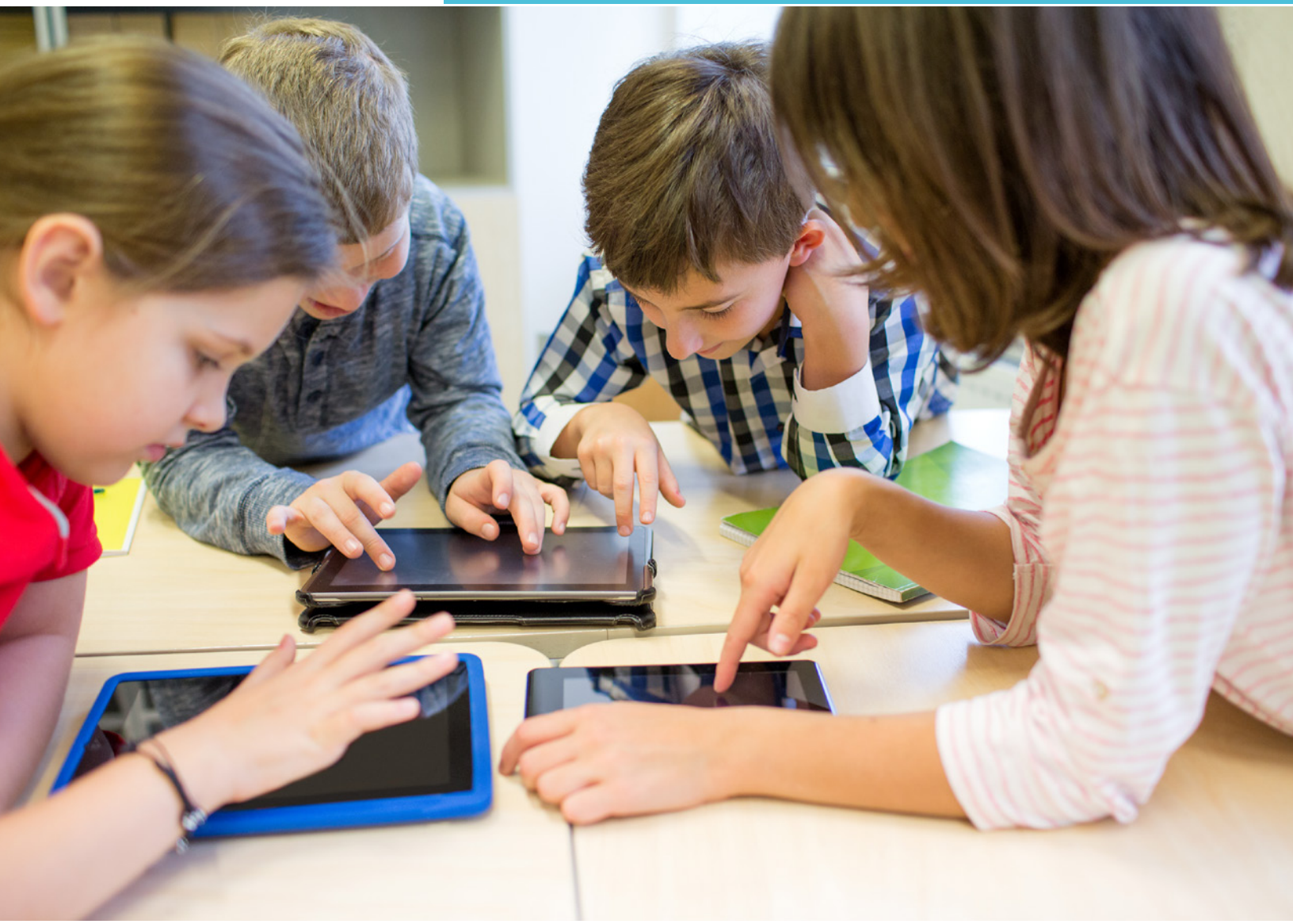
A WHITE PAPER FROM

CENTER FOR DIGITAL EDUCATION

The Keys to Connected Learning Success



Innovative school districts are adopting leading-edge technology to create environments that keep students learning inside and outside of classrooms.

It's no secret that mobile devices and digital learning tools are reshaping K-12 classrooms. While tablets and thin-profile notebooks may be in sync with the expectations of modern pupils, piquing student interest is only part of the story. These digital resources provide important links for connecting students to learning materials anytime and anywhere, whether in classrooms and computer labs or at public libraries and at home. The result is more opportunities for personalized instruction that plays to each student's individual strengths, weaknesses and interests.

In fact, a survey by Project Tomorrow found that 60 percent of educators believe online learning better motivates students and virtual, blended and flipped learning instructors use more digital content than traditional instructors.[1]

Connected learning also addresses some long-standing challenges that school districts have struggled to overcome. Disruptive snow days are a case in point. Making up lost hours during scheduled holiday breaks or summer vacation may fulfill local requirements for how many days students must attend school each year. But the workarounds don't address the negative impact unexpected interruptions have on lesson plans. Schools around the country are finding an alternative to snow days. For example, St. Cloud Cathedral High School in Minnesota is piloting a program that connects instructors with home-bound students via mobile devices and the Internet to keep learning going no matter the weather, eliminating the need for make-up days.[2]

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Connected learning becomes important at other times as well, such as for sick days when students remain home or just when they need extra help. In all of these cases, students now have an easy way to access the educational resources and multimedia content needed to keep learning on track.

But school superintendents and CIOs need a clear game plan to ensure connected learning can reach its full potential. Anytime, anywhere instruction upends traditional practices for accessing, managing and securing education resources. That means school districts must explore adopting the latest advancements in virtualization and mobile technologies to push out resources to the district and manage them across the entire environment.

Virtual desktops are what fuel connected learning. Applications and data are stored and managed within data centers, or in some cases in the cloud, and then delivered to students via secure wired or wireless connections. Thus, end users see familiar screen layouts, selections of applications and data resources every time they enter their secure log-in information. Aside from the formatting differences dictated by the display hardware used by various devices, the "look and feel" is consistent whenever and wherever students happen to be working. Another plus is that virtual desktops reduce the processing and storage requirements of end-user devices. The result: The value of even the most resource-intense applications can be delivered to almost any type of hardware used by students, teachers and administrators. This white paper discusses important first steps school districts must take to succeed with virtualization and mobile technologies, and ultimately, connected learning.

A Double-Edged Challenge

To truly support connected learning and reap the ancillary advantages of virtual infrastructures, schools need an underlying technology infrastructure that succeeds on two crucial fronts.

1. **IT operations must support modern teaching resources and strategies.** To do this, IT departments should create technology environments that power virtualized client computers and mobile learning materials. This foundation connects students and faculty to personalized desktops, applications and information both at school and outside the classroom. The key is being able to deliver full-featured applications to whatever types of devices students happen to be using at any given time, whether that's powerful laptops and desktop PCs or streamlined Chromebooks and mobile devices running iOS or Android operating systems. The right infrastructure doesn't come with unnecessary compromises. For example, whether they're using a laptop or a smartphone, high school students should have access to the full suite of Microsoft Office applications to do their assignments.

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2. **The technology foundation must enable schools to closely manage and protect the resources available to students and faculty.** Creating opportunities for learning inside and outside classrooms succeeds only if the environment doesn't create undue strains on the IT staff. That requires effective tools for rolling out and configuring thousands of devices and applications. It also means consistently enforcing security policies to protect students' personal information and school work whether it's being accessed behind or outside the school's firewall.

While this foundation requires multiple, interlocking pieces, IT managers have a variety of new options that make building the technology puzzle a manageable, cost-effective undertaking. It begins with finding a virtualization platform that can speed the journey to connected learning.

Anytime, Anywhere Learning Becomes a Reality

One of the biggest recent advancements for supporting connected learning is the rise of technology platforms that offer a single, cohesive suite of solutions that provide everything from full-featured user experiences to sophisticated capabilities for management and security. These platforms give school districts an important, overarching benefit — they make it easy for IT administrators to centrally manage and secure learning workspaces across all types of devices.

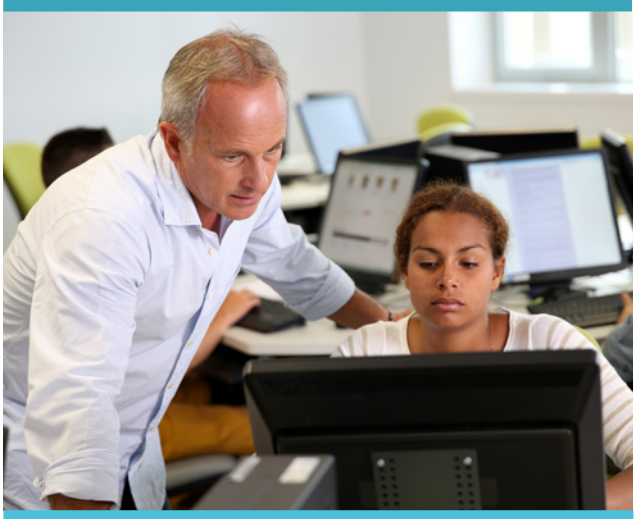
These options couldn't have come at a better time, given the pressures districts are under to enhance learning by using the latest digital tools. For example, a recent survey by the Center for Digital Education asked educators what challenges they faced when it comes to managing technology. Not surprisingly, the majority of respondents said the biggest stumbling blocks were limited personnel, resources and funding.[3] Other common concerns were difficulty monitoring student behavior on different devices, time-consuming IT updates and maintenance, and data and device security.

Today's virtualized desktop infrastructure (VDI) platforms represent a step forward from older VDI approaches, which provided similar benefits but proved difficult to launch by resource-constrained IT staffs. VDI can also create some unpleasant, ongoing surprises, such as the need for ever-increasing amounts of storage to centrally handle all of the applications and information that used to reside on individual PCs.

The best virtual desktop platforms offer a choice of on-premises and cloud-based solutions, the latter known as desktop-as-a-service (DaaS) offerings. The cloud further relieves school IT departments of managing onsite server and storage resources.

Depending on a school district's individual needs, the best approach to virtual desktops may be to run a virtualization platform within an onsite data center. Other organizations, particularly those with limited capital budgets and IT resources, may benefit more from a cloud-based service. A third option is a hybrid approach that continues to rely primarily on an on-premises infrastructure, but also takes advantage of cloud services for new demands. The key when evaluating platforms is to find one that supports this full range of choices to serve current needs and stay viable as requirements evolve.

Despite which approach is chosen, virtualization offers the following advantages.



As districts address Common Core State Standards and implement online assessments, virtual desktops give IT departments the flexibility to deliver certified online testing platforms to essentially any student device.

DaaS significantly reduces the capital costs for hardware. Schools can modernize their operations without having to get approval for major capital projects and large volumes of servers and storage systems. Instead, they pay predictable monthly costs from operating budgets for the level of cloud services they use. If enrollment grows and they must quickly support additional desktops, they simply contract for added capacity rather than investing in new equipment.

Schools continue to derive value from current IT investments. Districts can continue to run existing servers and applications, while enhancing overall capabilities by layering on DaaS modules. Even older PCs get new life without costly upgrades by essentially operating as thin clients that display applications and data maintained in backend data centers and the cloud. Despite the age of the equipment, students see the same performance levels and capabilities as if they were using the latest and greatest hardware.

Virtualized environments achieve high reliability. Traditional IT environments require technology staff to spend significant time maintaining hardware, keeping software up to date, loading an endless stream of security patches and performing other essential duties. These commitments leave little time for implementing the latest digital tools to enable connected learning and promote better academic outcomes. By contrast, centralized IT resources — using onsite data centers — reduce maintenance overhead and free up time for more strategic activities. Cloud-based options take this approach a step further with service provided by an outside staff of IT experts.

Students receive equal access to learning materials. As bring-your-own-device (BYOD) adoption increases, some families may equip their children with the latest mobile devices, while others may be able to afford only older equipment or rely on school-provisioned gear. Fortunately, centrally managed and delivered learning materials mean all students experience the same performance levels and diversity of resources. And despite encountering a rich mix of devices and operating systems, school IT managers centrally apply appropriate BYOD usage policies to everyone who signs into the network.

Security and regulatory compliance becomes easier to manage. The Family Educational Rights and Privacy Act (FERPA) and the Children's Internet Protection Act (CIPA) stipulate tight control of student information. But many risks exist, ranging from unauthorized access to personal data if a mobile device is lost or stolen to students falling victim to a hacker's social engineering attack. Virtual desktop environments mitigate these risks because sensitive information isn't stored on individual devices and all data — including malware — is cleared from memory every time a user turns off the hardware.

Online assessments don't overburden IT departments. As districts address Common Core State Standards and implement online assessments, virtual desktops give IT departments the flexibility to deliver certified online testing platforms to essentially any student device. In addition, with on-premises virtual desktops and DaaS, schools can quickly earmark computers for testing during part of the day, then centrally switch to a different computer image so students can use the hardware for general classroom activities once assessments are completed.

CASE STUDY

Virtual Desktops, Real-World Lessons

Buffalo Public Schools (BPS) is one of the largest school districts in the state of New York, with 58 facilities and approximately 34,500 students. A combination of incentives drove the school system to adopt virtual desktops. "We wanted to expand the access that students have for learning resources, including electronic textbooks and our educational software," says Sarah Edwards, the district's supervisor of instructional technology.[4] "Virtual desktops are a great way to make these materials available across all types of devices and in many physical locations."

The district was also attracted to the reduced costs realized by giving new life to outdated hardware. When laptops are too old to be reliably used by teachers, the IT staff can repurpose them for students to use in the virtual desktop environment. All of these factors led the district to adopt virtual desktops, or what it calls the "BPS Desktop."

Digital learning tools play important roles throughout the Buffalo, N.Y., public school system. The district streams BPS Desktop into all of its computer labs, giving students access to the software and information they need for projects, even when they're out of classrooms. In addition, the district maintains several carts filled with tablets that act as BPS Desktop clients for accessing educational resources stored in one of two data centers. Finally, all instructional spaces are equipped with interactive whiteboards to foster collaboration among teachers and students.

After extensive planning, the school's transition to a virtual desktop environment launched in 2013. "Virtual desktops are now accessible to every user in any site on any device in the district," says Edwards. "We are currently working to make BPS Desktop available to all of our users outside the district as well."

For example, some students have access to their virtual desktops from home or via community organizations, such as the county library system. "Students from Buffalo schools can go to any of these libraries and have access to their virtual desktops, all of their learning applications and any related educational materials," Edwards explains. "They can continue their learning activities wherever they happen to be at any point in time. Giving kids access to the learning resources outside of the classroom lets us expand the school day."

Virtual desktops also help schools tailor materials for students with special needs who qualify for Individualized Education Program (IEP) instruction. For example, a virtual desktop may include screen-reader software. "Previously, we would have one license for each student and would be able to install it only on one computer in the classroom. If he or she traveled to another site — even within the same school building — that student didn't have access to the software."

Now, the school can purchase licenses that tie the application to the student rather than the device being used. No matter where the student logs in — in class, at a county library

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Sarah Edwards
Supervisor of Instructional Technology, Buffalo Public Schools

or at home — the software is accessible. "That's a huge benefit that's transformative for the students," says Edwards.

Advanced placement (AP) students also benefit from virtual desktops. They can now access AP coursework via mobile devices at home. "That's giving them access to AP materials they wouldn't otherwise have because their school was unable to offer the course," she explains. "But as a district, we're able to offer students from a variety of schools the opportunity to participate in this course through that BPS Desktop."

The school system is investigating partnerships with network service providers to serve students who are confined to home on extended medical leaves. "Even though they're not in school, they can still collaborate with their classmates thanks to technology," says Edwards.

Planning for Success

Edwards says virtual desktops offer many advantages, but achieving success requires the right strategy. She advises school officials to carefully plan their technology rollout schedules to minimize disruption. For example, work with instructors to decide when a computer lab can be temporarily shut down and not interfere with a large project that students are completing. Similarly, regular communications with teachers will also ensure the desktop images that IT technicians create include the software necessary to support lesson plans.

Officials should also determine if some types of applications aren't right for a virtualized environment. For example, the performance of graphic-intensive video and computer-aided design (CAD) programs may be unacceptable when large files associated with the solutions flow between data centers and end-user devices.

Finally, extensive technical planning is crucial. Buffalo schools spent a year planning the architecture of the new data centers that support connected learning and other matters before they began installing any new equipment. They then launched pilot projects at representative schools to further validate their approach. "The large amount of time we devoted to planning the project was really the key to our success," Edwards says. "If we had just taken the approach of 'let's launch into the project and see what happens,' we would have been in a much different place than we are today."

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Managing an Increasingly Mobile World

Virtual desktops provide a solid foundation for connected learning, but many school districts will want to enhance this technology base with tools that accommodate the influx of mobile devices and applications. One study found that 25 percent or more of schools in approximately 70 percent of U.S. school districts used mobile technology in 2014, a rise from 60 percent a year earlier.[5] Mobile adoption doesn't appear to be slowing down anytime soon. In the same study, decision-makers at 82 percent of the districts described themselves as highly interested in implementing or expanding 1:1 mobile device activities over the next two years, if funding is available.

What's needed for mobility-fueled learning is a comprehensive set of tools for deploying, managing and securing devices for today's classrooms. The must-have features that IT managers should look for when evaluating solutions include nine core capabilities. The ability to:

1. Configure access to suitable applications and content based on grade levels
2. Track all mobile devices and apps running in the school's environment
3. Define and enforce district security policies
4. Automate user settings to comply with federal and local regulations
5. Regulate access to school networks
6. Monitor Web traffic and restrict access to specified websites
7. Restrict access to email, apps, chat or messaging functions, per school policies
8. Detect rooting and jailbreaking, which can increase security risks in mobile devices
9. Flag appropriate personnel when personal information about students has been disclosed without proper authorization

Mobile device management (MDM) programs are the go-to solutions used across various industries to accomplish these tasks. But given the unique needs of education institutions, school districts should look for management software that offers controls specifically for education environments. For example, school officials should be able to define usage policies and automate their enforcement using a central console. The programs should also enable detailed controls specific to individual mobile platforms. For example, administrators should have the choice to permit only one chosen app to run on a tablet to control the device during an online assessment. Similarly, IT managers may restrict a tablet's ability to wirelessly transfer files while the tablet is connected to the school's Wi-Fi network.

When evaluating MDM providers, it is essential school districts look for a provider that is building out enhancements specific to meet the needs of K-12 mobile learning. Outside of an opportunity to provide central management for school IT departments, an MDM provider should also empower both teachers and instructional technologists with mobile technologies. Teachers need to be able to guide mobile learning safely and manage the use of classroom devices while providing instruction. Instructional technologists need ways to enroll and configure school-owned devices quickly and in bulk quantities, across potentially thousands of students — MDM platforms should take this need into account.

The right virtualization platform and mobile management tools for connected learning that cater to the needs of educators create a foundation for promoting student success for years to come.

Connected Learning for the Long Term

To successfully integrate and take advantage of next-generation teaching and learning models in today's K-12 classrooms — including personalized learning, online learning and 1:1 instruction — schools need a reliable management and security environment. The right virtualization platform and mobile management tools for connected learning that cater to the needs of educators create a foundation for promoting student success for years to come.

Endnotes

1. http://e97f7d10b0a403e208e5-9fbee7de8d51db511b5de86d75069107.r75.cf1.rackcdn.com/CDESR_Q4_Interactive_V.PDF
2. www.weather.com/storms/winter/news/winter-storm-astro-students-stay-home-20141112
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