# DELIVERING THE FUTURE OF K-12 EDUCATION

Powerful new technologies create more agile, versatile and effective learning environments.



## **EXECUTIVE SUMMARY**

Technology has been the most powerful driver of change in K–12 education in recent memory, pushing educators to re-examine long-held beliefs about pedagogy and reimagine established classroom traditions. Ubiquitous devices, widespread connectivity, robust learning platforms and emerging technologies continue to transform not only what children learn but also how they learn and how they demonstrate their mastery to others.

In the process, the roles of teachers and students have dramatically shifted. As technology has empowered students with more agency and choice in their learning experiences, teachers have become facilitators as much as instructors. Today's learning communities are more egalitarian, collaborative and personalized than in the past, largely as a result of the expanded curricula and activities that technology makes possible.

Remote learning represents another major chapter in the evolution of K–12 education. It has challenged schools to prepare teachers and students alike to thrive in the modern learning environment. It has highlighted a persistent digital divide, and it has intensified the demands on IT professionals.

As districts address these issues, they can also position themselves for a stronger, more innovative future by investing in teachers' professional development, engaging in comprehensive, stakeholder-driven planning, and building IT departments that leverage flexible, strategic technology solutions.

## Classroom Technology and the Modern Learning Environment

The role of technology in education has changed dramatically in recent decades, with computers — once a rarity in the classroom — now an essential tool for teaching and learning. Educators began to align technology and pedagogy more deliberately in the 2000s, an evolution often expressed in the SAMR model: a spectrum of technology integration that identifies stages of substitution, augmentation, modification and redefinition. Ultimately, educators began designing lessons around content and tasks for which computers were not optional, but necessary.

Parallel to this shift, educators began to rethink the learning environment. The traditional classroom — students seated in rows, teachers directing every element of the learning process — no longer reflects current pedagogical best practices. As technology opened the doors to active learning and self-directed exploration, teachers became architects of collaborative learning rather than disseminators of top-down instruction. Many districts are adapting classrooms to align with this philosophy, outfitting them with movable, flexible furniture and technology solutions designed for interactive, project-based activities.

These shifts have also opened the door to a vastly broader set of curricular possibilities. Students are learning to code, exploring distant countries through virtual reality, creating video games and robots, and deepening their understanding and application of science, technology, engineering and math (STEM). Educators have expanded their view of assessment, moving from tests of rote knowledge to demonstrations of critical thinking, collaboration, creativity and communication.

These changes have also transformed the roles and responsibilities of IT staff. The emphasis on classroom technology, combined with widespread adoption of one-to-one device programs, has placed massive demands on school infrastructure, particularly networking. In addition, much like their counterparts in other industries, K–12 IT leaders are now involved in every facet of operations: 74 percent say their responsibilities include both educational and administrative technologies, up from 63 percent in 2019, according to research from the Consortium for School Networking (CoSN).

As technology has evolved, IT leaders have had to adapt staffing accordingly, ensuring they have the skills to support everything from cloud computing to educational software. Today's IT departments must include both generalists and highly skilled specialists.

#### Pandemic Response and Remote Learning

However dramatic these evolutions have been, they were still situated in the physical classroom. That changed in early 2020, when the COVID-19 pandemic forced schools to move quickly

to remote learning.

Two make-or-break factors shaped districts' experiences: technological readiness and educator readiness. For students who lacked adequate devices or high-speed internet access at home, the same technologies that once opened doors to new learning experiences became a barrier to keeping up. It also became clear that, however much progress teachers had made in integrating digital content, they were



The percentage of parents who are willing for their high school students to take some classes online, up from 56 percent in 2009<sup>1</sup> completely unprepared for remote learning. In one region of Texas studied by the <u>Urban Education Institute</u>, 95 percent of teachers had no previous experience with online teaching.

In their first encounter with remote learning, many teachers struggled to engage students and to translate lessons to the virtual space. They have had to develop new ways to provide access to assignments, facilitate collaboration and communicate with students and families. These realities have exacerbated an existing challenge in K–12 education, in which teachers consistently report that they lack the skills and knowledge to optimize educational technology.

The rapid shift to remote learning, together with the need to prepare for various scenarios amid pandemic-related uncertainty, has stretched IT teams thin. The pandemic has forced IT departments to accomplish in weeks what they normally might have tackled in months. Districts that lacked one-to-one device programs have struggled tremendously, and IT teams have been at the forefront of efforts to overcome these hurdles.

A recent survey by the <u>International Society for Technology</u> <u>in Education (ISTE) and BrightBytes</u> found that the majority of teachers, students and parents say they always or usually have access to device-related technical support from their schools when they need it. The flip side of this positive outcome, of course, is that IT staff are spending a significant amount of

## Remote Learning May Widen the Digital Divide

When teachers used tablets and laptops primarily in face-to-face instruction, one-to-one device programs served to level the playing field, ensuring that all students had access to the same tools and materials. When remote learning is the primary model, however, great variability exists in students' at-home access to devices and reliable networking.

A survey from ISTE and BrightBytes found that in schools with a higher proportion of low-income students, 60 percent of students use their own devices for remote learning, and 41 percent use school-owned devices. Nearly the reverse is true in higher-income schools: 64 percent of students use school-owned devices, and 45 percent use their own devices. Internet access may be an even bigger problem, with many districts finding themselves unprepared to support students who lack access to high-quality connectivity in their homes or neighborhoods.

A variety of other factors also affect the quality of remote learning, including whether students have access to a quiet place to work, accessibility issues for students with learning disabilities and reduced support for English language learners. All these factors have raised concerns about students who were already vulnerable to educational inequities and now, as a result of the pandemic, may fall further behind. time responding to these requests, even as they also work to manage new workloads, transition to or expand the use of cloud computing, and address new security threats and vulnerabilities.

## **Future Challenges and Opportunities**

For the foreseeable future, most districts will remain focused on improving and optimizing remote instruction; when possible, transitioning back to fully in-person instruction; and working to address the lags in academic progress that many fear have resulted from this uneven period of remote learning. When <u>McKinsey</u> analyzed high schoolers' experiences in remote learning in 2020, it identified three groups: students continuing to progress academically, albeit more slowly than usual; those receiving low-quality instruction that hinders their progress; and those receiving no instruction at all.

From an opportunity perspective, experiments in remote learning are likely to add momentum to calls for change in pedagogy, for improvement in digital equity and for innovation in the embrace of classroom technologies. Schools may also respond to these experiences by renewing their focus on professional development programs that prepare teachers for technological fluency within a modern pedagogical approach — one that is capable of delivering high-quality instruction face-to-face or online.

Finally, K–12 educators will be asking how to evolve the modern learning environment from here. If the traditional classroom was out of step with active learning before the pandemic, it may seem even more disconnected after it, once students and teachers have mastered the art of "anytime, anywhere learning." In addition, the emerging technologies of today — virtual reality, artificial intelligence—powered personalized learning, data–driven analytics — will mature in ways that push the boundaries of education even further. As educators continue to advance pedagogy for the modern age, the role of technology will shift accordingly, adding value to IT solutions that are adaptable and flexible.

## The Building Blocks of the Future of Education

From an IT perspective, the modern learning environment has greatly expanded staffs' scope of responsibility. Technology teams must facilitate teaching and learning in physical, virtual and hybrid classrooms, across all grade levels and within diverse academic disciplines. Success depends on selecting the best tools and creating an ecosystem that maximizes the extent to which those tools can integrate seamlessly and securely.

## **Connected Devices**

Inside and outside the classroom, tablets, laptops and phones have become a primary means of K–12 instruction. Many K–12 schools have long had one-to-one device programs for some or all grade levels, taking advantage of the benefits of standardization for both users and IT.

These programs paid off in early 2020, making it easier for schools to transition to remote learning with the knowledge

that students at least had school-owned devices and that teachers were familiar with digital content and applications. However, some of these devices were not intended to serve in predominantly virtual classrooms, and many students continued to rely on their own devices, including phones, to get and complete assignments. In lowerincome districts, nearly 20 percent of students use cellphones as their primary learning device, according to the ISTE-BrightBytes survey.

In the future, districts may favor devices with the flexibility and robustness to support the demands of remote learning, including downloading

and streaming videos, participating in synchronous class sessions, running specialized software and collaboration platforms, and maintaining security. For the best user experience, devices also need to integrate easily with the

## Remote Learning Requires a New Security Strategy

As K–12 schools have expanded network connectivity and reliance on endpoints, cybersecurity risks have grown. For three years in a row, cybersecurity has been the top concern among IT leaders <u>surveyed by CoSN</u>, with the percentage identifying their response as "proactive" or "very proactive" increasing from 52 percent in 2019 to 69 percent in 2020. Remote operations have made for an even steeper climb, with learning taking place across potentially unprotected networks and devices. Hackers have adapted their attack strategies accordingly.

It is more critical than ever that IT teams protect student data at every step. Authentication and authorization processes must be seamless — for example, using single sign-on — both to facilitate a better user experience and to accommodate the variable skill levels inherent to K–12 learners. Before the pandemic, IT policies were already moving toward restricted-access models, ensuring that only authorized users have administrative rights to sensitive data and infrastructure. Remote learning makes this even more imperative. Schools may also face a greater threat from shadow IT, as remote users deploy their own tools that may not follow security policies or best practices.

Even as cloud computing has been valuable in allowing districts to support remote learning, it has also created new vulnerabilities and, in some cases, impeded visibility into user activity. Accordingly, districts should evaluate their readiness for cloud–specific solutions, such as cloud access security brokers and cloud security posture management, that can help IT teams identify and correct vulnerabilities.



The percentage of elementary school students who communicate with teachers via email, compared with 93 percent of high school students<sup>2</sup> learning management system (LMS), simplifying day-to-day work for students and teachers and reducing the need for IT troubleshooting.

## **Audiovisual Solutions**

Monitors, cameras and audio equipment transform online instruction from a static, content-focused activity to an engaging, interactive experience. The ability for students and teachers to see, hear and speak with one another adds depth and connection to synchronous sessions in which classes are all online at the same time. This connection can be especially important as teachers strive to maintain

engagement with younger students and with those who may need additional support.

Although some districts have used both face-to-face and online instruction during the pandemic, the majority of instruction has taken place online, with teachers leading classes from their homes and creating content for asynchronous sessions. High-quality audio and video recording equipment ensures that students can easily see and hear the teacher, while also making it easier for teachers to create digital content. Recordings should be easy to incorporate into LMSs or collaboration platforms and simple for students to access.

## Software

Online learning software includes LMSs, videoconferencing and collaboration platforms, video recording software and a wide variety of applications developed specifically for K–12 education. Integration among these solutions, particularly between the LMS and meeting platform, is a critical task for IT.

LMSs are the one-stop shop for teachers, students and parents: feature-rich solutions that serve as an administrative hub. In remote learning, roughly 70 percent of teachers say they always use the LMS as their primary educational platform, compared with 30 percent who say the same of videoconferencing platforms, according to <u>ISTE-BrightBytes</u> <u>research</u>. The LMS is where teachers post class information, assignments and grades and where students submit their assignments and interact with classmates. The better the integration between the meeting platform and the LMS, the better the user experience will be.

In addition to the LMS foundation, teachers layer on tools for specific content and activities, such as lessons, quizzes and game-based interactivity. Increasingly, face-to-face and remote learning both call for students to use self-directed content creation, carried out through multiple formats, to demonstrate mastery of content and pedagogical objectives. A variety of tools can increase students' options and keep them engaged. In older grades, students may need specialized software — for example, for computer-aided design or engineering applications — that school-issued devices do not support. Virtualized applications and similar solutions can help districts provide this access remotely.

To optimize integration, IT staff should streamline the collaboration tools in use, with the goal of increasing consistency where it makes sense to do so. Over time, and particularly as schools shifted quickly to remote learning, teachers may have created ad hoc solutions that do not integrate well with LMSs, are not used consistently across schools or do not support best practices for security and privacy.

#### Infrastructure

In recent years, many districts have prioritized networking enhancements and upgrades that allowed them to support one-to-one device initiatives and the increased use of digital content in the classroom. Amid the pandemic, that focus shifted to networking capabilities outside the school: specifically, students' internet access at home. As remote learning revealed major discrepancies in students' connectivity, districts have responded by placing Wi-Fi hotspots on buses and in communities, lending out Wi-Fi hotspots and partnering with libraries and municipalities to expand internet access.

On the back end, infrastructure has moved from an on-premises capital expenditure model to a cloud-based

## Software Advances Benefit IT Teams and Educators

Software advances have enabled K–12 schools to incorporate powerful new tools in recent years, expanding their capabilities for data analytics, IT resource management and optimization, and oversight of students' internet access.

For IT departments, dashboard-driven application management software provides visibility into the tools that teachers are using the most. That means they can improve ROI on technology spending, minimize duplicative services and identify areas where teachers may need additional training.

For educators, the rise in computer-based learning has created new opportunities to leverage data to improve academic outcomes. In many districts, teachers collaborate in datadriven analysis and decision-making via professional learning communities. In concert with teachers' experience, these objective measures guide districts toward the most effective teaching strategies. In addition, incorporating data-driven insights throughout the school year, rather than limiting this to an end-of-year assessment, allows for continuous improvement.

Districts also are using software to manage students' internet activity on district-owned devices, both to minimize classroom distractions and to provide safety alerts. For example, if students search for information about violence against themselves or others, staff will receive an alert that enables them to provide interventions and mental health support. operational expenditure model. This resulted in converting physical labs to any time, any device virtual online classrooms.

The cyclical nature of the school calendar, with heavy usage only nine months out of the year, makes the cloud an attractive cost-saving strategy. Application and desktop streaming services allow more flexible use of both apps and hardware. This democratizes the use of industry-leading software by students — they can now use popular design, engineering and gaming apps running on any device. IT staff can fine-tune the required computing power for individual applications to provide an optimal experience for end users. Increasingly, the cloud is the strategy that enables schools to achieve the agility, security, versatility and reliability they need to support students — wherever they happen to be.

At the same time, cloud services may place new pressures on IT departments. Staff may need more training, peer-to-peer support or the addition of new hires who are skilled in cloud management, security and optimization. Districts transitioning to the cloud will need to establish governance processes to monitor and manage costs. Finally, although the cloud can strengthen security in many respects, it may also warrant new solutions that address cloud-specific vulnerabilities, such as misconfigurations.

## Moving into the Future of Education

For K–12 education, the pandemic has tested one of the most difficult qualities for any organization to achieve: readiness for change. In a field already undergoing significant transition, the move to remote learning has revealed an entirely new set of obstacles and challenges — but also opportunities. As districts recover from this period of intense change and resume normalcy, many will redefine for their communities what "normalcy" looks like. Whatever vision they pursue, the most successful strategies will address professional development for teachers, high–level planning and forward–looking adaptation for IT staff and solutions.

## **Address Teacher Readiness**

Teachers' lack of preparedness for remote learning spanned both technological and pedagogical considerations. Even as technology has become central to day-to-day classroom activities, many teachers have said they need more training to be able to use such tools effectively.

Notably, even teachers who are enthusiastic about technology-enhanced education may feel insufficiently prepared. For teachers who are reluctant to give up traditional pedagogies, the transition is even more difficult. For both groups, professional development should be ongoing, because educational technologies will evolve, and educators will continue to refine the alignment of pedagogy, curricula and classroom practices.

Professional development should be flexible, with modular, online courses giving teachers the most options to pursue training that matches their schedules. It should also be customizable, so teachers can spend time on the areas where they most need help. Instructional coaching, with onsite specialists in educational technology working alongside teachers in classrooms, also has been shown to increase comfort and confidence for teachers.

## Implement Broad-Based Planning

Any initiative related to learning spaces, whether online or brick-and-mortar, requires input from stakeholders across the district. Even though IT teams will deploy the solutions that ultimately support the learning space, such initiatives are about learning — not technology. Engaging colleagues across academic departments and school campuses is critical to develop the buy-in that will ensure proper implementation and optimal ROI.

Before districts decide which solutions to buy, they should engage in robust planning and visioning to establish key objectives. Districts often look to third-party experts to facilitate these processes and to provide guidance on the best way to align goals and IT solutions. The focus for any endeavor should be a holistic approach to educational technology that addresses the needs of all stakeholders and delivers the best user experience.

## Adapt Technology Roles and Services

Just as educators can expect additional transformation of their day-to-day workflows, so can IT staff. New classroom technologies, increased demands on networking and cybersecurity, and the strategic shifts inherent in cloud adoption have dramatically expanded the purview of IT leaders and staff. To manage these expanded responsibilities, many IT leaders have focused on staff training and skills development. IT's role within the educational organization also has grown, with more IT leaders becoming involved in high-level strategic planning and decision-making.

Together, these developments mean that many IT departments are experiencing a fundamental shift in how they deliver services to their schools. Depending on available resources, these transitions can be challenging for IT staffs to absorb. Many find that the right technology solutions, together with professional and managed services, take a meaningful burden off IT teams. That, in turn, allows them to focus on optimizing and supporting solutions so they can provide the best service to their communities.

## **CDW: We Get the Future of Learning**

CDW has a large and experienced staff of educational technology experts to help optimize your remote learning environment. We understand that K–12 schools are striving to facilitate the success of all students by offering meaningful, flexible instruction that reflects best practices in pedagogy and learning innovation.

Our goal is to partner with schools to help them create experiences that engage students with active, collaborative learning and keep them connected, no matter where they may be. We help schools identify the right solutions and services to achieve their goals, and we provide the strategic support and insights to ensure optimal results. Our solutions and services encompass modern learning environments; cloud services migration, planning, implementation and governance; cybersecurity; and more.

## **CDW** Amplified<sup>™</sup> Services

CDW Amplified<sup>™</sup> Workspace services employ a comprehensive approach that enables employees to work from anywhere, on any device.



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Our design and planning workshops help you align your business goals and needs to create an outcome-based collaboration strategy based on end-user satisfaction.

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