CRPE
REINVENTING PUBLIC EDUCATION

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Getting Beyond the Lightbulb Stage: Why AI Is Not Yet Transforming Education

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Executive Summary

AI has the potential to radically improve how students learn, make teachers' jobs more manageable, and expand access to opportunities like more rigorous and personalized coursework. Already, students use AI regularly, while parents and teachers recognize that AI will shape both the workforce students will enter and the skills they will need to succeed in it. However, many AI-enabled interventions aren't meeting either these present or future challenges. The Center on Reinventing Public Education (CRPE) set out to identify gaps between the supply of AI solutions and stakeholder needs. In other words, where are the gaps between what current AI-powered solutions can provide and what transformative solutions will require?

We conducted semi-structured interviews with more than 50 informed K–12 education stakeholders, including ed tech developers, philanthropists, policymakers, teachers, students, parent and community advocates, and researchers. Across these interviews, we heard that there is a profound mismatch between the supply side, or what AI developers are building for education, and the demand side, or what students, teachers, and systems actually need. New AI-enabled tools are entering schools and classrooms, but they aren't being used to rethink outdated models of scheduling, staffing, or instructional design. Our interview participants told us that they want something more profound than a collection of new AI tools that each address discrete instructional issues.

At the same time, education leaders have not clearly defined the major challenges that they want to use AI to address. Developers are responding to market incentives, but they aren't receiving clear information from the administrators and teachers who will use their tools and supervise student use. The result is a marketplace crowded with "point solutions" that don't move the needle on improving schooling or the education system as a whole.

This is not a technology problem, but a problem of connecting developers with the needs of their users. Our interviews make clear that realizing the potential of AI in education will require action on both the supply and demand sides of the market.

On the supply side, funders and policymakers should focus on fewer and better tools. Ed tech funding should target high-leverage pain points where AI remains under-deployed, including teacher coaching, special education, career pathways, and family communication. Investments should also look to the future, connecting to bold visions for how education could work in radically different ways and solve the most persistent problems in education.

On the demand side, the field also requires more investment in capacity building and change management. Funders and policymakers could organize large-scale networks of states and districts committed to a high bar for quality and a clear vision for what AI-enabled education could become and communicate that vision effectively to ed tech developers.

The field also needs protected spaces for co-design and experimentation, stronger incentives for evidence generation, and clearer policy guardrails so educators know what they can actually do. Taken together, these shifts move AI in education from a collection of point-in-time tools to the foundation of something fundamentally different.

About This Research

The research was exploratory in design, and participants were identified through snowball sampling and selected for their knowledge of AI in education. We were not seeking a statistically representative sample but rather a wide range of perspectives from stakeholders who are deeply engaged in the field. We included participants with different roles and backgrounds to better understand the dynamics, opportunities, and gaps in the current AI marketplace. However, almost all interviewees saw a clear role for AI in schools. The insights that surfaced reflect what is working, what is not, and what may be getting in the way for stakeholders who are generally supportive of AI in education.

Findings

Lack of Vision, Poor Integration, Misguided Incentives, and Underlying System Design Issues All Contribute to Misalignment

According to our interviewees, the gaps limiting AI's impact are not primarily technical. Instead, they reflect deeper structural issues related to a lack of vision, poor implementation in the classroom, misguided incentives for developers, and underlying issues with the education system's design. While some early adopter schools and districts are experimenting with AI-enabled school redesign, many of these efforts struggle to scale or translate into coherent, systems-level progress.

1. Tool Obsession Without A Broader Vision

Interviewees expressed frustration that the education sector is overwhelmingly focused on individual AI tools rather than on how those tools fit into a larger strategic vision. The sense that the field is over-tooled and under-visioned came up repeatedly.

> ***"Funders are WAY too focused on tools… We need more investment in capacity and change management."***
>
> ***"We are likely over-tooled and over-solutioned at the moment."***

Beneath these critiques was a concern that the field has not clearly articulated what issues in education AI should help address or how to define success. Districts often express their desire for short-term, efficiency-driven solutions (for example, "How can AI make teachers more productive today?") rather than for solutions oriented toward fundamentally rethinking workflows and learning experiences.

> ***"People design based on what they have, but they don't actually change based on how the tech will change the world. You could say, 'How does AI help me teach seventh -grade math?' Or you could say, 'Should there even be seventh-grade math?'"***
>
> ***"The problem is structural. They are not designing for a structure that is any different than what we have today."***

Several interviewees observed that leaders in other industries are using AI to reconsider foundational processes and structures, while education leaders debate whether to allow students to use chatbots. The irony was not lost on our interviewees: The sector most responsible for preparing young people for the Age of AI is among the last to engage with the technology's transformative potential.

> ***"Companies are remaking how they structure their systems. Over here in education, we're talking about chatbots."***

2. Poor Integration into Classrooms and Schools

According to our interviewees, schools and districts rarely integrate AI tools into a coherent instructional strategy, school- or district-wide goals, or existing curricular materials. Instead, these tools are introduced as stand-alone, out-of-context applications.

> ***"Ed tech thinks engagement means balloons, not integration."***
>
> ***"An app isn't a lesson plan. Any tool needs to come with a pedagogy."***
>
> ***"Teachers often have a core curriculum, plus a handful of supplementals, plus products or programs they like, plus tutoring programs down the hall. All might be good, but they don't talk to each other, and the teacher is saddled with the job of understanding how to use all of them together."***

Ed tech companies seem largely unaware of how teaching actually works, heightening implementation challenges in the classroom. Interviewees emphasized that developers design products without understanding how teachers plan, how instruction unfolds, and how tools must fit into an overall teaching and learning strategy. This reflects a structural disconnect between product development and instructional reality, which often leads to shoddy, fragmented implementation.

3. Disconnected from Instructional Science and Evidence

Many interviewees also expressed concern that developers have rushed AI tools to market without grounding them in learning science or empirical research. While AI technology may be in constant flux, the principles of how students learn, including cognitive load theory, productive struggle, and feedback timing, have not changed.

> ***"What's coming out is not necessarily very useful or meaningful to improving learning or may not be grounded in learning science."***
>
> ***"We have decades of research on the science of learning that hasn't gone away; those things are still true. We need to hang on to learning principles and not make it feel so untethered."***

What's more, evidence backing a tool's effectiveness is often an afterthought. Districts and policymakers rarely require developers to invest in rigorous research demonstrating that their products improve learning. And even when evaluative systems are in place, they cannot keep up with AI's continuous evolution or what is happening on the ground. Adoption decisions are made based on peer district recommendations, vendor claims, or urgency, rather than research on what improves learning, for whom, and under what conditions.

> ***"Show me the research… that interacting with this chatbot is going to be better than research-based best practice."***
>
> ***"We're back in the days of 'the district next door is using X, so it must be good.' There's not a lot of science or data to inform those decisions."***

4. Misaligned with Education's Core and Future Challenges

Our interviewees identified a misalignment that went much deeper than the tensions around classroom integration: AI tools are not designed to address the most pressing problems in education today or to prepare students for the radically different future they will face as adults.

Interviewees pointed to major issues on the demand side, such as students' lack of motivation, decreased social connection, and increased chronic absenteeism, as well as staffing shortages, outdated high school models, and low expectations, that current tools largely ignore. In particular, several interviewees noted that most AI products are not designed with underserved students in mind.

> ***"The biggest problem is that students don't like school."***
>
> ***"AI tools are all about self-help, not human help."***
>
> ***"It's abundantly clear that young people need more social connectedness, social support, PERIOD."***

On the supply side, market incentives push developers to build products that attract buyers, not necessarily products that solve schools' problems. Districts reinforce this pattern when they make purchasing decisions based on relationships with vendors rather than on a clear analysis of instructional needs.

Looking ahead, interviewees expressed concern that the conversation about what students should know and what skills they should have in an AI-saturated economy has barely begun. The workforce and civic demands of the coming decades will require creativity, collaboration, good judgment, and adaptability, which are all capacities that our current system does not prioritize.

> ***"We're not talking at all about what we should or should not be teaching in the age of AI."***
>
> ***"If we want creative and collaborative people, we can't keep putting them through a factory."***
>
> ***"[AI] breaks the mold of the education system. We have a system that was meant to be for factory workers, and we now have a tech that can do that in seconds. What does that mean for the future of work?"***

5. Tools Layered onto an Outdated Delivery Model

The most fundamental gap is that AI tools are being layered onto an outdated education delivery model when they should be used to redesign that model instead. Grade-level standards, accountability systems, staffing structures, and scheduling norms, for example, all constrain what AI can do, and current investments are reinforcing those constraints rather than working to upend them.

> ***"We are hyper-focused on reinforcing the traditional structure of the school building, delivering content in the structure and methods that we've always used. But what are the opportunities to expand our definition of how teaching is done?"***
>
> ***"The worst idea is that we get tools in place that reinforce the current education structure."***

Interviewees also pointed to the limiting effect of sparse or contradictory policy guidance. Without clear direction from states and districts, educators are reluctant to experiment, even when they see potential. This absence of vision at the top creates risk aversion throughout the system.

> ***"Young people are playing with AI and using it all the time, but educators don't feel safe or empowered to innovate."***
>
> ***"We have all these district schools that don't have the direction to do what's needed."***

Capacity is also a critical constraint. Most schools and systems do not have the internal expertise to evaluate AI tools, build coherent implementation strategies, or think seriously about how AI could reshape what teaching and learning look like. Without investment in this infrastructure, even the best tools will underperform.

> ***"You have to have internal capacity to even conceptualize the infrastructure and the stack. There's a MASSIVE gap between what's needed and what schools currently have."***
>
> ***"There aren't enough true AI experts to go around. This is a non-intuitive domain. One IT person moonlighting is not enough—we need investment in capacity rather than tools."***

6. Rushing Ahead Without Bringing Teachers, Students, and Families Along

Students, parent advocates, and teachers see AI's potential, but they also have concerns about trust and accountability issues surrounding the technology's use. Students emphasized that they must be able to contest AI-generated grades. Parent advocates wanted to know who would bear responsibility when something went wrong. Teachers expressed frustration at being excluded from the design process and cautioned that listening only to students or only to teachers would lead to predictable failures.

> ***"I wish there were more teachers that were being asked what they want from these platforms."*** **-Teacher**
>
> ***"If they just listen to teachers, they are going to get it wrong. If they just listen to students, they'll get it wrong. We've really got to find a balance—and let's make sure that we don't ignore the equity issues."*** **-Teacher**

> ***"I didn't consent to my kid being exposed to AI just because they're on a Chromebook."*** **-Parent Advocate**
>
> ***"We're not against it, but if something happens… who is responsible? Don't just tell me the algorithm."*** **-Parent Advocate**
>
> ***"AI is exciting and growing fast, but education has been around for thousands of years… Before we rush new regulations, we should be clear about how we actually want AI used."*** **-Student**

Families and advocates do not want to be left out of the conversation. They are frustrated that schools and districts rarely consult them on basic issues like privacy and safety. But parents are not just raising concerns; they also have ideas about the issues that they want AI to address. If schools fail to involve families, then they miss an opportunity to solve the problems that affect families the most, and backlash against the technology is more likely.

AI in Education: Stuck in the Lightbulb Stage

Our findings suggest that AI in education is still in its "lightbulb stage." Electricity was first introduced into factories to make them brighter and safer. Dramatic productivity gains came later, when businesses fundamentally rethought how factories were organized and operated. The lightbulb was not the transformation; it was a precondition for imagining one.

AI in education today looks similar. Tools are making some existing tasks, like grading, lesson prep, or communication with families, faster or easier, but the fundamental structure of schooling remains untouched. Interviewees did not dismiss these efficiency gains, but they were clear that they represent only a fraction of what is possible. The real opportunity lies in using AI to ask harder questions about what school is for, who it serves, and how it should work.

> ***"The work in AI space feels piecemeal-y and point-in-time, but if you squint, you can see pieces contributing to a reimagined future."***

Recommendations

Moving beyond the lightbulb stage requires action on both the supply and demand sides of the market. The following recommendations are directed primarily at funders and policy influencers, who have the greatest leverage to shift incentives, set direction, and build the infrastructure that the field currently lacks.

1. Invest in Capacity and Coherence, Not Just Tools

The most consistent message from interviewees was that the field needs investment in the human and organizational infrastructure required to use AI well (as well as fewer and better tools). This means hiring AI experts who can help districts and schools integrate existing tools into their priorities, assemble district-level strategy and implementation teams, and provide principal and cabinet-level training.

> ***"If every school in America had a director of AI and a team that does training and strategy, and creates structures to think about how AI could transform, every kid would be better off."***

The field also needs new, coherent, whole-school designs that can serve as models and test beds for future-ready schools. Such designs should not be built around AI, but around a vision for what students and families want and need to thrive in the age of AI. The principles designed by CRPE's Think Forward Fellows could serve as a north star.

2. Create Powerful Signals to the Market to Drive Quality and Support Instructional Strategy

Districts and funders need clarity on which problems they are trying to solve before turning to AI. To achieve that clarity, they should invest in root-cause analysis, use smarter procurement tools (like well-designed RFPs and policy guidelines that send clear signals to developers), and work with major markets (like districts in New York City or Los Angeles).

> ***"Can we drive versus being driven? That would require a tectonic shift in our approach to education."***
>
> ***"Right now we ask for dreamy, wishy things."***

3. Target Key Pain Points Where AI Can Reduce Friction and Enable Transformation

Funders and policymakers should redirect investment toward specific areas where AI is most likely to reduce the burden on educators and improve outcomes for students. Some immediate pain points include teacher coaching and feedback, scheduling, formative assessment, and family communication.

> ***"We could revolutionize special ed with AI."***
>
> ***"Start by asking teams what they need for scheduling, feedback, communication."***

There are also high-leverage pain points where AI is under-deployed, and the potential gains could be significant. These include matching teachers in teams based on complementary expertise, remaking high school schedules from the ground up rather than optimizing existing ones, helping families navigate school choice and advocate for their kids, and improving student mental health and peer connection.

4. Create Pilot Spaces and Co-Design Opportunities

The field needs protected spaces where educators can experiment, fail safely, and learn together. Several interviewees referred to these spaces as "design environments where teachers can play." Funders and intermediaries should support co-design labs that bring together diverse teams of teachers, students, families, developers, and researchers to build and test tools grounded in instructional needs. Rapid-cycle pilots with built-in feedback loops can help the market learn faster. Funders should support whole-school design efforts and communities of practice where educators can learn what is possible.

5. Incentivize Evidence Generation

The evidence base for AI in education is thin, and developers have few incentives to build it. Funders should require and support context-based research alongside product development, create shared infrastructure for gathering and sharing evidence, and reward developers who invest in rigorous evaluation. Researchers need to engage with developers earlier in the design cycle to shape products proactively, rather than just waiting to evaluate them after the fact.

> ***"We need principles that don't let us forget the science of learning and student and educator experience."***

6. Clarify Policy Guardrails

States and districts need to move from silence or confusion to clear, affirmative guidance that tells educators what they can (and cannot) do with AI. Without this clarity, innovation stalls.

> ***"The lack of clarity from county offices, intermediaries, and states makes people throw up their hands and not want to engage because they don't know what the touch and don't-touch buttons are."***

Policymakers should engage educators, parents, and students in developing policy. They should also be explicit about equity expectations, including which students should benefit and how progress will be monitored.

Conclusion

AI presents a genuine opportunity to address some of education's most stubborn systemic problems and to reimagine schooling for a very different, AI-powered future world. But that opportunity is quickly passing us by. The market is misaligned, the vision is absent, and the infrastructure to use AI well does not yet exist in most schools.

Closing these gaps will require more than better products. It will require funders willing to invest in capacity rather than just tools, policymakers willing to lead rather than react, and an education field willing to ask harder questions about what schools are for and what students actually need. The obstacle is not technology itself, but rather finding the courage to use it for true transformation.

CRPE will continue to track these developments and support the field in moving AI in education from the lightbulb stage to more consequential, coherent implementation. We welcome dialogue with funders, policymakers, and practitioners who share this urgency.

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About the Center on Reinventing Public Education

The Center on Reinventing Public Education (CRPE) is a research organization at Arizona State University's Mary Lou Fulton College for Teaching and Learning Innovation, where transformative ideas are rigorously examined and tested, and research informs action. Since 1993, we have remained independent of any single ideology while holding firmly to our core belief that public education is a goal—to prepare every child for citizenship, economic independence, and personal fulfillment—and not a particular set of institutions.

From that foundation, we study what it will take for public education to meet every student's needs and use those insights to inform meaningful changes in policy and practice. Learn more at crpe.org.

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