An AI Aspiration for Education

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IMAGINE IF...

.... Individualized learning could help every teacher help every student reach their full potential

Today

Fifty million students rely on the United States' K-12 schools for an educational foundation for life. A poor education can lead to cascading lifelong impacts and decreased future employment prospects. Unfortunately, lack of access to a high-quality education is disproportionately experienced by many of our most marginalized students—including low-income students, students with disabilities, students from rural communities, and students of color. And now, the pandemic has left students in critical need of intensive support across all grade levels. In reading and mathematics, students are scoring at the lowest level since the 1990s.

Schools face several barriers to addressing the wide range of student needs, many of which have intensified in recent years. Due to constraints in personnel and resources, schools are designed to deliver instruction to intact groups of approximately 20 to 30 students. Teachers rarely have the time necessary to individualize instruction across all of their students. Even among students with disabilities, who are required by law to receive instruction tailored to their instructional needs, schools have difficulty dedicating sufficient resources to fulfill their obligations. In short, even though American society relies on schools to prepare students as citizens and for the workforce, schooling in the U.S. has not achieved what is demanded of it.

For decades, educational technology has offered the potential to improve outcomes across the board. But despite some progress and many billions of dollars spent by schools to buy EdTech products, this promise has not been realized at a scale necessary to achieve America's educational objectives for all students.

AI opens the door

Advances in AI technologies present new opportunities to personalize education to meet students' specific strengths and needs in real time and to alleviate demands on teachers' time. The EdTech industry has already produced tools that could reduce the burden for educators by helping to create lesson plans, generating high-quality, high-interest readings, offloading time-consuming but non-essential tasks, and more. EdTech providers are now drawing on generative AI to optimize instruction for individual students. Perhaps most promising, personalized feedback is increasingly common through adaptive, intelligent tutoring systems and has been demonstrated in non-profit and commercial technology offerings.

These advances dovetail with opportunities presented by research on student learning in school contexts. High-dosage tutoring—where students receive individualized academic goals and immediate, targeted feedback—ranks among the most effective interventions for supporting student learning across a range of student populations. We have developed high-quality evidence on the most effective school-based approaches to supporting student skill development in key academic and social-emotional domains.

The work ahead

EdTech's use of AI techniques doesn't by itself address the longstanding barriers to schools and educators adopting and implementing new tools to achieve better outcomes for their students. Teachers and school districts face an overwhelming number of options. But few proven methods or metrics exist by which to evaluate their choices. This adds to the ongoing set of challenges in ensuring the privacy of student data, mitigating bias, increasing the quality and accuracy of information generated through AI, and promoting fairness in how AI is employed.

To achieve the promise of AI for K-12 education, we must:

- Establish clear guidelines that schools can use to buy and implement new EdTech tools and systems with confidence about privacy, safety, fairness, and transparency.
- Provide robust evidence of the impact of widely-used or promising AI-enabled EdTech on student outcomes, through timely, high-quality evaluations that show which tools work, for whom, under what conditions, with what forms of implementation (including professional development).
- Ensure the availability of resources that allow all schools to leverage the promise of AI technologies.

These efforts can build upon established and impactful current programs, including the rigorous evaluations of educational practices provided by the Department of Education's Institute of Education Sciences.

This undertaking must recognize and address key issues in the K-12 environment. One is the concern that technology will displace authentic relationships between teachers and students, or between students and other students. Meaningful evaluation will include assessing how new tools change these important personal relationships.

The other is the fact that educators, researchers, and EdTech providers each have important roles to play. Educators understand the reality of the classroom, students' needs, and school systems. Researchers deliver evidence about educational programs, policies, and practices, and try to mobilize this knowledge into schools. Software developers work to fill needs in the school market and scale approaches. For assessments to be useful and effective, active collaboration among these actors will be essential.

Major hurdles and societal risks

Because EdTech providers are already active in using AI to improve their products, the greatest hurdles in this AI Aspiration relate to evaluation and adoption. EdTech tools and systems are numerous and varied, and schools and educators represent a wide range of resources and backgrounds. Students' capabilities, interests, motivations, backgrounds, and contexts vary significantly. To be meaningful and useful, assessments will need to conducted thoroughly, carefully, and at scale. That will require significant effort and resources.

The evaluation and adoption of EdTech must be done with a strong focus on managing risks to privacy, equity, and the educator workforce.

The power of AI comes from data, and private data about students will be extremely valuable in achieving individualized learning. But as these systems leverage data on students across a wide range of sources maintained by schools and districts, privacy must be closely protected. Safeguards against data breaches or inappropriate uses of these data will be of paramount importance.

The quality of schooling that a student receives is largely dependent on the circumstances surrounding where their family happens to live. There are over 13,000 school districts in the United States, and their staffing, funding, and resourcing levels are highly variable. Effects of the pandemic have been most pronounced among students from low-income families and among students of color. New technologies and tools glimmer with

the promise of easing inequities, but long experience shows that is only possible with a deliberate and constant focus on reaching all students, not just those who are already well off.

If the implementation of new educational technologies does not reduce the current burdens placed on educators—or worse, exacerbates the challenges on their plates—then an additional risk will be the negative impact on the stability of the educator workforce. Across the country, states are facing increased numbers of teaching shortages, driven simultaneously by attrition due to negative working conditions in schools as well as decreased enrollment in teacher preparation programs. The perceived prestige associated with teaching as a profession is at the lowest level in decades. We must ensure that AI is used as a tool to uplift and support students and teachers, rather than cause additional burden.

A transformative national capability

If we can achieve the long-sought promise of technology for K-12 education in this time of AI, we would see progress across the country, especially in the schools that have historically had access to the fewest resources. Students with disabilities and English learners would achieve far better outcomes. Fewer students would be chronically absent and fewer would drop out as learning engaged them and kept them focused on school. More students would pursue the college degrees and advanced schooling that open more possibilities, and the United States would increase its status as an international leader in education. Most important of all, America's children would be prepared to navigate and succeed in the complex future that lies ahead.