Solving the Edtech Integration Dilemma

Why More Tools May Create Less Impact — and What We Can Do About It

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Foreword

By Julia Fallon, Executive Director, State Educational Technology Directors Association (SETDA)

For the past four years, my organization — a professional membership association representing state educational technology leaders — has published an annual report on state edtech priorities and trends. Our report documents the strategic shifts underway as state education systems respond "to a world where technology is ubiquitous and where new and emerging innovations create never-before-seen opportunities and risks."

Each year, SETDA highlights the tremendous work happening across the country, though much still remains to be done. Indeed, K-12 systems are expected to be technologically nimble while juggling concerns that other industries don't have to navigate, like policy, procurement, protection, privacy and the unique challenges of serving minors in an environment where the stakes are children's futures. As I noted in the foreword to last year's report: "Other sectors, both public and private, have been leveraging technology to modernize business practices for decades."

But what does modernization actually mean in K-12 education? And why is it so important, especially at a time when families and educators alike are questioning the role of technology in students' lives?

Let me be clear: When I talk about modernization, I'm not talking about adding more technology for technology's sake. In fact, many of us experienced firsthand how simply adding more tools without a coherent system can backfire. If the influx of devices during the pandemic had truly modernized schools, we wouldn't have ended up with disconnected systems, overwhelmed educators, and parents and students juggling logins across multiple platforms. What we got instead was a fragmented, often chaotic experience. While schools shouldn't create centralized super-databases, this report outlines how individual school organizations can maintain autonomy and choice while improving security and efficiency with their chosen vendors.

Modernization isn't digitization. It's not about replacing a whiteboard with a smartboard or using artificial intelligence to automate tasks without improving the underlying process. It's about fundamentally rethinking how our systems work, with intentional design, interoperability and human-centered outcomes at the core. Though devices and connectivity solutions that schools purchased during the pandemic helped students continue learning while schools were shuttered, it's hard to argue that this experience was an improvement for most learners. We must now reengineer our systems to work for people — like teachers, students and families — rather than just IT departments.

In every other sector, modernization has meant integrating systems, streamlining workflows and aligning technology with the needs of the people it serves. The same must be true for K-12 education. That means making sure that tools talk to one another, that educators can access the insights they need in one place, and that families experience school communication and engagement as seamless and accessible. When families get different messages from five different platforms, they stop checking all of them. That isn't a tech failure. It's a system failure.

This is where integration; interoperability; and, yes, the often-overlooked but critical concept of the "edtech tax" come into play. App developers and school organizations alike feel the costs, stifling innovation and creating barriers for under-resourced school organizations and small providers. The inefficiency also carries inherent risk, with each separate touch point between a school system and an edtech provider serving as a potential point of vulnerability for cyberattacks or data breaches.

But the cost isn't just financial — it's human. Teachers burn out. Parents check out. Students tune out.

Today's edtech ecosystem is still far too fragmented. Thousands of school organizations and vendors operate in parallel, without shared standards or frameworks, and we cannot afford to keep building bespoke workarounds for all of them. We need common rails, smarter procurement, and state and school system leadership that centers systems thinking. Because when systems are noisy and disconnected, the most vulnerable students suffer the most. Instead of chasing the next shiny object, we must focus on creating durable infrastructure that supports teaching, learning and equity in meaningful ways and designing for scale without sacrificing local context.

The pandemic didn't modernize education, but it opened the door. And now, we stand at a critical inflection point. Our collective mindset must shift from compliance-driven technology adoption to mission-driven modernization — which will require policy, procurement and people systems to evolve. State leaders, including the members whom SETDA represents, have an essential role to play. We can model integrated, interoperable, privacy-forward, learner-centered systems in our own agencies. We can support rural and under-resourced school organizations with tools and guidance that meet them where they are. And we can champion policies and practices that reward interoperability, accessibility and impact.

The road ahead won't be easy. Budgets will tighten. Technology will evolve faster than regulations. And staffing will continue to challenge implementation. But the opportunity before us is real. With effective systems in place, we can make data and technology solutions work for us, not against us. We can empower educators, engage families and support learners with the clarity, consistency and care they deserve. Technology won't solve this alone. Leadership, policy and thoughtful procurement are just as essential as the tools we choose.

This is the work of the Great Modernization. And it's work worth doing.

Executive Summary

School organizations around the world have a numbers problem—and it's creating mounting challenges for educators, edtech providers, families, and students alike. In countries like the United States, where over 17,000 independent school organizations and more than 11,000 edtech tools exchange data daily—including sensitive, personal information— with the goal of helping educators teach better in the classroom, parents learn more about their children or school organizations run more smoothly. The modern school system, like almost every other aspect of our world, runs on these transactions.

Unfortunately, those schools and tools operate in an ecosystem that is decentralized. In the U.S., each district sets its own rules of engagement for edtech providers, leading to widespread fragmentation. Similar dynamics are playing out in other countries, including the U.K. and Canada, where decentralized governance structures lead to uneven standards, integration bottlenecks, and interoperability gaps.

With each school system determining its own rules of engagement for edtech providers, the resulting fragmentation creates a web of complex integration challenges that ripple across the entire sector. And as technology stacks expand each year, the number of connections between school organizations and edtech tools—including fragile, one-off, manual integrations—has surged. For instance, during the 2022–23 school year, U.S. school systems used an average of 2,591 edtech tools—a 400% increase since 2017–18. Each connection must be managed and maintained, often without centralized infrastructure or staffing. These inefficiencies create real operational burdens, reduce return on investment, and increasingly threaten the effectiveness and equity of education systems themselves.

First, security risks compound with each individual integration point and exchange of data. In addition, the lack of common standards means that tools from different providers often don't "speak" with each other, leaving student data siloed across incompatible platforms, negatively impacting personalized learning and real-time interventions. Integration issues also stifle innovation in multiple ways, creating challenges for school organizations and edtech developers alike as they struggle to realize the promise of technology — and new artificial intelligence-powered tools in particular.

Addressing this integration challenge — and reducing or removing the costs it creates on the system as a whole — could massively benefit the sector at large, including edtech companies; school organizations; and, ultimately, students. This report explores four key benefits that could result from addressing this edtech integration challenge:

- **Improved Outcomes:** Enabling seamless data flow can allow for deeper personalization through comprehensive student monitoring and real-time interventions.
- **Accelerated Innovation:** Freeing resources to focus on educational outcomes can allow us to better understand what tools and strategies are actually impacting student learning.
- **Strengthened Security:** Implementing consistent, secure exchanges of studnet data reduces the risk of data breaches.
- **Establish Equitable Access:** Reducing costs and technical barriers for entry opens the door for smaller edtech providers and school organizations.

This paper presents a vision for K-12 education, where the entire sector can fully realize the benefits of technology by reducing edtech integration challenges. In doing so, it acknowledges that reducing all the factors that create that friction is difficult — perhaps impossible — without eliminating local control, and it acknowledges that standardization may also present challenges. It makes the case, instead, that there are significant opportunities for school organizations to meaningfully streamline edtech integration to reduce inefficiency and risk while supporting innovation and student outcomes, without forfeiting autonomy or local decision-making.

Like any research, this paper reflects certain perspectives and cannot cover every aspect of this complex topic. It was commissioned by a provider of a global identity platform for schools' edtech integration solutions that is enthusiastic about the potential benefits of streamlining edtech integration and interoperability for the K-12 education ecosystem, including educators, parents, edtech providers and students. We hope that readers will consider it within that context and treat it as an invitation for further discussion and exploration of the topics raised.

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Clever

Clever is on a mission to connect every student to a world of learning. As the leading identity platform for education, more than 110,000 schools worldwide use Clever to power secure digital learning experiences. With Clever's layered security solutions, schools can protect access and identities for all staff, teachers, and students. With a secure identity platform for schools and a network of leading application providers, Clever is committed to advancing education with technology that works for students everywhere. Clever, a Kahoot! company, has an office in San Francisco, CA, but you can visit us at clever.com anytime.

W/A Whiteboard Advisors

For more than 20 years, Whiteboard Advisors has collaborated with the most transformative organizations, individuals and investors in education. Our diverse team of educators, wonks and storytellers brings in-depth understanding of policy, technology and practice to bear on cutting-edge research, powerful writing, and the design of communications and advocacy campaigns that challenge the status quo. Whether we're working with startups or the most established organizations in education, we're passionate about taking breakthrough ideas to scale.

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Introduction

The modern K-12 education system runs on technology.

From the tech that keeps HVAC systems running to those that make sure kids get picked up in the morning and dropped off at night and the tools that support learning in the classroom, technology is everywhere. The reason is clear. Technology offers a number of benefits to the educator and administrators, increasing productivity, enhancing communications and collaboration, and improving efficiency. In education, "Technology is a game-changer — it offers the prospect of universal access to high-quality learning experiences, and it creates fundamentally new ways of teaching," said Dan Schwartz, dean of Stanford Graduate School of Education (GSE), who is also a professor of educational technology at the GSE.

Unfortunately, edtech isn't living up to this potential. The reason lies in the structure of our K-12 system of education.

Globally, school organizations are increasingly dependent on the seamless integration of thousands of digital tools to function effectively. In countries like the United States, over 17,000 independent school organizations and more than 11,000 edtech tools exchange sensitive data daily—with the goal of helping educators teach more effectively, parents stay informed, and school operations run smoothly. Like nearly every other sector, education now relies on these constant, complex data transactions.

Unfortunately, these systems operate in ecosystems that are often highly decentralized. In the U.S. in particular, each school system sets its own rules of engagement for edtech providers, creating widespread fragmentation. Likewise, in both the U.K. and Canada, decentralized decision-making around edtech procurement and governance has led to fragmented systems and integration bottlenecks. School district leaders and edtech providers must manage each of these integration points. That takes time and effort — effort that they could better spend on more impactful endeavors.

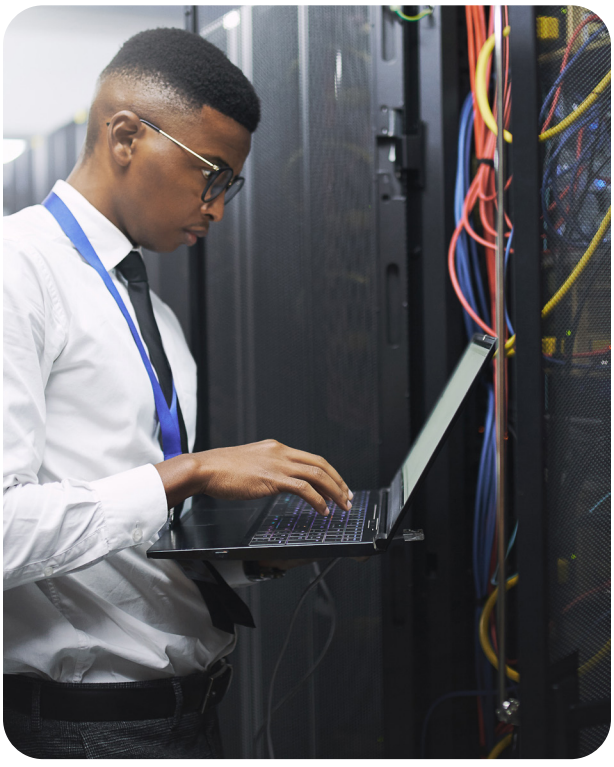
And as each school system's technology stack grows, the number of fragile, manual, or one-off integrations grows alongside it. In the 2022–23 school year, U.S. districts used an average of 2,591 edtech tools—a 400% increase since 2017–18. The resulting inefficiencies place a heavy operational burden on both school leaders and technology providers and ultimately undermine the core mission of education.

The result is a highly fragmented K-12 edtech ecosystem. To make each of the tools in this stack perform their function in the school system, it is often necessary to exchange data and information — including sensitive, personal information — between the edtech provider and the school organizations. Integrating all of these edtech tools into unique school system tech stacks in an ecosystem that hasn't adopted common standards isn't easy, leading to the creation of multiple integration points within an individual school system and creating significant challenges for both edtech companies and school organizations.

> "By advancing towards common integration standards, we can empower both edtech innovators and school systems to unlock the full potential of data-driven education—enabling more personalized, effective, and equitable outcomes for students."
>
> **Sharad Gupta**
> Chief Product Officer,
> GoGuardian

School system leaders and edtech providers must manage each of these integration points. That takes time and effort — effort that they could better spend on more impactful endeavors.

For instance, edtech providers have the potential to create tools that accelerate personalized learning for students, close achievement gaps, simplify working methods for teachers, and leverage artificial intelligence-powered technologies in ways that transform teaching and learning. But realizing this potential depends on the secure and seamless flow of data between systems—a complex process that demands significant resources. As a result, development teams often spend substantial time setting up and maintaining integration points across the various school organizations they serve, diverting attention from product improvements and innovation.



In addition, for smaller edtech providers and innovative startups, the costs of integration may present a significant barrier to growth and impact. Newer or less-well-staffed companies often may lack the wherewithal to meet the bespoke integration requirements of multiple school organizations, preventing them from potentially working with numerous school organizations. Sometimes, these providers may be relegated to one-off relationships or manual data integrations with individual educators or schools, creating more inefficiency and underutilized data and resources across a school system. Gupta elaborates that "a unified industry approach—such as a common digital identity standard—would lower the barriers to entry, foster greater competition, and ensure that every school, regardless of size or resources, can benefit from the latest educational innovations. Ultimately, this drives efficiency, equity, and better outcomes for students and educators alike."

School organizations also face challenges. It takes people to integrate systems together — people whom small and rural school organizations may not have in their midst. Each point of integration introduces additional, and potentially serious, risks through the possibility of data breaches and cyberattacks. Today's students have comprehensive digital identities — collections of online credentials, including information about the students themselves, their academic performance and demographic data — and leave digital footprints that encompass everything from personal data and academic records to behavioral patterns and learning preferences. If this information is stolen, students can remain vulnerable for years before and after the theft is discovered, potentially affecting their future financial, educational and employment opportunities.

Beyond just connecting edtech tools to school organizations, there's also significant untapped potential in app-to-app integration, with different educational applications potentially working together to create more powerful learning experiences or provide deeper insights into individual student learning. However, in the current fragmented environment, these cross-application integrations rarely materialize, because vendors must prioritize the already-complex task of connecting to individual school organizations rather than building interoperability with complementary tools.

Ultimately these deep structural challenges and systemic inefficiencies weigh down K-12 education, increasing costs for school organizations and vendors and stifling innovation while introducing risks. More importantly, they diminish the potential impact of edtech on student outcomes, both for individual solutions and for applications whose impact might be amplified through working with other applications. As Sara Romero-Heaps, chief product officer at Seesaw, says, "To maximize benefits, we need the different aspects of a school system's teaching and learning approach to be seamlessly integrated."

Addressing this integration challenge — and reducing or removing the burden it creates on the system as a whole — could massively accelerate outcomes in K-12 education. If we don't solve this complex problem, then we face continued inequitable access to edtech tools, persistent achievement gaps, overwhelmed educators, increased security vulnerabilities and stagnant innovation in a sector that needs transformation. By tackling this challenge, we can:

- **Improved Outcomes:** Enable seamless data flow can enable deeper personalization through comprehensive student monitoring and real-time interventions.
- **Accelerated Innovation:** Free resources to focus on educational improvements and outcomes can improve our ability to better determine what tools and strategies are actually impacting student learning.
- **Strengthened Security:** Implement consistent, secure exchanges of student data, rather than fragmented, vulnerable manual processes, reduces the risk of data breaches.
- **Establish Equitable Access:** Reduce costs and technical barriers for entry opens the door for smaller edtech providers and school organizations, as well as under-resourced school organizations, to access edtech tools.

This paper presents a vision for K-12 education where the benefits of technology can be fully realized by reducing the friction that edtech integration challenges cause. In doing so, it acknowledges that reducing all the factors that create that friction is difficult — perhaps impossible — without eliminating local control and that standardization may also present challenges. It makes the case, instead, that there are significant opportunities for school organizations to meaningfully streamline edtech integration to reduce inefficiency and risk while supporting innovation and student outcomes, without forfeiting autonomy or local decision-making.

The Challenge of Unlimited Permutations and Limited Capacity

The integration challenge in K-12 education is fundamentally a numbers problem. A decentralized supply of edtech tools provided by thousands of providers met with fragmented demand from school organizations leads, somewhat naturally, to significant inefficiencies. At the same time, the system lacks the necessary staff — in particular, tech leadership — to support the rapid digitization of school organizations that has taken place over the past decade.

> "Most school systems don't have the luxury of dedicated IT teams—staff juggle multiple roles with limited time. Expecting them to support complex, customized integrations is challenging. We need to meet them with tools built on common standards, not limited solutions."
>
> **Dan Jarratt**
> Vice President of Data Science, Education Analytics

The Challenge of Multiple Systems and Integration Points

As each school system's technology stack has continued to expand year over year, so too has the number of integrations between school organizations and edtech providers. The rapid digitization of the sector, along with the pace of technological innovation, has created challenges to standardizing the sector. In general, the development of technology and data standards makes it easier for systems to work together, creating consistency and improving the end users' experience. For instance, standardization and interoperability in banking has made it possible for a customer to take money out of an ATM — even if it isn't operated by their bank.

Efforts by the edtech standards bodies to develop industry standards have met limited success to date. While those efforts have led to the creation of important foundational frameworks, they have not led to the adoption of a common standard. Instead, the existence of multiple, competing standards has created a Wild West of integration approaches. And, as noted, managing multiple integration points takes time — a resource that is in short supply in most school organizations.

For instance, each integration point must be developed, tested and maintained. However, given the sheer number of tools in use in school organizations, it's not uncommon for educators to become unwilling guinea pigs in testing imperfect (or nonexistent) edtech integrations. Teachers may find themselves troubleshooting why student rosters didn't sync between their gradebook, manually reentering assignment data when platforms fail to communicate or spending class time helping students navigate login issues across multiple disconnected tools. This is why educators spend an average of two to four hours per week navigating multiple educational apps, often due to poor integration between systems.

The fragmentation of the space — and the need for multiple integration points in school organizations — creates a number of problems for both edtech providers and schools. DaCota Cole, director of support services at Progress Learning, comments on this challenge: "We offer about seven different integrations, and when they do not work smoothly, it becomes a significant roadblock for educators trying to ramp up usage of a platform. If those roadblocks prevent adoption of a tool, then the schools don't renew the contract with the vendor."

Reducing the number of integration points will yield significant benefits for K-12 education, especially for school organizations that are already struggling with staff limitations. Cole continues, "Any solution that can streamline integration will not only save us time but also ensure that educators can access the tools their schools have purchased."

IT Departments Are Overwhelmed and Understaffed

The availability of qualified staff is a fundamental constraint facing most school organizations. It creates significant problems when it comes to addressing cybersecurity challenges in K-12 school organizations, and the same is true with edtech integration.

School organizations compete with private industry for technical talent at a significant disadvantage, and when IT staff turns over, it creates recurring integration challenges as institutional knowledge is lost. As Jarratt states: "Retaining skilled IT staff is one of the biggest barriers school systems face—they simply can't offer what the private sector can."

As a result, school organizations may rely on personnel who lack specialized, technical expertise to build and maintain complex technical integrations. As Cole notes, "Sometimes the people who get promoted to manage integrations at the school system level have no relevant experience. They have worked their way through the ranks and are placed in these roles by people who, themselves, don't have technical backgrounds and can't adequately gauge their ability to do the job."

Unvetted Tools Multiply Risk and Undermine Strategy

Addressing edtech integration often requires funding — in addition to staff time — to implement, creating further challenges for school organizations. For instance, a school system may believe it can't afford to purchase a centralized integration platform. When centralized integration isn't available, teachers may resort to using free or personally funded tools or school leaders may make isolated purchasing decisions, and, in the process, the school system loses visibility into what tools are being used — and what's working — in classrooms.

As Tal Havivi, managing director of research & development at ISTE+ASCD, noted, "I remember talking to an educator and asking them how they request a new edtech product they want to use, and the teacher responded, 'Oh, we usually use a free version.'" He continued, "The educator wouldn't even consider going to the district to ask for funds. There's an erosion of trust in terms of the process of meeting classroom-level edtech needs with district-level funds."

The proliferation of teacher-adopted free and freemium solutions — whether the result of tight budgets or the challenges of school system procurement — leads to numerous edtech solutions that exist "outside the system," invisible to the eyes of administrators, other educators and perhaps families. Under-resourced school organizations and educators — lacking the capacity to set up streamlined, secure systems — may often resort to fragile, manual workaround processes like spreadsheet imports/exports or manual data entry, creating significant security vulnerabilities. Staff may share credentials or files via insecure methods or implement other stopgap measures that expose sensitive student data to breaches — precisely in communities that lack the resources to respond effectively to security incidents or data compromises.

And each tool that is added to the school system's stack may compound the integration costs associated with the adoption of future edtech tools. As Mark Racine, former chief information officer of Boston Public Schools, explains, "Integration is rarely a forethought for school systems, but it has to be a critical component to whatever solution they are looking into."

Improved Outcomes: How Integration Makes Learning More Personalized and Effective

Technology makes it possible for school organizations to have unprecedented access to learning data, creating valuable opportunities to track and support student progress. But the various types of data remain siloed, unable to be shared between apps or systems, meaning that most schools can access only a fraction of this rich information.

How Edtech Integration Can Help Personalize Learning

The promise of data-driven instruction remains largely unrealized due to fragmentation, and teachers rarely see the complete picture of student performance across multiple platforms. As a result, real-time intervention opportunities are missed due to delayed or incomplete data sharing and the cognitive load on educators increases with each disconnected data source they must monitor. Havivi says, "Interoperability isn't just important for its own sake. Sharing data about a student across multiple systems can actually help inform better and quicker decisions to support that student."

While school organizations and edtech companies collect vast amounts of student data, interoperability barriers often make it difficult for educators to make the most of that data. Unfortunately, those barriers may make the proliferation of data an administrative burden for educators rather than an asset.

Gupta echoed Chancey's sentiment, "A unified data ecosystem holds immense promise for student personalization. Today, the lack of seamless integration across multiple technology vendors makes it nearly impossible for educators to obtain a 360-degree view of each learner—combining attendance, wellbeing, and academic data to inform targeted interventions. By bridging these data silos, we can enable schools and EdTech providers to collaborate on truly individualized learning pathways, supporting the whole child and driving measurable improvements in student achievement and wellbeing."

Truly personalized learning for students requires seamless integrations between all of the software they use. Dan Carroll, co-founder of Clever, says, "From the beginning, Clever's goal was to give application developers the ability to write a single integration for rostering and single sign-on for all of their customers. But fully realizing that vision has been elusive. To fully solve the integration challenge, Clever needs to be able to integrate no matter what platform a school system uses."

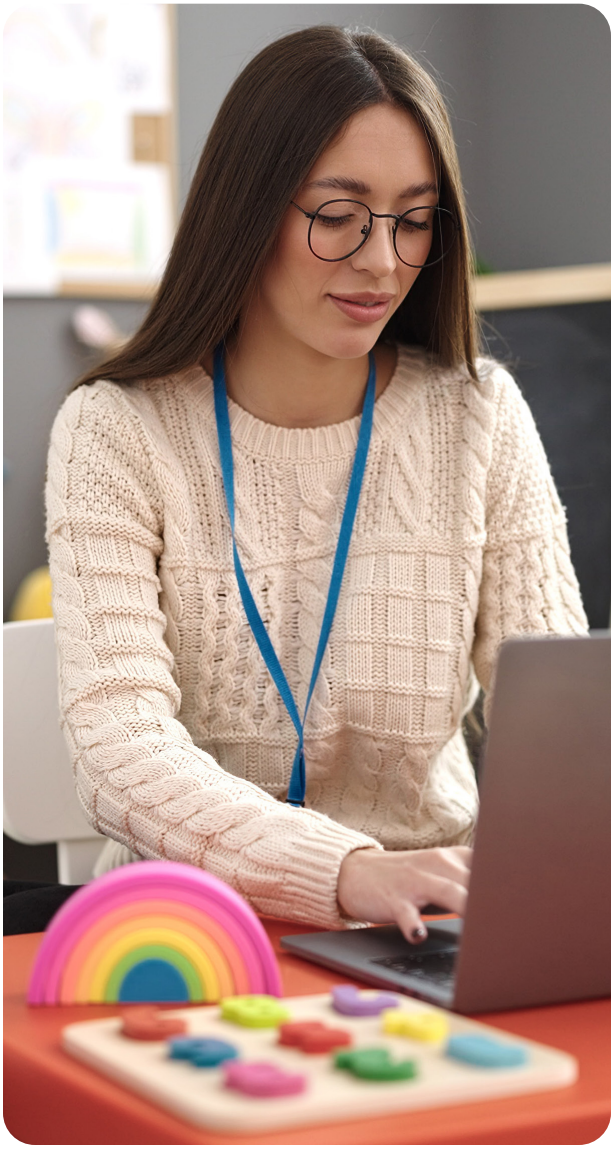
> "We have a dashboard that administrators can use to see data about how their school system is performing. But with different vendors using different methologies for presenting the data in their dashboards, and if those vendors are not integrated, then educators or administrators who want a complete picture need to look at data across a number of different dashboards."
>
> **Jason Chancey** | Director of Engineering, Khan Academy

Making the Best Use of Time

Students miss learning opportunities when tools aren't seamlessly accessible. Valuable instructional time is lost to navigation between disconnected platforms. Students and families face additional barriers when they must navigate multiple logins, remember different passwords for each platform, and troubleshoot technical issues across various systems — challenges that disproportionately impact those with limited technical support at home. The isolation of data in individual edtech silos may also limit the potential for artificial intelligence as a tool for supporting personalized learning paths.

When systems don't "speak" to each other, teachers are forced to manually transfer information between systems rather than focusing on instruction. Rather than streamlining educator workflows and giving them more time for planning and instruction in the classroom, poorly integrated edtech can further stress educators who are already short on time. Elizabeth White, curriculum integration & support, Fairfax County Public Schools, says, "An ideal state would be a landing page where a student can go to see a filtered view of the tools that might be most relevant to them, but that they can also search for other tools available to them. We want to remove barriers to access to resources so students can encounter them on their own and decide whether this is the right tool for the job they need to do."

Even worse, parents receive a fragmented view of their children's educational journey across multiple interfaces. Cole says, "Parents need a single actionable view of what is going on in their kids' lives and how they can help them. I'm an edtech professional and when I get stuff coming home from my kid's school, even I think, 'This is too much for me to figure out.' I can't imagine how any parent can make sense of this." Parent engagement suffers when information is scattered across multiple platforms. The technology meant to simplify communication often creates new barriers, and families with limited technical resources are particularly disadvantaged by fragmentation.



Accelerated Innovation: Why Seamless Integration Sparks Better Products

When one looks at an edtech tool — for example, a math assessment application — one might assume that the software developers who work on the application spend all of their time trying to improve the math assessments and the impact on student learning. Unfortunately, this isn't the case, because edtech providers must often divert developer resources to developing and managing their integrations with school organizations. As Gupta explains, "As Chief Product Officer, I need to dedicate engineering bandwidth to build and maintain bespoke SIS integrations—a challenge faced by every vendor in the market. This systemic inefficiency diverts resources away from innovation that could deliver greater value to educators, IT leaders, and students. By standardizing integrations, we can collectively redirect our efforts toward advancing teaching, learning, and student support, rather than reinventing the integration wheel."

Product Improvements

As Gupta's comments imply, edtech companies exist in a world of limited resources; resources spent on creating and maintaining multiple integration points are resources that aren't spent on improving their solutions. Focusing on innovations as an early-stage startup, meanwhile, leads to delays in integration and interoperability, sometimes damaging relationships with school organizations as a result.

"Integration is rarely straightforward," Chancey explains. "Edtech apps entering the K-12 market might start with one integration approach, but they quickly need to add others as they engage more school systems. Eventually they need manual solutions for systems that don't fit their existing approaches. Your focus shifts from your core product to managing a suite of integrations just for rostering — difficult for established companies and nearly impossible for early-stage companies with limited resources."

The better a company is able to facilitate interoperability with school organizations, the more likely it is to win and renew contracts.

> "The data I've seen from edtech providers demonstrates a clear pattern: When companies invest in robust interoperability with school system tech stacks, they see measurably higher renewal rates. Integration isn't just a technical nicety—It's a business imperative that directly impacts customer retention and product sustainability."
>
> **Erin Mote**
> Chief Executive Officer,
> InnovateEDU

The inability to integrate makes it hard for school organizations to adopt the latest technologies. Chancey continues, "For a company like Khan Academy, what ends up happening is sometimes a reverse challenge. We launch a brand new product, but integration issues hinder us from deploying the innovation across our entire user base."

Improving Research and Development

The inefficient use of data makes it very difficult to understand the impact that edtech solutions are having — either individually or together with other solutions — on students. This holds back the ecosystem from performing the research that is necessary to support continuous improvement and identify what is working and what isn't.

> "This isn't just about efficiency. It's about being good stewards of limited resources and ensuring we're not diverting technical expertise away from innovations that directly impact student learning. Every hour our IT team spends on custom integrations is an hour they're not spending on enhancing the digital learning experience."
>
> **Audrey Cisneros**
> Director of Instructional Technology, IDEA Public Schools

As Romero-Heaps corroborates, "We haven't yet figured out how to fundamentally advance instruction with technology at scale. It has been really challenging to fundamentally reimagine the system of how we instruct students because of the disparate nature of all the tools that we're using to try to get there."

Emerging Technologies

Outdated legacy integrations also make it challenging for school organizations to adopt new technologies. "For companies like ours, it creates challenges when old legacy systems within school systems can't integrate with new systems," Chancey explains. "When you launch a product with emerging technologies, it's very limiting to only target the small portion of school systems that have up-to-date integrations."

"AI is moving to a place where we need data across different domains," Mote explains. "If you can't access sufficient quality data, the tools deteriorate. You get unreliable algorithms and inaccurate outputs. Then teachers, educators, parents, and students don't trust the tool, slowing adoption. It's a vicious cycle."

Strengthened Security: Why Integration is the Front Line of School Cybersecurity

Cybersecurity remains the top priority for both state and school system edtech leaders. It isn't hard to understand why, when student records can sell for up to $300 on the dark web, according to the U.S. Department of Education, and with cyberattacks costing K-12 schools and colleges over $9B in downtime alone in 2023. The 2021 cyberattack on the Buffalo Public Schools alone resulted in $10M in recovery efforts. But while school system leaders spend millions of dollars to develop and protect valuable student identities, the fragmentation of the K-12 ecosystem undermines those efforts.

"When we talk about security, each integration point between systems creates potential vulnerabilities," Gupta explains. "In a perfect world, school systems would have centralized systems with consistent security controls across data exchanges. But today's fragmented integration systems often rely on legacy file transfers or manual data methods with sub-optimal authentication. As a result, school systems face security blind spots across their technology environments, which translates directly to increased cybersecurity risk and insurance costs."

Outdated Security Protocols are Exacerbating the Risk

As the number of integration points grows alongside the proliferation of edtech tools, the protocols securing those exchanges of data haven't kept pace. While school organizations rely on various integration methods to connect their systems, inconsistent implementation and over-reliance on any single approach — in particular, outdated approaches — creates vulnerabilities. Secure File Transfer Protocols (SFTP) — in which data is manually exported from one system, uploaded to a secure server, and then downloaded into another system — can be a valuable tool when used strategically for a few critical vendors, offering school organizations flexibility and control. However, when school organizations default to managing dozens of SFTP connections, the security risks multiply.

Application Program Interface (API) protocols represent a more scalable path forward with automated, real-time data exchanges between systems — such as syncing student rosters, grades, and login credentials without manual intervention. Unlike SFTP, which often require school staff to export, upload, and reformat data files on a regular schedule, APIs allow edtech systems to "talk" to each other continuously in the background. APIs shift the integration burden from school employees to vendors while enabling better security protocols. Yet, without greater coordination and collaboration among vendors, many school organizations continue managing fragmented, manual processes with minimal authentication that create significant security blind spots across their technology environments.

"Right now, many school systems are requesting data from vendors, and those without APIs — surprisingly common among edtech providers — rely on manual processes that create massive security risks," Jarratt notes. "Someone has to produce the file, download it, upload it to a secure transfer service; then school system staff must download, verify, and scrub the data. Manual data transformation introduces frequent errors, and every mistake erodes trust in your product, with teachers, and in the implementation process."

Racine echoes this sentiment: "We've invested significant time ensuring that a paraprofessional who rarely uses email has Multi-Factor Authentication. Yet, the File Transfer Protocol server between our School Information System and applications still uses antiquated username and password authentication — no MFA."

Centralized Integration is a Security Solution

As Jarratt continues, “Interoperability is about the secure transfer of data. The key is having proper centralized implementation — whether through well-configured SFTP with appropriate encryption and access controls, or through robust API integrations — rather than the ad hoc, manually intensive processes that many school systems currently rely on.” Integration solutions provide baseline security so organizations can focus on innovation and broader security concerns. For example, the following issues could be prevented if more unified systems are already in place:

- A lack of integrations leads to nontechnical school system staff resorting to manual, insecure methods of sharing roster data.
- A lack of automated rostering means accounts in applications often linger long after students/teachers have left a school system.
- If apps aren’t integrated with a school system’s Student Information System (SIS) or identity provider, their users will need to have a separate set of credentials for each app. Many school organizations don’t have the technological sophistication to share and manage those credentials securely.

> “Having a secure, centralized integration solution has become fundamental to our school system’s identity and security posture and creating confidence with teachers and students that their tools are safe to use.”
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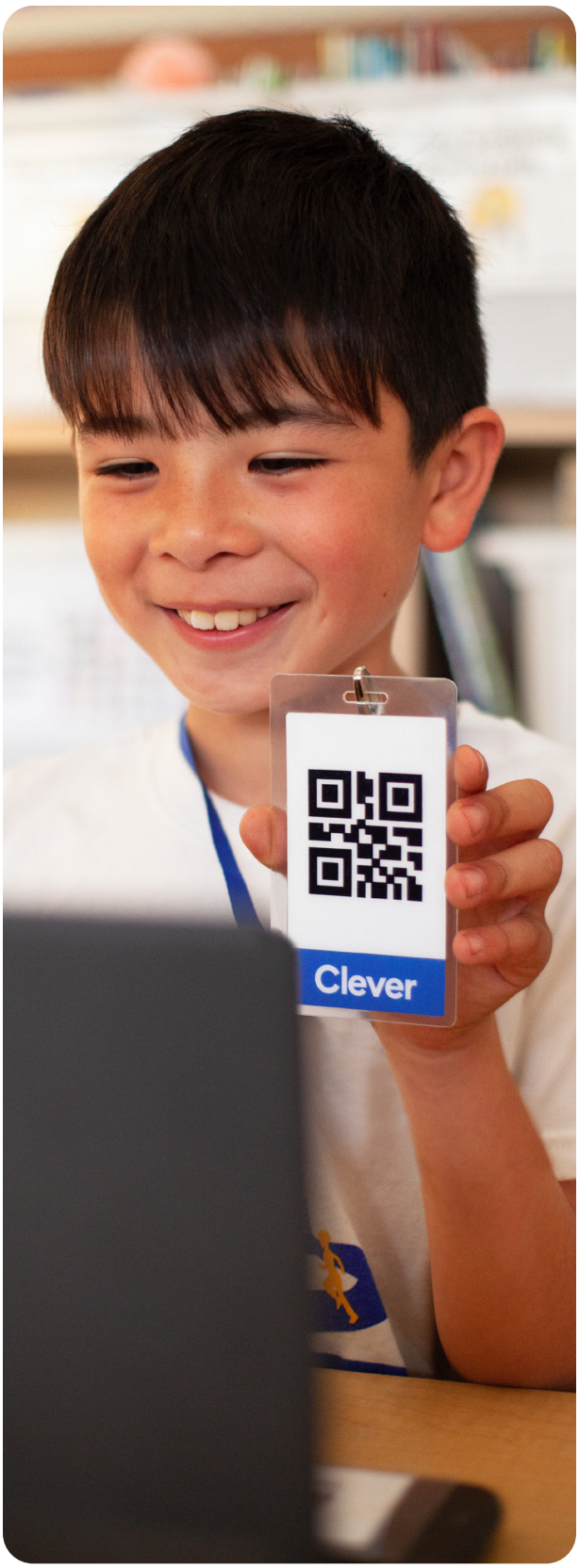
> **Audrey Cisneros**
> Director of Instructional Technology, IDEA Public Schools



Equitable Access: How Unified Systems Support All Learners and Schools

Resource Disparities Create Integration Challenges

Integration barriers disproportionately impact under-resourced school organizations. “The reality of edtech integration is that it imposes a real ‘tax’ on school system resources,” Cisneros notes. “When evaluating tools that don’t integrate with our central system, we’re looking at eight to 10 hours of specialized technical talent versus 30 minutes for standardized integration.” These costs compound for large systems: “For a school system our size with 145 schools across multiple states, that difference multiplies hundreds of times over.”

Large school organizations face implementation challenges, the “tax” is particularly acute for under-resourced, small or rural school systems.

> “The big school systems have the infrastructure to make integration happen, as painful as that can be, but it can be a challenge in smaller school systems...largely depends on the technical resources of the school system whether they can actually do anything.”
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> **Mark Racine**
> Former Chief Information Officer,
> Boston Public Schools

Under-resourced systems that lack capacity for streamlined, secure setups often resort to fragile manual workarounds like spreadsheet imports or manual data entry, creating significant security vulnerabilities.

Not surprisingly, rural and under-resourced school organizations also have small, or even nonexistent, IT departments. These departments often lack the specialized knowledge to properly secure the numerous custom integrations required by disconnected edtech tools. For example, recent data highlighted that while rural school system administrators most strongly agree that cybersecurity should be a collaborative effort (87%), they are also more likely to view cybersecurity as the IT department’s responsibility relative to their town, suburban, and urban counterparts — often the result of limited personnel dedicated to cybersecurity. Staff may share credentials or files via insecure methods or implement other stopgap measures that expose sensitive student data to breaches — precisely in communities that lack the resources to respond effectively to security incidents or data compromises.

Similar Challenges for Edtech Startups

Like smaller or rural school organizations, early-stage startups face distinct resourcing disadvantages. “The reality is that at the earliest stage, all of an edtech startup’s focus is on achieving product market fit, so they delaying investment in integrations and interoperability,” Carroll reflects. “It doesn’t matter how good your integrations are – you won’t get a contract if your product doesn’t solve a critical problem. While this sequencing is rational, it creates huge headaches for edtech companies lucky enough to scale. Suddenly, customers are onboarding rapidly, manual processes are breaking, and larger school organizations are demanding deep, automated integration with their systems.” Due to integration issues, many small edtech companies struggle to meet diverse school system needs, leading to roadblocks or lost contracts instead of increased research and development.

Centralized Solutions Level the Playing Field

Streamlined innovation levels the playing field. Centralized integration solutions implement consistent security controls and monitoring across data exchanges, significantly reducing breach exposure. Without centralized integration, both vendors and school organizations introduce opportunities for error through manual data transformation processes. “This baseline security allows my small team of just two people to manage over 70 centrally integrated applications for 85,000 students while maintaining a 98% satisfaction rating,” Cisneros notes. “Without this standardized approach, we’d be spending countless hours building custom security protocols for each integration point instead of focusing on innovations that enhance teaching and learning.”

The Path Forward: From Integration Challenge to Integration Value

Reframing Integration as Investment

Whether considering the consequences of cybersecurity risks under the current fragmented system or the loss of student learning due to a lack of interoperability, integration is the path forward. As the future rapidly unfolds, both edtech providers and the school organizations they serve must make integration a priority, transforming past the tax and into value.

> "Streamlining integration enables personalization by not getting in the way of users. Clever give you a home base to launch into different experiences. They're not trying to force a square peg into a round hole. They recognize that the web is made up of a diverse set of solutions, and they empower that personalized user journey for teachers and students, even within the same district."
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> **Ian Lotinsky**
> Chief Technology Officer,
> Great Minds

For school organizations, integration must be reframed as an investment in efficiency and security rather than a cost. Without integration, after all, school organizations are paying for resources that remain unused. White continues, "When integration is seamless, it helps us to better predict a return on investment. Teachers and students need to be able to easily access the resources we purchase if we want them to get used."

Even though switching from less-integrated to more-integrated systems involves some costs, school organizations shouldn't let this prevent necessary adjustments. Inertia comes at the expense of transformative change. "Historically, inertia was likened to 'stickiness' for education companies — as soon as you're in, you're in," Havivi explains. "Once you hook into enterprise systems within a school district, it's painful to do it again, and nobody wants to repeat the process. So, the friction involved with getting new products into school systems can actually inhibit innovation."

Building Trust Through Reliable Systems

Trust is the foundation of effective edtech implementation. When data exchanges are inconsistent or error-prone, school leaders, teachers and students lose confidence in the entire system, slowing adoption and limiting impact. Mote says, “Every time you transform data and it has errors, you lose trust in your product; you lose trust with teachers; and you lose trust in the implementation cycle.” Conversely, reliable integrations build trust that accelerates implementation in the classroom and enables innovation in edtech research and development.

The benefits for school leaders, teachers and edtech providers are clear. As Gupta says, “The path forward is clear: a unified digital identity and integration framework benefits everyone in the K-12 ecosystem. With a single, industry-wide ‘switchboard’ for secure, seamless data exchange, school leaders gain efficiency, teachers gain actionable insights, and EdTech providers can focus on delivering innovation rather than navigating integration complexity. This is the win-win-win scenario our industry needs to unlock the next era of educational transformation.”

Creating Win-Win Solutions for All Stakeholders

The benefits, however, are perhaps greatest for students, who stand to gain from a truly integrated edtech system. Romero-Heaps says, “Getting at something that’s a more integrated ecosystem gets us in the direction of improving instruction with technology. To maximize benefits, we need the different aspects of a school system’s teaching and learning approach to be really seamlessly integrated.”

All of the stakeholders across the education ecosystem must take practical steps toward a more integrated, efficient education technology landscape. Cole says, “We need people, bodies, organizations to think across systems and how they might better function together.”

For edtech companies, Carroll envisions a future where integration is no longer a stumbling block to success. “The costs of building against Clever – both in money and developer time – should be so low that it’d be crazy not to do it from day one,” he says. “The only thing constraining an edtech company’s growth should be the market’s desire for their product — not a company’s ability to handle the technical integration.”