

Executive Summary

Artificial intelligence has rapidly shifted from an emerging educational technology to a transformative force within K-12 teaching, learning, assessment, and school administration. Within only a few years, educators have moved from asking whether AI belongs in schools to determining how it should be implemented responsibly. State agencies, school districts, and educational organizations have responded by developing guidance that emphasizes data privacy, procurement, acceptable use, academic integrity, professional learning, and equitable access.

Convened in response to Senate Bill 1288 (Becker), the California Department of Education's (CDE) Artificial Intelligence in Education Working Group has helped position California as a national leader through the development of the 2023 *Artificial Intelligence Guidance*, the 2024 *Artificial Intelligence Resource Kit*, and the recommendations of the 2025 California Public Schools Artificial Intelligence Working Group.

These efforts at AI in K-12 education policy formation have expanded the state's attention from awareness and responsible use toward governance, professional learning, data privacy, procurement, accessibility, equity, and instructional implementation. They provide an important foundation for helping educators and educational leaders navigate an increasingly AI-mediated future.

These developments constitute meaningful progress. Yet they also reveal a fundamental limitation shared by much of the current AI policy landscape. Existing guidance is increasingly sophisticated about governing AI technologies but remains comparatively underdeveloped in explaining how AI should support learning itself. Discussions of privacy, procurement, bias, accessibility, and responsible use are essential, but they do not fully answer the educational question that ultimately determines the success or failure of AI implementation:

What counts as learning in AI-mediated environments?

As AI becomes more and more embedded within classroom practice, however, California faces a new policy challenge. The central questions are no longer primarily technological; they are educational.

- What counts as genuine learning when AI increasingly participates in thinking, writing, problem solving, assessment, and knowledge production in the lives of K-12 students?

- How should educators distinguish between AI that assists and extends learning and AI that substitutes for and offloads the cognitive work necessary for genuine student development?
- How should schools preserve trustworthy evidence of student growth and understanding of the curriculum while taking advantage of upskilling students who will eventually interact with increasingly capable intelligent AI systems?

These questions cannot be answered through governance frameworks, procurement policies, or acceptable use guidelines alone. They require an explicit educational framework capable of connecting responsible AI implementation to what decades of research tell us about ambitious teaching, deeper learning, classroom assessment, and human development.

California is uniquely positioned to address this challenge because it already possesses one of the nation's most comprehensive systems of continuous educational improvement. Rather than constructing an entirely new AI policy infrastructure, the state can build upon existing systems—including School Accountability Report Cards (SARCs), Local Control and Accountability Plans (LCAPs), the Local Control Funding Formula (LCFF), Learning Management Systems (LMSs), Professional Learning Communities (PLCs), and statewide networks for educator professional learning. The opportunity is not to create additional layers of compliance, but to embed a richer learning architecture within the systems California already uses to improve teaching and learning.

This white paper proposes such an architecture by connecting three complementary components. First, the learning sciences provide the theoretical foundation for understanding how learners develop knowledge, expertise, and agency in AI-mediated environments. Second, the Five Pillars of Practice—Accuracy, Agency, Accessibility, Assessment for Deeper Learning, and Authenticity—provide a learning-centered research-based framework for evaluating whether AI supports meaningful educational experiences (Duckor & Holmberg, 2026). Third, the paper illustrates how AI Review Cycles can provide a practical methodology for transforming educator inquiry into structured evidence that informs instructional improvement, procurement, professional learning, policy refinement, and continuous improvement. Together, these components connect educational theory, classroom practice, and public policy through a common language focused on learning rather than technology alone.

This white paper is intended to support California's next generation of educational leadership as the state's AI policy continues to evolve. While written in response to the rapid emergence of generative artificial intelligence, its recommendations are designed to inform long-term decision making across the California Department of Education, Geographic Leads (Geo Leads), county offices of education, school districts, institutions of higher education, California Subject Matter Projects, professional learning organizations, and other educational partners committed to strengthening teaching, learning, and continuous improvement in the classroom.

Rather than prescribing a single implementation model, the paper offers a learning-centered framework that educational leaders can adapt to their local contexts while contributing to a broader statewide conversation about responsible AI-mediated learning. It argues that the next generation of

AI policy should move beyond responsible technology adoption toward responsible AI-enabled student learning.

Building on California's existing leadership, we recommend **six complementary priorities** for strengthening the state's AI policy infrastructure:

- **Integrate the learning sciences into future AI guidance** by explicitly incorporating concepts such as productive struggle, scaffolding, metacognition, developmental progression, transfer, self-regulated learning, and the Zone of Proximal Development as foundations for evaluating AI-supported learning.
- **Develop practical implementation resources** that operationalize the Five Pillars of Practice through district policy review protocols, classroom observation tools, instructional design resources, facilitation guides, student reflection protocols, and criterion-based evaluation instruments.
- **Embed AI within California's existing continuous improvement infrastructure** by integrating learning-centered AI evaluation into SARC, LCAP, LCFF reporting, LMS platforms, and Professional Learning Communities rather than treating AI as a separate educational initiative.
- **Continue broad stakeholder engagement** by convening educators, researchers, policymakers, students, families, and technology developers to refine a shared vision for AI-mediated education that remains responsive to technological innovation while grounded in enduring educational purposes.
- **Establish a statewide infrastructure for continuous AI learning** through implementation of the Five Pillars of Practice and AI Review Cycles Evaluation Framework, enabling educator inquiry to generate shared evidence, professional knowledge, and continuous improvement across California's educational system.
- **Invest in sustained research-practice partnerships** among teacher educators, preparation programs, school districts, county offices of education, higher education institutions, nonprofit organizations, industry partners, and state agencies to generate robust evidence regarding AI-supported teaching, learning, assessment, accessibility, and student development.

Collectively, these recommendations position California to move beyond governing artificial intelligence toward cultivating a statewide learning system capable of continually improving how AI supports ambitious teaching, deeper learning, educator professional judgment, and student development. Rather than viewing AI policy as a static set of regulations, this paper envisions it as a dynamic process of organizational learning in which educator expertise, classroom evidence, and continuous inquiry become the foundation for ongoing policy refinement.

The next generation of AI policy will not be defined by the sophistication of its technology guidance alone. It will be defined by the extent to which it strengthens the intellectual, social, relational, and professional conditions that make meaningful learning and human development possible. California

now has an opportunity to lead not only in governing artificial intelligence, but also in defining what counts as learning in an age of increasingly capable intelligent systems—and in building the knowledge infrastructure through which educators, policymakers, students, families, and communities can continually improve the ways AI serves ambitious teaching, deeper learning, and the flourishing of every learner.

Selected references:

Duckor, B., & Holmberg, C. (2026). *AI and deeper learning: Promises, paradoxes, and evolving practices*. Harvard Education Press.

Duckor, B., & Holmberg, C. (2026, May, 6). *Designing for agency in AI-mediated classrooms: From cognitive offloading to productive struggle aimed at deeper learning* [Conference presentation]. 2nd Annual AI Futures Symposium: On the Role of Agency in the Age of Innovation in Public Education, Budapest, Hungary.

Duckor, B., & Holmberg, C. (2025). Five pillars of ethical AI use for teaching and learning. *Kappan*, 107(3-4), 14-18.

Recommended citation:

Duckor, B., Holmberg, C., & Ravitz, J. (2026). *From AI adoption to pedagogical practice: A learning-centered framework for evaluating AI policy in K–12 education* (Executive summary; IAEP White Paper No. 2026-01). Center for Innovation in Applied Education Policy, San José State University.