported teaching and learning and are scientifically accompanied to derive transferable insights.

Across these settings, we observe that AI can:

- support adaptive learning and individualized feedback
- stimulate reasoning, explanation, and communication
- reduce routine workload for teachers

However, these opportunities can only be realized under two central conditions:

- **Reliable infrastructure and equitable access**
- **Systematic and high-quality teacher professional development**

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2. From Generic AI to Didactic AI Agents

We observe a clear shift away from generic AI tools toward **specialized, didactic AI agents** that are **co-designed by teachers**.

In our projects, teachers collaboratively develop AI agents that:

- are aligned with subject-specific goals (e.g., mathematical reasoning)

- address typical student misconceptions
- take on pedagogical roles (e.g., Socratic tutor, critical feedback partner)

A key insight is that the **creation of system prompts (the initial instructions given to an AI system) itself becomes a powerful didactic practice**. It requires teachers to articulate learning goals, define quality criteria, and reflect on instructional strategies. This turns AI design into a meaningful component of professional learning.

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3. Student Agency through Co-Configuration of AI

In addition, we increasingly involve students themselves in the configuration of AI agents. Using so-called *meta-bot prompting support*, students are guided to actively shape how their AI learning partner behaves.

This includes decisions such as:

- how explanations should be structured
- when help should be given or withheld
- how feedback should be formulated

Our findings show that this approach has a **strong positive effect on student agency**. Students do not simply use AI. They actively design it as a learning tool.

This leads to two important outcomes:

- **deeper mathematical understanding**, as students reflect on what constitutes a good explanation or solution process
- **enhanced AI literacy**, as students gain insight into how AI systems can be shaped, controlled, and critically evaluated

In this sense, AI is not only a tool for learning but also an object of learning itself.

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4. Dual Strategy: Specialized Systems and AI Literacy

We recommend a **dual strategy**:

1. **Teacher-configured AI systems**
    - tailored to specific classroom contexts
    - aligned with curriculum and pedagogy
    - under teacher control
2. **General AI literacy for students**

- understanding how AI systems work and where their limits are
- critically evaluating outputs
- applying AI responsibly beyond school

From our perspective, AI literacy is most effective when **embedded within subject learning**. In mathematics, for example, AI can support argumentation, explanation, and the comparison of solution strategies.

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5. Teacher Education as a Central Lever

AI must become an **integral part of teacher education** across all phases (pre-service, induction, and in-service training).

Future teachers need opportunities to:

- design and test AI-supported learning environments
- reflect on pedagogical and ethical implications
- develop both general AI literacy and subject-specific applications

Equally important are:

- **low-threshold entry materials** (e.g., adaptable teaching resources and AI agents)
- **opportunities for continuous exchange with experts and peers**

Without embedding AI into teacher education, large-scale implementation will not be sustainable.

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6. Process-Oriented Assessment in the Age of AI

AI challenges traditional assessment formats that focus on final answers or reproduction of knowledge.

We therefore need a shift toward **process-oriented assessment**, which emphasizes:

- reasoning and explanation
- problem-solving processes
- reflection on the use of AI
- transparent documentation of learning paths

AI can support this shift by making learning processes visible. At the same time, assessment must ensure that students can **explain, justify, and critically evaluate** their work.

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7. Evidence-Based Implementation and International Collaboration

AI in education is a **rapidly evolving field**, which makes **evidence-based implementation essential**.

Successful integration requires close collaboration between at least:

- schools
- universities
- educational administration
- industries

In addition, **international collaboration is crucial**. Within the Erasmus+ project ADAPT-AI, we work with European partners to develop a framework for the effective and pedagogically sound use of AI in mathematics education.

Our research also highlights an important pattern:

- **Students tend to overestimate their AI competencies**
- **Teachers tend to underestimate them**

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8. Equity, Accessibility, and the Digital Divide

AI has the potential to both **reduce and amplify educational inequalities**.

On the one hand, we see strong potential for inclusion:

- AI systems can act as **low-threshold, always-available tutors**
- emerging developments in **speech- and video-based interaction** promise highly accessible support
- AI can provide **targeted support for learners with special needs**

On the other hand, AI acts as a **powerful amplifier of existing advantages**:

- strong problem solvers benefit disproportionately
- students without access or guidance risk falling behind

This makes equitable access essential. Educational systems must ensure:

- universal access
- structured guidance
- targeted support

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9. Data Protection and Trustworthy Systems

Data protection is a fundamental requirement. Approaches such as **Named Entity Recognition (NER)** support the protection of personal data in Germany while still enabling innovation through flexible model selection. All students have access to such systems; however, it is unfortunate that they often do not yet match the performance of commercial solutions.

Educational systems should ensure:

- transparency
- secure data handling
- clear governance structures

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10. Final Recommendations

To support effective AI integration in teacher preparation and higher education, we recommend:

- Investing in **infrastructure and equitable access**
- Embedding AI firmly in **teacher education across all phases**
- Supporting the development of **teacher-configured, subject-specific AI agents**
- Promoting **AI literacy integrated into subject learning**
- Providing **low-threshold materials and expert support structures**
- Advancing **process-oriented assessment formats**
- Strengthening **research-practice partnerships and international collaboration**
- Ensuring **robust data protection frameworks**

AI has the potential to significantly enhance education but only if it is shaped by educators, grounded in research, and implemented with care.

Thank you for your attention.

WRITTEN TESTIMONY

Informational Meeting on Artificial Intelligence in Higher Education
Pennsylvania House Education Committee
Chair Peter Schweyer
April 22, 2026 | Pittsburgh, Pennsylvania

Submitted by

Lori Bailey

Assistant Dean of Enrollment, Technology, and Assessment
College of Education and Human Development
Temple University

Introduction

Chairman Schweyer, members of the Committee, thank you for convening this informational meeting and for your attention to the role of artificial intelligence in Pennsylvania's education system. My name is Lori Bailey, and I serve as Assistant Dean of Enrollment, Technology, and Assessment in the College of Education and Human Development at Temple University. I am here today as a representative of college leadership to share what we are seeing on the ground as an institution that prepares future teachers for Pennsylvania's public schools. My portfolio spans enrollment, technology, and assessment, which means I sit at the intersection of the institutional systems, data, and operational infrastructure that either enable or constrain our ability to respond to challenges like this one.

My testimony today will address three realities: the scale of the institutional challenge, the lack of shared infrastructure to support this work, and the consequences of inaction for Pennsylvania's students and workforce.

Before I describe the challenges facing higher education, I want to ground this conversation in a simple fact: AI is not a future concern. It is a present reality in every school in this Commonwealth.

My colleague, Dr. Kristie Newton, Associate Dean of Educator Preparation and P-12 Partnerships, has shared examples as a parent and from our own students and their practicum experiences that illustrate what this looks like in practice. Students are using Google Translate to check their work in a second language. They are photographing math and science problems to receive step-by-step guidance when they are absent or struggling to keep up with in-class instruction. They are using AI to organize their thinking before writing an essay, or to search for study material when teacher notes are sparse. These are not acts of cheating. They are acts of

self-directed learning — students reaching for the tools available to them to close gaps in understanding.

A recent report from Gallup and the Walton Family Foundation (2025) indicates that 60% of U.S. K–12 public school teachers used AI tools during the 2024–2025 school year, with 32% using them at least weekly (p. 4). The share of U.S. teens using ChatGPT for schoolwork doubled from 13% in 2023 to 26% in 2024 (Sidoti et al., 2025, para. 1). Additionally, 71% of teachers and 65% of students consider AI assistants essential for learning and workforce preparation (World Economic Forum, 2024, as cited in Joint State Government Commission, 2026).

The question is no longer if students will use AI—they already are. The core challenge is whether teachers will be equipped, through their preparation, to guide AI use ethically, critically, and equitably. This is the essential task before us.

Temple University is one of the largest providers of educator preparation in the Commonwealth. In the 2024–2025 academic year, we enrolled over 500 students across our teacher preparation programs, including more than 120 graduate students who will complete their programs within two years and enter classrooms across the region. The question before us is direct: Will those new teachers be prepared to address the use of AI in their classrooms?

The Scale of the Institutional Lift

Preparing future teachers to address AI in their classrooms requires solving a layered problem. First, we must build AI literacy among our own faculty — the people who design and deliver the curriculum. Then, we must revise our teacher preparation programs to address AI knowledge, skills, and values. Only then can we hope that new teachers leave our institution equipped to guide the use of AI among their own PK–12 students.

The research is clear about where we stand nationally. The Center on Reinventing Public Education (CRPE) reports that only 10% of school leaders in education say their faculty feel confident using AI in instruction (Weiner et al., 2024, p. 4). More than half report that faculty lack confidence in integrating AI into teaching practice, and many are indifferent or actively resistant. At the same time, their research "suggests that schools of education are not likely to move quickly or at a large enough scale to train America's future teachers in AI without a significant shift in faculty interest and capacity building" (Weiner et al., 2024, p. 1). The result is a widening gap between what educators need to do and what they are prepared to do.

This is not a failure of will. It is a failure of capacity. Faculty concerns are legitimate: data privacy, intellectual property, academic integrity, and the fear of professional displacement. But the dominant response in teacher preparation nationally has been reactive. CRPE found that the majority of AI content in teacher prep programs focuses on plagiarism prevention and academic dishonesty (Weiner et al., 2024). Only about 25% of programs provide training on

how to use AI to improve instruction, personalize learning, or support students (Weiner et al., 2024). As Kelley and Wenzel (2025) suggest, advancing AI literacy in teacher education is not primarily a technology challenge — it is a professional learning, intentional engagement, and leadership challenge.

The urgency of this challenge is not theoretical in Pennsylvania. A recent report from the Joint State Government Commission on AI adoption and use in Pennsylvania highlighted a community college in our Commonwealth that surveyed its students and faculty across two consecutive years. The findings reveal the gap between student reality and faculty readiness in sharp relief. In 2024, nearly 60 percent of students were already using ChatGPT or Grammarly to support their academic work — and the majority had positive reactions to these tools. Faculty, however, told a different story: roughly 60 percent expressed concern about academic dishonesty, decreased critical thinking, and AI-perpetuated bias, and many stated directly that they needed more training on responsible AI use before they could effectively teach it. By 2025, that faculty concern had not resolved; it had deepened. These are not outliers. They are a preview of what teacher preparation faculty across Pennsylvania are navigating right now, without adequate support or guidance to move forward with confidence.

At Temple, we are working to move from reaction to intention. But the lift is significant. It has taken us nearly the full 2025–2026 academic year to initiate two efforts: first, establishing a Community of Practice for our teacher preparation faculty to collaboratively explore and develop AI literacy; and second, partnering with Temple alumni to develop professional development opportunities that we can deliver to faculty across the university and to teachers in surrounding school districts. Neither initiative is scheduled to launch before Fall 2026.

Meanwhile, AI continues to advance at a pace that outstrips any institution's ability to keep up through conventional curriculum review cycles. CRPE warns that if teacher prep programs continue to update curricula on three- to five-year cycles, new teachers will remain underprepared, leaving districts to address the gap (Audrain, 2025).

These efforts are unfolding amid severe institutional constraints. Temple University faces a structural deficit exceeding $40 million, driven in large part by enrollment declines associated with the national "enrollment cliff." Faculty and staff are stretched thin. There is no discretionary capacity for an initiative as complex as building AI literacy across multiple disciplines and multiple audiences — instructors, future teachers, current students, and PK–12 learners in field placement classrooms. The research confirms this is not unique to Temple: Antonio and Sison (2026) found that the effectiveness of AI integration is largely driven by institutional readiness, faculty support, infrastructure, and policy alignment — not the inherent power of any particular AI tool.

The Absence of Shared Infrastructure

Compounding these institutional constraints is a critical structural gap: there is no shared framework from the Pennsylvania Department of Education or the Commonwealth that guides AI integration in teacher preparation.

PDE released an AI Endorsement Framework in June 2025, establishing a voluntary 12-credit endorsement that educator preparation programs can develop and submit for approval. The framework defines six competency domains — from foundations and ethics to AI leadership and societal thriving — and it makes visible just how complex and substantive AI preparation actually is. Teacher preparation programs cannot simply add a module to an existing course and consider the problem solved.

However, the endorsement is voluntary and unfunded. The framework exists; the resources and incentive structures to implement it do not. Building a 12-credit endorsement program requires faculty with sufficient AI literacy to teach it, the capacity to develop curriculum, and field placement infrastructure. None of that exists at scale, even at institutions that are actively working on it. The framework itself acknowledges that "there are currently no professional organizations that have established specific standards for [AI] use in PK–12 settings" (Pennsylvania Department of Education, 2025, p. 4).

The disparity in available resources compounds this problem. In September 2025, Pennsylvania's State System of Higher Education partnered with Google to offer the AI for Education Accelerator — providing free, structured AI training for faculty, staff, and students at five PASSHE institutions (Joint State Government Commission, 2026). That initiative represents exactly the kind of funded, coordinated support that can accelerate progress. But Temple University, like many non-PASSHE institutions in the Commonwealth, has no equivalent access to that partnership or its resources. We serve a predominantly urban student population, preparing teachers for Philadelphia and the surrounding region: communities where the consequences of inadequate AI preparation will fall hardest. The absence of a parallel pathway for non-PASSHE institutions is not a minor administrative gap. It is an equity issue, and it deserves the Committee's attention.

As a result, each institution is operating in a silo. At Temple, President Fry's establishment of a university-wide AI task force in early Fall 2025 reflects exactly the kind of forward-looking institutional leadership this moment demands — and that work is ongoing, navigating the same uncharted policy and data security terrain that institutions across Pennsylvania and the nation are working through without clear guidance. This pattern is replicated across the state. More than two-thirds of schools of education nationally lack formal AI policies (Weiner et al., 2024). Where policies do exist, they overwhelmingly focus on misconduct rather than instructional

guidance. The absence of clear standards creates legal, ethical, and instructional ambiguity, shifting risk downstream to districts and beginning teachers.

If Pennsylvania's institutions are going to meet this challenge, we cannot each build the infrastructure on our own. We need mechanisms for collaboration, shared resources, and aligned expectations that reduce duplication and accelerate progress.

The Consequences of Inaction

The Joint State Government Commission's own January 2026 report on AI in Pennsylvania commissioned by this General Assembly, reached a conclusion that should concern this Committee: stakeholders convened at Penn State last fall — superintendents, teachers, STEM advocates, and workforce experts — identified teacher training on AI use, data privacy, and approved-use policies as the most pressing needs facing Pennsylvania schools (Joint State Government Commission, 2026). They recommended that PDE develop a list of approved AI vendors meeting cybersecurity and data privacy standards, and that schools receive clear guidance before being asked to act. That guidance does not yet exist in a form that reaches teacher preparation programs. The people preparing Pennsylvania's next generation of teachers are being asked to solve a problem the state has not yet equipped them to solve.

The stakes of delay are not abstract. They are measurable, and they compound over time.

Temple's more than 500 teacher preparation students represent just one institution's pipeline. Across the Commonwealth, thousands of new teachers enter classrooms each year. Every cohort that graduates without structured preparation in AI-informed pedagogy enters a classroom where students are already using these tools — and where districts are left to provide training and guidance that should have occurred during preparation. As Sat (2025) found, if AI attitudes and acceptance are not shaped during preparation, teachers may default to avoidance or prohibition, districts will shoulder remediation costs, and equity gaps may widen as AI-literate teachers cluster unevenly.

The equity dimension of this challenge demands particular attention. Research consistently shows that AI benefits cluster in institutions and communities with stronger infrastructure and funding. Without deliberate intervention, AI may widen existing disparities in teacher preparation and, consequently, in PK–12 education. A recent report by the American School District Panel (ASDP), a research partnership between the RAND Corporation and CRPE noted that "suburban, majority-white, and low-poverty school districts are currently about twice as likely to provide AI-use training for their teachers than urban or rural or high-poverty districts" (American School District Panel, 2024, as cited in Lake, 2024, para. 11).

We cannot afford to leave behind students in challenged districts by taking the path of least resistance and defaulting to blanket bans on AI use. Urban-serving institutions like Temple —

which prepare teachers primarily for Philadelphia and surrounding districts — need the resources to develop and deliver this preparation equitably. All Pennsylvania students need to learn to use AI ethically, responsibly, and critically. As PDE's own endorsement framework recognizes, AI endorsement candidates must be able to "advocate for equitable AI integration in education" (Pennsylvania Department of Education, 2025, p. 6). The goal is for AI tools to enhance learning opportunities rather than reinforce existing disparities — and reaching that goal requires deliberate policy, not optimism.

The longer we wait, the wider the divide grows — between students who have access to AI-literate teachers and those who do not, and between graduates who enter the workforce with AI competencies and those who do not. As the U.S. Department of Education has emphasized, AI systems that are implemented without intentional equity considerations risk perpetuating or amplifying existing disparities, particularly for students from historically underserved communities (U.S. Department of Education, Office of Educational Technology, 2023).

Opportunities for State Action

I recognize that this Committee is convening today to learn, not to legislate. In that spirit, I offer the following observations about where state action could meaningfully accelerate progress.

Invest in faculty capacity, not just frameworks. PDE's endorsement framework is a valuable first step, but frameworks without resources remain aspirational. Multiple studies confirm that AI readiness depends on faculty professional development, institutional support, and sustained investment — not one-time pilots. Competitive grants for AI-integrated curricula, faculty development, and cross-institutional collaboration would directly address the capacity gap that every educator preparation program in the Commonwealth faces.

Create mechanisms for cross-institutional collaboration. No single institution can build this infrastructure alone, and the current siloed approach wastes limited resources through duplication. Promising models already exist at institutions such as Ball State University, Arizona State University, and the University of Northern Iowa, but they succeed only when three conditions are in place: leadership, partnerships, and incentives. Pennsylvania would benefit from funded intermediary structures — such as consortia, shared curriculum repositories, or coordinated professional development networks — that enable institutions to learn from one another and move faster together.

Signal that AI literacy is a priority in teacher certification and program review. Even modest steps — incorporating AI literacy indicators into existing program review processes, recognizing early-adopter programs, or aligning accreditation conversations with AI readiness — would send a clear signal that this work is no longer discretionary. Without state-level expectations, AI preparation will remain optional and inconsistent.

Address the equity imperative directly. Targeted funding and statewide standards are essential to ensure that AI preparation is not concentrated in well-resourced programs while under-resourced institutions and the districts they serve fall further behind. PDE's endorsement framework already recognizes this in its equity-focused competency domains. Policy and funding should follow that recognition.

Pennsylvania already has a model worth building on. The University of Pennsylvania's Graduate School of Education launched the Pioneering AI in School Systems program in late 2024, piloting structured AI professional development for educators and administrators directly in Philadelphia schools (University of Pennsylvania Graduate School of Education, 2024). PaTTAN has developed an AI Toolkit aligned to PDE's Computer Science Standards (Joint State Government Commission, 2026). These are genuine assets — and they are the exception, not the rule. The challenge is that promising initiatives remain isolated and uneven in their reach. What Pennsylvania needs is not more pilots. It needs the infrastructure to take what is working and make it available to every educator preparation program in the Commonwealth — regardless of whether that institution is part of the state system, regardless of its budget, and regardless of its zip code.

Closing

AI is already transforming classrooms. The question before this Committee is whether Pennsylvania's new teachers will be prepared for that reality — or perpetually behind it.

These are not Temple's challenges alone. Every educator preparation program in the Commonwealth is navigating the same terrain. If we have any hope of catching up, we need to leap ahead — together. That requires the kind of collaborative infrastructure, shared standards, and strategic investment that only state-level action can provide.

Thank you for the opportunity to share Temple's perspective. I welcome your questions.

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NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES

Artificial Intelligence in Teacher Preparation Programs

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Updated: *April 2026*

SUMMARY

Teacher learning needs regarding artificial intelligence are twofold: they need to know how to leverage the technology for their own planning, teaching, and grading purposes and how to teach students about the technology and appropriate use. The Center for Reinventing Public Education (CRPE) recently surveyed leaders of schools of education and found that institutions were in the beginning stages of considering the implications of AI on their work, but there was more focus on supporting faculty and preventing plagiarism than on preparing future teachers in AI. CRPE also found that faculty will and interest could pose barriers to fully meet teachers' learning needs regarding AI.

However, there are some teacher preparation programs working on integrating AI education into their coursework and curricula. The Alliance for Innovation in Teacher Education, led by the International Society for Technology in Education (ISTE), includes 65 educator preparation programs working to prepare teacher candidates for AI-integrated classrooms. Additionally, the Council for the Accreditation of Educator Preparation (CAEP) released *Navigating AI in Educator Preparation: Considerations for EPPs*, which highlights how educator preparation programs can thoughtfully integrate AI into their programs.

While a number of states have proposed and enacted legislation regarding in-service educator professional development in artificial intelligence, bills incorporating artificial intelligence into preparation programs have arisen only in a small number of states.

Pending legislation in Connecticut modifies an existing requirement for including computer science instruction in teacher preparation programs to provide that such instruction may include responsible use of emerging technologies. In Iowa, there are multiple pieces of pending legislation addressing teacher preparation in artificial intelligence. All the bills add a requirement that preparation programs include instruction in computer science, artificial intelligence and computational thinking that is appropriate for the grade level and subject area to be taught and require the development and distribution of related guidance. Two of the bills also provide for the creation of a plan to expand statewide computer science and artificial intelligence teacher capacity. In Kentucky, 2024 legislation that failed to pass would have required the department of education to develop guidelines for the implementation and monitoring of artificial intelligence in schools, including recommendations for incorporating artificial intelligence in the standards of teacher preparation programs.

The table below details the recently proposed and enacted legislation pertaining to artificial intelligence in teacher preparation programs.

RECENTLY PROPOSED AND ENACTED LEGISLATION

YEAR	STATE	BILL	SUMMARY	STATUS
2026	Connecticut	CT SB 5	Concerns online safety; provides that instruction on responsible use of emerging technologies may be included within the requirement for teacher preparation programs to include instruction in computer science.	Pending
2025	Iowa	IA HB 252	Requires approved practitioner preparation programs to include preparation in computer science, artificial intelligence, and computational thinking that is appropriate to the grade level and subject area in which the practitioner preparation student will teach, beginning July 1, 2026; allows a practitioner preparation program to satisfy this requirement by requiring completion of a dedicated course or module, or by integrating such preparation into the existing program. Requires the state board of regents to develop and distribute guidance related to how to incorporate preparation related to computer science, artificial intelligence, and computational thinking into the program.	Pending
2025	Iowa	IA SB 2094	Relates to computer science and artificial intelligence instruction; requires publication of a plan to expand statewide computer science and artificial intelligence teacher capacity; provides that when creating the plan, the department must consult with a variety of stakeholders, including teacher preparation program providers; requires teacher preparation programs include preparation in computer science, artificial intelligence and computational thinking that is appropriate to the grade level and subject area for which the candidate is seeking an endorsement. See also 2025 IA HB 2540 (pending).	Pending
2024	Kentucky	KY SB 52	Establishes the Artificial Intelligence in Kentucky's Schools project and requirements for the Kentucky Department of Education to implement the project; provides for the establishment of a Council for Education Technology to assist in development of a master plan; provides that the plan shall include recommendations for needed changes to standards for teacher preparation programs relating to emerging fields of technology and computer science, including AI; provides the recommendations be submitted to the Education Professional Standards Board for consideration.	Failed

ADDITIONAL RESOURCES

- For more information regarding proposed and enacted legislation, see NCSL's Pre-K-12 Education Legislation Database, Postsecondary Legislation Database, and Student Loan Database.

Please note that NCSL takes no position on state legislation or laws mentioned in linked material, nor does NCSL endorse any third-party publications; resources are cited for informational purposes only.

BACKGROUNDER Education

The Promise and Peril of Artificial Intelligence in Education

March 26, 2026 23 min read

Authors:

Annie Chestnut Tutor and Jonathan Butcher

Policymakers and families should scrutinize proposals to adopt artificial intelligence in education, especially when those proposals rely on for-profit educational technology platforms. When powerful technologies are introduced without clear limits, safeguards often arrive too late. As policymakers consider AI in education, they must take seriously the research on harms to children from addictive design features that are common across online platforms. These risks are not hypothetical: They can harm attention, mental health, and learning. Schools should respond with common-sense limitations and clear restrictions instead of assuming that new technology will regulate itself. Protecting children, supporting families, and preserving educational integrity must remain the central goals.

KEY TAKEAWAYS

1 The U.S. Department of Education is seeking to expand "offerings of AI and computer science education in K–12 education."

2 The White House has called on Congress to "protect children," and "empower parents" to manage their children's use of AI.

3 Federal officials will have to distinguish among categories of AI systems, what they do, and their risk profiles and weigh AI's unique challenges and benefits.

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Testimony on Artificial Intelligence in Teacher Preparation Programs in Pennsylvania

Introduction

Hello. My name is Dr. Camille Dempsey, and I serve as Director of the PennWest Center for Artificial Intelligence and Emerging Technologies and Professor of Educational Technology at PennWest University. Thank you for the opportunity to provide written testimony on the role of artificial intelligence in teacher preparation programs across the Commonwealth.

The purpose of this testimony is to share an overview of how artificial intelligence is shaping K–12 education, how teacher preparation programs in Pennsylvania are responding, and why this moment requires thoughtful attention. Artificial intelligence is no longer a future consideration. It is already embedded in the tools, platforms, and systems that teachers and students use every day. As a result, it is directly connected to how we prepare educators to enter the profession. My perspective is informed not only by my work in educational technology, but also by ongoing engagement with educators, institutions, and policymakers across the United States and internationally. Through this work, I have seen a consistent pattern emerge across contexts: the pace of technological advancement is moving faster than the pace of educator preparation. That gap is not unique to Pennsylvania, but it is one that presents both a challenge and an opportunity.

In addition, my perspective is shaped by a conceptual framework I developed known as the Theory of Virtuality Culture, which examines how emerging technologies reshape human presence, communication, and meaning making, often in rapid succession. This framework builds on the work of Walter J. Ong, who described the historical shift from oral culture to written literacy and later to electronically mediated communication. Those earlier transitions unfolded gradually over extended periods, often taking place across multiple generations. In contrast, today's technological shifts, particularly with artificial intelligence, are occurring at a much more rapid pace. The Theory of Virtuality Culture helps explain this acceleration by focusing on how technologies are no longer simply tools we use, but systems that actively participate in communication and meaning making. In many ways, they extend us as humans, expanding our ability to think, create, communicate, and access knowledge, while also reshaping how those very processes occur. With this broader context in mind, it becomes important to consider how artificial intelligence is already influencing educational environments across Pennsylvania.

Overview of Artificial Intelligence in Education

Artificial intelligence refers to computational systems that can perform tasks typically associated with human cognition, such as generating text, analyzing patterns, providing feedback, and adapting to user input. In educational settings, these systems are increasingly embedded in instructional practice and school operations. Across Pennsylvania school districts, educators are using tools that support lesson planning, generate instructional materials, analyze student

performance, and provide real-time feedback. Students are engaging with adaptive platforms that respond to their individual learning needs. At the same time, AI-powered chatbots and agents are becoming more common, allowing students to ask questions, receive explanations, and engage with content in new ways.

As these technologies evolve, their capabilities are expanding significantly. AI agents can plan and carry out multi-step tasks, track learning over time, adapt instruction dynamically, and integrate information across systems. They can simulate classroom scenarios, support research and inquiry, and prompt reflection or next steps in learning. In this way, artificial intelligence is not only assisting with instruction but actively shaping how learning unfolds. As a result, both the role of the teacher and the nature of the learning environment are evolving.

This aligns with findings from the recent Joint State Government Commission report on artificial intelligence, which highlights the rapid expansion of AI across sectors, including education, and emphasizes both its potential benefits and its risks. The report notes that AI is evolving quickly and requires careful consideration of its social, ethical, and educational impacts. As a member of the committee who contributed to the report, I remember discussions on how this would impact PA educators and learners. Viewed through the lens of the Theory of Virtuality Culture, this represents a fundamental shift. Technology is no longer simply delivering information; it is participating in the creation and exchange of knowledge. As a result, both the role of the teacher and the nature of the learning environment are evolving, and teacher education programs need to reflect this evolution.

Current Teacher Preparation Landscape in Pennsylvania

Teacher preparation programs in Pennsylvania operate within a structured system governed by the Pennsylvania Department of Education and the Pennsylvania State Board of Education. These entities establish certification requirements and program approval standards that guide how future educators are prepared. To understand the present, it is helpful to briefly consider the past. Institutions such as PennWest University trace their origins to the normal school movement, where institutions like Edinboro were among the earliest PA institutions founded with the explicit purpose of preparing teachers. From the beginning, teacher preparation in Pennsylvania has been closely tied to the needs of society. As those needs have evolved, so too has the structure and focus of educator preparation. That tradition of adaptation continues today. At PennWest, teacher preparation programs are beginning to integrate artificial intelligence through coursework, faculty development, and initiatives within the PennWest Center for Artificial Intelligence and Emerging Technologies. Pre-service teachers are being introduced to AI-supported instructional tools while also engaging with questions of ethics, policy, and responsible use. PennWest has recently developed and approved a new AI endorsement for educators, designed to prepare future teachers with the knowledge and skills needed to integrate AI responsibly and effectively

into their practice. We are also regularly called upon to provide professional development for in-service teachers, supporting districts across the region as they navigate the opportunities and challenges of AI in education. The goal is not only to prepare educators to use these tools, but to understand how they are shaping the future of teaching and learning.

At the same time, this work is still developing. Across Pennsylvania, there is variability in how artificial intelligence is addressed within teacher preparation programs. Some institutions are moving forward with intentional integration, while others are in earlier stages of exploration. This variability is consistent with observations in the Joint State Government Commission report, which emphasizes the need for workforce preparation and training as artificial intelligence continues to expand across sectors.

In many cases, AI has not yet been systematically embedded into program design. This variability reflects a broader transition. In my work across different regions and countries, I have observed that innovation often begins at the individual or program level before it becomes system wide. From the perspective of the Theory of Virtuality Culture, this moment represents a shift from environments centered on human interaction and tool use to environments where intelligent systems influence communication, authorship, and knowledge construction. Recognizing this shift helps clarify why preparation in this area is becoming increasingly urgent.

Key Issues and Considerations

As teacher preparation evolves, several key issues come into focus. One of the most immediate is the need for AI literacy among pre-service teachers. Educators must understand how these systems function, what their capabilities and limitations are, and how they shape learning environments. Closely connected to this are ethical considerations. Artificial intelligence raises important questions related to student data privacy and confidentiality, particularly when third-party platforms are involved. It also introduces concerns about equity and bias, as algorithmic systems may reflect or amplify existing disparities, as well as topics such as AI detection, data security, and privacy. Accessibility remains essential to ensure that all students benefit from these technologies.

These concerns become more complex as AI systems become more capable. When agents can generate content, provide feedback, and simulate interaction, questions of authorship, authority, and responsibility become less clear. Teachers must be prepared to evaluate AI-generated outputs, guide students in their use, and maintain appropriate instructional boundaries. At the same time, artificial intelligence must be aligned with Pennsylvania academic standards and digital literacy goals. Educators must also be prepared to navigate district-level AI policies, which are developing at different rates across the Commonwealth. Taken together, these issues point to the need for intentional and consistent preparation.

Importance of Addressing AI in Teacher Preparation

Teacher preparation programs serve as the primary entry point into the profession. While in-service professional development is important, it is often uneven and reactive. Pre-service preparation provides a more consistent opportunity to establish foundational knowledge and practices. By addressing artificial intelligence within teacher preparation programs, institutions can help ensure that educators enter the workforce prepared to navigate these technologies. This supports instructional quality and promotes consistency across Pennsylvania's diverse districts. My experiences working internationally reinforce this point. In systems where teacher preparation has proactively addressed artificial intelligence, educators are more confident and more deliberate in their use of these tools. In contrast, where preparation has been limited, educators often rely on trial and error or inconsistent guidance. From the perspective of the Theory of Virtuality Culture, this preparation is essential because educators are now working in environments where technology actively participates in shaping interaction and learning. Without adequate preparation, there is a risk of overreliance on automated systems and a diminished emphasis on human judgment and relationships. These realities highlight the importance of considering how policy can support more systematic integration.

Potential Policy Approaches for Pennsylvania

Several approaches may support this work. One crucial step is the inclusion of foundational concepts related to artificial intelligence within teacher preparation curricula, ensuring that pre-service teachers develop a clear understanding of how these systems function and how they influence teaching and learning. In addition, guidance on ethical and responsible use can help align practice with existing data privacy protections and broader educational values. Providing opportunities for applied learning is also essential, as hands-on experience allows pre-service teachers to engage meaningfully with the tools, they are likely to encounter in Pennsylvania classrooms. Consideration may also be given to whether AI-related competencies should be reflected in certification requirements or program approval standards. Supporting teacher educators through professional learning opportunities will also be critical to ensuring consistent implementation. These approaches represent not just incremental updates, but a coordinated response to a broader transformation in education.

Implications for the Commonwealth

As these efforts are considered, the implications for Pennsylvania are significant. Integrating artificial intelligence into teacher preparation programs can increase the readiness of new teachers entering the workforce and promote greater consistency across institutions. It can also support school districts in implementing AI tools in ways that are responsible, effective, and aligned with educational goals. At the same time, these efforts position Pennsylvania within a

broader national and global conversation. By preparing educators to work effectively with artificial intelligence, the Commonwealth can lead while ensuring that its students are supported in meaningful and equitable ways.

Conclusion

Artificial intelligence is already shaping classrooms across Pennsylvania, and its influence will continue to grow. Teacher preparation programs represent a critical point of entry for ensuring that educators are equipped to respond to this change. Through the lens of the Theory of Virtuality Culture, this moment represents a rapid and significant shift in how communication, knowledge, meaning, and learning are experienced and constructed. The expanding capabilities of AI agents further underscore that teaching is no longer occurring in environments defined solely by human interaction and traditional tools. As the Commonwealth considers policy in this area, continued coordination, review, and stakeholder engagement will be essential. I offer this testimony as informational support to assist in that process.

Thank you for your time and consideration.

Dr. Camille Dempsey