7. Unfulfilled Promise

The Forty-Year Shift from Print to Digital and Why It Failed to Transform Learning

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Executive Summary

The shift from print to digital is the most significant change in how human beings learn since the printing press. It marked a shift from information scarcity to abundance, a shift from searching to sorting. It changed what, how, and where people learn, and not always for the better. Social media feeds displaced newspapers. YouTube videos became the world's instruction manual. In American schools, the shift to digital learning was gradual, uneven, often chaotic, expensive, and even while there was observed improvement in engagement, largely ineffective at boosting traditional outcomes.

By 2022, American elementary and secondary schools were spending about $44 billion annually on education technology (edtech) and related training, adding $750 per student and more than 4 percent to school budgets. Over the forty-year shift, there was limited growth in basic skills (which was all lost during the pandemic) with some observed benefits to learner experience. New schools, particularly those in managed networks, appear to be the best examples of scaled technology-enhanced learning models implemented with fidelity and achieving strong results.

The shift to digital learning was marked by four phases: computers in the back of the room, the introduction of the World Wide Web, the rise of blended learning, and remote learning. The rise of generative AI in 2022 marks a new era of human–computer interaction.

This chapter identifies challenges in the adoption of technology-enhanced learning and makes recommendations for system leaders and policy makers.

- The shift from print to digital remade society, including the educational system.

- Hopes that tech would revolutionize public education have failed to be fulfilled.
- But there are ways to use technology to enhance learning that educators would be wise to adopt.

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FOUR DECADES OF TECHNOLOGY ADOPTION

The historic shift from print to digital learning in US schools happened gradually over four distinct decade-long periods. These were marked by important developments in hardware and software, curricula and assessment, connectivity, public policy, and new learning models.

1983–1993: BACK OF THE CLASSROOM

A Nation at Risk, the 1983 report by the National Commission on Excellence in Education, was a clarion call for education reform and a driver of the standards movement, but it was silent on technology-enhanced learning.[1] Ironically, 1983 was also the year the Apple IIe catalyzed the first wave of classroom integration and adoption, despite being largely relegated to a supplemental role in the back of classrooms. Word processing and spreadsheets became widely used in business and could occasionally be accessed by secondary students in computer labs. Web browsers accessed static information but gave a few teachers the sense that we were moving from information scarcity to a new age of information abundance.

1994–2004: WELCOME TO THE WEB

The World Wide Web appeared in 1994, giving rise to dynamic, user-generated content and interactive web applications. Schools began developing web pages, educators started blogging, and school systems began communicating with email and web applications.

The US Department of Education established the Office of Educational Technology in 1994 and two years later published the National Educational Technology Plan, which outlined a vision for technology-enhanced learning. Congress created the $2 billion Technology Literacy Challenge to promote the integration of technology into teaching and learning and the E-Rate program to provide discounted internet access and other telecommunications services.[2]

The first one-to-one laptop programs started in Australia in the early 1990s and inspired the Microsoft-sponsored Anytime Anywhere Learning initiative, which in 1995 helped ten school districts implement the blended and personalized learning model and inspired Maine (2002) and Michigan (2003) to sponsor one-to-one initiatives.[3] The advent of learning management systems and web-accessible curricula, meanwhile, paved the way for statewide online schools including the Internet Academy in Washington State (1996) and the Florida Virtual

School (1997). A few years later, K12 and Connections Academy began supporting virtual schools in most states.

In 1998, responding to the explosion in digital content and communication, Congress updated copyright laws and passed the Children's Online Privacy Protection Act, requiring websites and online services designed for children younger than thirteen to obtain parental consent.[4] This was followed by the Children's Internet Protection Act, which added federal funding for libraries.[5] The Collaborative for Academic, Social, and Emotional Learning (CASEL) published guidelines for social and emotional learning in 1997.

Two project-based networks launched in California in 2000: High Tech High and New Tech Network. In addition, the NewSchools Venture Fund began accelerating the development of high-quality charter management organizations incorporating early blended learning models. And in 2001, the No Child Left Behind Act (NCLB) expanded federal oversight in public education, including annual testing provisions focused on grade-level proficiency. NCLB had the unintended consequence of reinforcing a time-based system of age cohorts and dampening developments in personalized and competency-based learning.

2005–2015: THE RISE OF BLENDED LEARNING

Expanding access to computers, digital curricula, and broadband connectivity accelerated the adoption of blended learning models that combined face-to-face instruction with online learning to create more flexible and personalized learning. In 2008, Clayton Christensen, Curtis W. Johnson, and Michael B. Horn published the blended learning treatise *Disrupting Class*, and a trio of North Carolina school districts—Henrico, Mooresville, and Charlotte-Mecklenburg—showcased technology-enhanced learning. In 2009, the International Association for K–12 Online Learning (iNACOL) shifted its focus to blended and competency-based learning.

Google Apps for Education launched in 2007, and the free suite of productivity tools quickly displaced several categories of premium products. In 2011, Google introduced Chromebook, an inexpensive, cloud-first mobile computer ideal for secondary school use, and four years later it commanded a 40 percent market share.[6] In 2014, Google added Classroom, a free assignment manager, and it quickly became the most widely used learning platform. These tools accelerated the adoption of blended learning but dampened private investment in developing premium tools.

In response to the Great Recession (2007–2009), the federal government passed the 2009 American Recovery and Reinvestment Act, which included several education technology programs and more than $10 billion to increase connectivity and innovation. State adoption of the Common Core State Standards gave rise to the development of two testing consortiums in 2010. High-stakes testing monopolized the next decade of US public education. The focus on grade-level proficiency was so strong that adaptive curriculum providers, which had focused on personalized growth, repackaged their applications into grade-level bundles to improve test scores.

Thirty years after venture investments began powering Silicon Valley innovation, edtech venture investment began expanding with the formation of six impact-oriented edtech venture funds between 2008 and 2015. Notable venture-backed startups included ClassDojo, Clever, Edmodo, Schoology, Kahoot, Duolingo, DreamBox, and EVERFI. In postsecondary learning, 2012 was the year of Massive Open Online Courses (MOOCs) with the launch of Coursera, Udacity, Udemy, and the nonprofit edX.

Blended learning matured in the 2010s with large urban school districts deploying a portfolio strategy and new and improving schools scaling in networks. Led by Dr. Terry Greer, Houston's PowerUp initiative was a frequently cited example of coordinated deployment of blended learning models, connectivity, hardware, and professional learning. In Denver, then superintendent Tom Boasberg scaled innovation networks and charter networks.

2016–2023: REMOTE LEARNING AND BEYOND

The modern whole-child movement was codified by the Science of Learning and Development (SoLD) Alliance beginning in 2016 with an outcome framework and design principles. Battelle for Kids began encouraging school districts to create a Portrait of a Graduate, embracing broader learning goals.

Private equity became a visible force in edtech in 2015 when Vista Equity acquired PowerSchool. Hundreds of edtech startups were acquired in the next five years, sometimes leading to integration but also encouraging more startups. By 2023, school districts were accessing almost twenty-six hundred different edtech applications.[7] In the school-adjacent space, Microsoft launched Minecraft Education, and FIRST Robotics, VEX
Robotics, LEGO, and Tynker all scaled.

Around the edges of the economy and education, Web 3.0 gave rise to distributed ledger technology including blockchain and decentralized autonomous organizations (DAOs) and token-based economics. Learning and Employment Records (LERs) are the only distributed ledger technology with traction and the likelihood of scale in education.

By 2019, connectivity advocates declared victory as nearly every school in America had broadband access, and there was close to one device for every learner.[8] However, a year later, the quick shift to remote learning during the COVID-19 pandemic laid bare that at least 15 percent of US households with school-age children did not have a high-speed internet connection at home.[9] The pandemic provoked several rounds of massive federal investment including roughly $150 billion for supporting safe distance learning and connectivity.

The sudden shift to remote learning that occurred in most US school systems in 2020 illustrated that only a small percentage of public systems had well-developed digital learning models with one-to-one take-home technology. Those systems flipped quickly and efficiently to remote learning and experienced limited learning loss. The majority of school systems struggled to equip learners with devices and digital-first instruction. Remote learning also brought on a decline in the mental health of students as a result of COVID restrictions,

addictive use of social media, pressures to perform on traditional measures at school, as well as a context of violence and climate crisis.

As bad as the pandemic was for teaching, learning, and mental health, remote delivery may have been a tipping point for anywhere, anytime learning and teaching in teams on common platforms with shared resources and strategies. The return to physical school buildings in the 2022–23 school year may also have been a tipping point for a whole-learner focus with broader measures of success and stronger systems of support.

Most recently, in the fall of 2022, free generative artificial intelligence (AI) applications were released to the public. Global use exploded, as did speculation about implications for work and learning. High school and college students quickly began using AI chatbots to write essays and get help with homework. Teachers went back to school in the fall of 2023 with many unanswered questions about how and when generative AI would be used and how it would change expectations, assignments, and assessments.

LIMITED MEASURED BENEFIT FROM TECHNOLOGY ADOPTION

The forty-year shift from print to digital learning was gradual, chaotic, expensive, and largely ineffective at transforming learning experiences and outcomes. In most cases, computers were added slowly and opportunistically to schools with a mixture of teacher adoption and phased systemwide initiatives. Computers were purchased with surplus funds, grants, and periodic bursts of public funding, often without a plan or professional development. There was tremendous variation in the use of technology, even within schools, with few models of transformed learning at scale and a great deal of digitized twentieth-century pedagogy. When the pandemic forced systems to switch to digital learning, it was an unmitigated academic disaster for all but a few well-prepared systems.

Despite this, total K–12 edtech spending in the United States is about $40 billion per year.[10] Technology-related professional learning adds approximately $4 billion more annually. About $38 billion of that is spent by public schools, with a breakdown of roughly 4.4 percent of total expenditures (capital and operating) and about $750 per student.

With nearly every school in the country connected to the internet and 94 percent reporting that they provide a laptop or tablet for learners, almost every school has some degree of blended learning.[11] Despite the near ubiquity of technology, there has been limited aggregate improvement in basic skills over the past thirty years, and most of the incremental gains were lost during technology-based remote learning.[12]

An evidence review of technology-enhanced learning found that technology largely failed to improve learning outcomes with the exception of some positive results for computer-aided learning in math, including trials with ASSISTments, Cognitive Tutor, and DreamBox Learning.[13] Most elementary schools have subscriptions to personalized reading and math software, and

all of the vendors tout research backing and evidence of results. However, after decades of investment, the lack of improved reading and math scores at scale is complex (as discussed below), but the core problem appears to be a lack of use. A pre-pandemic survey showed that of the annual $12 billion investment in learning software, only 16 percent of the licenses had high-fidelity use. Another study showed that 67 percent of software products went unused.[14]

In addition to boosting topline performance, technology adoption in most sectors aims to improve labor productivity. While blended learning models have the potential to improve productivity, labor savings were seldom a stated goal in education. In fact, student-to-teacher ratios have declined since 1990, adding the equivalent of four teachers to a typical elementary school.[15] Staffing increases were likely not caused by the adoption of technology, but technology has added at least 5 percent to the cost model with no observed improvement in labor productivity.

WIDELY APPRECIATED BENEFITS

While technology has not transformed most systems, educators have come to believe that digital learning tools are integral to teaching and learning. A pre-pandemic Gallup study showed at least eight in ten teachers and nine in ten administrators strongly agree or agree that they see great value in using digital learning tools in the classroom.[16] Despite some signs of a post-pandemic technology backlash, a 2023 study showed the same level of educator support for edtech.[17]

There are at least six areas of widely appreciated benefit of technology-enhanced learning:

- Engagement: Students may be more engaged and motivated when learning with technology.[18] Opportunities include learning games, simulations, virtual reality, and maker tools.

- Personalized learning: Edtech can provide personalized learning experiences that give students voice and choice and allow students to control the pace and place of their learning by supporting both synchronous and asynchronous learning experiences.[19]

- Project-based learning: When students explore real-world problems through individual and group projects, it allows them to make sense of why content is useful and how it might be applied. Rigorous project-based learning has a strong effect on student achievement.[20] Inquiry and project-based learning in higher education is often called "active learning," a field of study with more than twenty years of supporting research.[21]

- Employment skills: Technology-enhanced learning can develop job skills including spatial reasoning, abstraction, data visualization, content creation, and project management. It is central to delivering computer science and information technology

pathways including software development, cloud computing, network engineering, and machine learning.

- Pathway access: Online learning extends career exploration opportunities and the availability of career-related courses and college credit courses.

- Persistence: The combination of more engaging learning experiences, more learning options, and data-informed support systems appears to have contributed to improved persistence and graduation rates. These have improved by 20 percent in the past twenty years.

NETWORKS OF NEW SCHOOLS SHOW LEARNING AND STAFFING PRODUCTIVITY

In 2010, Project RED observed that "effective technology implementation in schools is complex, with hundreds of interrelated factors playing a part." The study concluded that blended learning works best when each student has a personal portable device and when teachers base instructional practice on digital resources. They identified nine implementation factors and said system and school leadership were key to developing a strong plan with aligned components. With strong implementation, Project RED observed improvement in eleven success measures.[22]

The most promising developments in technology-enhanced learning are networks of schools that were developed as blended learning models with shared platform resources, a mobile device for each student, and high-fidelity deployment. The largest and best examples of high-quality school development are charter management organizations including Alpha, Aspire, ASU Prep, Green Dot, Harmony, IDEA, KIPP, Summit, and Uplift. They have been recognized for their academic performance and operate with less funding than traditional public schools.[23]

New York City is another example of high-quality new-school development. Between 2002 and 2008, the school district closed twenty-three large failing high schools where fewer than half the students graduated and opened more than two hundred new small schools in networks including Urban Assembly, Outward Bound, New Visions, and Internationals. The new schools featured personalized and project-based learning and showed dramatically higher achievement levels and graduation rates than both the schools they replaced and the schools serving comparable populations.

During the pandemic, a dozen or so quality online schools served full- and part-time learners, often in partnership with local school districts, with better-than-state-average achievement levels. These online schools include Florida Virtual, ASU Prep Digital and Khan World School in Arizona, GEM Prep in Idaho, and VLACS in New Hampshire. New schools create an

opportunity for the coherence of goals, learning models, tools and materials, staffing and professional learning, schedule, structure, and systems.

WHY TECHNOLOGY ADOPTION WAS CHAOTIC AND INEFFECTIVE

Education is not the only sector that struggles with effective technology adoption. Global business investment in information technology is nearly $5 trillion annually. An EY study showed that three out of five companies do not know how much they spend on technology or what value it yields. To address the problem, the majority of business leaders are centralizing their investment in technology and are adding programs to measure outcomes.[24] An Accenture analysis concluded that the majority of businesses do not see a return on their technology investments, and just 14 percent of businesses achieve the intended impact of their investments. Businesses that were most successful with their investments were the ones investing in bold moves rather than incremental shifts.[25]

Breakthrough results are achieved in business by new organizations formed around new technologies (similar to the new-school opportunity in education) and by organizations transformed by best practices from what EY called digital leaders, who do the following:[26]

- Establish a strong digital foundation and culture of innovation first
- Focus digital investments on innovation and new products and services
- Align technology deployment, process innovation, and skill building
- Carefully allocate spending tied to milestone achievements

MORE OPPORTUNISTIC THAN COHERENT CAPITAL DEPLOYMENT

Unlike in every other developed nation, public education in the United States is primarily a local affair governed by more than thirteen thousand elected school boards and about five thousand nonprofit boards. Local funding is augmented by a maze of state and federal programs that come with compliance requirements.

Effective technology adoption requires the development of new learning models and coordinated investment in hardware, software, and professional development; however, public schools have limited ability to manage capital expenditures. School districts have taxing authority and may be able to pass a bond for new or remodeled facilities, but (with the rare exception of a technology levy) they rely on surplus funds, special programs, or grants to purchase assets like computers and network equipment. This, along with revolving-door leadership, makes it challenging to plan and execute a multiyear transformation investment strategy.

In addition to local control, education has historically been pedagogically decentralized. In the 1980s and 1990s, most teachers had some degree of pedagogical autonomy. As a result, the first two decades of technology adoption followed consumer rather than enterprise adoption patterns. The rise of blended learning (2005–2015) came with the growth of school networks and leading school districts attempting coordinated systemwide change initiatives. The pandemic flipped the remaining systems to an enterprise approach with common resources on a shared platform and more teaching in teams.

INEFFICIENT EDTECH MARKET

A highly decentralized education system with sporadic funding and a chaotic combination of teacher adoption and systemwide initiatives contributed to weak demand signaling and an inefficient market. Compared to other large sectors of the economy, education research and development has had limited public and private investment. Before the Great Recession, there was almost no venture capital investment in education. It wasn't until 2015 that six active impact-focused edtech funds led to the investment of $3 billion in startups, which is roughly equivalent to the first banner year of technology venture funding in 1978 that launched the information age.[27]

When Google (and later Microsoft) began offering free productivity tools and then a free learning platform, it displaced several existing applications and slowed investment in new platforms. The availability of free tools and weak demand signaling are two of the reasons the sector lacks sophisticated personalized learning platforms. Another reason the market is inefficient is that research is not yet a strong signal to venture investment. Studies on edtech and technology-enhanced learning are in the early stages of building evidence, and most studies are underpowered and not replicated.

Lastly, the marketplace struggles due to limited interoperability and edtech business models that are based on ownership of item-level data. When businesses own student data, they have control over how it is used and shared. This leads to a lack of transparency and accountability, creates conflicts of interest, and dampens innovation. Interoperability and data transferability will be key components of a future fueled by lifelong learning and portable learning records.

LIMITED CHANGE MANAGEMENT CAPACITY

Technology-enhanced learning has added to the complexity of developing and operating modern school models. Small school districts cannot afford or attract the talent necessary to develop or adopt a K–12 digital curriculum, technology stack, and associated professional learning experiences. There are about nine thousand school districts with fewer than twenty-five hundred students, which is too few to manage a technology infrastructure. Solving this will require consolidation or working in shared service networks.

Before 2002, there was little consulting capacity in the sector to support the development of new models or to guide system transformation efforts. By 2006, with philanthropic support, there were half a dozen national consultants, a dozen regional intermediaries, and two dozen scaled, managed, and voluntary school networks that contributed to change capacity.

THE NEW ERA OF AI-ENHANCED LEARNING

While machine learning applications were ubiquitous in corporate computing by 2017, it was the introduction of generative AI tools to the consumer market in the fall of 2022 that marked the beginning of a new era of human–computer interaction, an era that will change how we work and learn and more specifically how we create and share content. It is hard to know what the next forty years will bring, but edtech developments of the next four years should be anticipated and influenced for equity.

As students went back to school in the fall of 2023, generative AI applications (e.g., ChatGPT from Open AI, Bing from Microsoft, Bard from Google, Pi from Inflection AI) were widely available, but few schools had a plan in place for how to use them. Teachers should now assume that content creation (e.g., writing, coding, visual art) and problem-solving outside of class will include AI collaboration. This won't always be the case, as some students will have moral concerns or fears of getting caught, will lack access, or will just find it unhelpful for an assignment. Teachers should ask for disclosure of use and inform students of limitations. The AI detection tools are not worth using.

Built on top of the large language models that power generative AI, personal learning assistants like Khanmigo from Khan Academy provide smart tutoring and pathway guidance. Learning assistants like Project Leo from DaVinci Schools help students build inspired projects while gaining feedback from teachers, professionals, and peers throughout the process. AI-powered teaching and learning assistants will be widely adopted by 2025.

AI changes what we can expect young people to do, the quality of work they produce, and the value they can create. It further reduces the value of hand calculation and increases the need for computational thinking. Conrad Wolfram argues that computational thinking is required in all fields and in everyday living and suggests that "[this approach] is built on actual problems solved by real people in the real world with today's technology. A computer-based maths curriculum should be built around real-world requirements such as data science, information theory, and modeling."[28]

The rise of AI-generated content requires new levels of digital discernment and civic literacy, stressing curation, application, and creation skills. Navigating this flood of synthetic visual and audio content will require applied ethics and a commitment to shared values at the level of the community and the planet. Decisions will become less clear, more frequent, and more impactful.

In addition to changing learning goals and experiences, AI applications will inform student services, improve resource allocation, and benefit talent acquisition and development. AI applications will help make facilities and transportation systems more efficient. They may (as we once believed social media would) improve community learning and help facilitate civic and education agreements. Exponential technologies will also, however, inevitably exacerbate income and wealth inequality.

CREDENTIALS AND LEARNER RECORDS

The post-pandemic labor market is increasingly focused on skills. These are best communicated via verifiable digital credentials. Eight in ten human resources professionals affirm that skill assessments hold equal or greater significance than traditional factors such as degrees and years of experience in their hiring decisions.[29] By 2025, workplace credentialing systems will add durable skills like critical thinking, communication, collaboration, and creativity as well as character skills like fortitude, growth mindset, and leadership.[30]

The three million high school graduates in 2023 earned about two million credentials of varying value. The growth in skills-based hiring and the rise of skills credentialing will result in more high schools, colleges, and workforce preparation programs issuing credentials and supporting the credentialing process for durable skills as well as technical skills. In 2024, hundreds of high schools will begin to credential valuable experiences such as client projects and internships. In the second half of this decade, these new forms of evidence of demonstrated capabilities will begin to replace courses and grades as the primary signaling mechanism for talent transactions, and they will be securely shared via LERs.

In 2022, North Dakota was the first state to adopt a blockchain-based digital credential wallet and provide high school and college students ownership of their records. Although some higher education institutions are adopting LERs, they will only reach their full potential if states make them a public utility. This would allow lifelong learners to capture and communicate capabilities developed within and outside of school and to access offers of scholarship and employment more fully and efficiently.

NEW SCHOOLS

While the largest public school systems continue to decline in enrollment and close schools, more than one thousand new schools will be created by 2027. More than half will be charter schools, and more than half of those will be microschools. More than half will incorporate aspects of new learning models that combine AI-powered personalized skill building and project-based learning. Of the high schools, more than half will focus on new career pathways and will include work-based learning, entrepreneurial experiences, and accelerated credentials achievement. More than half of the high school learners will unlock opportunity with a curated learner record.

RECOMMENDATIONS

Technology-enhanced learning largely failed to live up to its perceived promise as a result of chaotic decentralized adoption, uneven use, and weak teacher supports. Following are five recommendations for system leaders and policymakers to address these challenges and take advantage of the new era of AI-enhanced learning.

1. Encourage school networks. Encourage schools to work together in networks or systems that share a coherent learning model including shared outcomes, experiences, assessments, supports, and professional learning opportunities for educators. Expand high-quality managed networks. Encourage district schools to join voluntary networks like New Tech Network, NAF, Linked Learning, Summit Learning, and CAPS Network. Similarly, schools can join curriculum networks that provide some of the benefits of a whole-school model like EL Education and Project Lead the Way. Small districts can work together in networks like Collegiate EduNation in Texas and SparkNC in North Carolina. Small districts could also consolidate to create enterprise scale.

2. Leverage formative assessment. Streamline performance monitoring and reduce end-of-year testing by aggregating samples of formative assessment data at the state level. This would require schools to belong to an authorized network or district with an assessment system that had demonstrated accurate and consistent tracking of growth as well as proficiency. This lightweight progress monitoring solution could be extended to schools serving students funded through vouchers and education savings accounts.

3. Invest in R&D. Encourage disclosed use of generative AI applications in project authoring and content creation. Pilot AI learning assistants and support systems. Sponsor the formation of AI-forward school networks.

4. Update public learning infrastructure. Ensure that all learners and workers have access to broadband connectivity, learning devices, and statewide learning opportunities. Provision a Learning and Employment Record to ensure learners and workers a lifetime of portability, security, interoperability, and opportunity. School systems, with state and federal assistance, should enact interoperability and privacy standards in vendor relationships. Learner data should be portable within and between education systems.

5. Update learning goals. Host a regional conversation about what young people can do with exponential technology. Adopt learning goals that include creativity, collaboration, critical thinking, and entrepreneurship. Help learners identify strengths, interests, and community needs and build pathways to contribution through a series of learning experiences that are engaging and intentional, community connected, supported, and accelerated.

HESI PRACTITIONER COUNCIL RESPONSES

Essays in this series were reviewed by members of the Hoover Education Success Initiative (HESI) Practitioner Council. For more information about the Practitioner Council and HESI, visit us online at hoover.org/hesi.

To realize the promise of educational technology in transforming learning, it is imperative that policymakers and practitioners take a systems-change approach to leading in the future. By emphasizing purpose, creating coherence with goals and outcomes, and producing authentic evidence of learning, technology can support new learning designs. The key is to start with the broader ends in mind and backward-design toward future learning goals—not just layer technology on old reforms of the past forty years or on traditional models of ranking and sorting students.

It's critical to first ask the question: What is the appropriate role of technology in redesigning K–12 education? What resonates is being clearer about how technology meets the goals and aims, identifying what professional development is needed and what products and tools are required to meet the needs, and having a strong focus on instruction with contemporary pedagogy, authentic assessment, and curriculum redesign, all aligned to equip students for building the knowledge and skills to be prepared for lifelong learning.

As the educational landscape continues to evolve, research remains a touchstone for progress to unlock the full potential of educational technology. For policymakers and practitioners, modernizing research and development (R&D) is an important next step. Reorganization and investments are required to build a more robust federal, state, and local R&D infrastructure. A collective call to action for reorganizing the Institute of Education Sciences to future-proof education is needed in a rapidly changing, technology-driven world.

—Susan Patrick, independent consultant and advisor, and former president and CEO of the Aurora Institute

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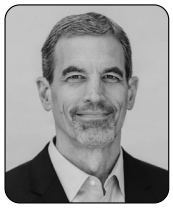

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