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A Roadmap to Digitally Delivered Education

Start the journey with an integrated plan for reaping the academic, economic and management benefits of technology innovations.

Produced by CENTER FOR DIGITAL EDUCATION

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A Smart Strategy for Integrating Technology

Every year, the education technology available to school leaders becomes increasingly impressive. This can be both a blessing and a curse for K-12 schools and districts. With each new advancement comes the fresh promise for creating better academic results by preparing students to reach higher levels of achievement. But it's also difficult for budget-strapped schools that want to stay competitive and give students the best possible resources while also integrating new technology into a cohesive whole that quickly delivers academic results. Add the pressures of policies and initiatives that aim for increasing achievement scores, addressing Common Core State Standard (CCSS) requirements, Race to the Top imperatives and other performance-based programs, and the digital age can look like a whirlwind of programs, policies and products ready to spin into chaos. What K-12 schools and districts need is a plan.

Fortunately, as the elements of a smart strategy for digital education are becoming clear, so too are the specific integration practices and technologies that together will deliver successful results. Even so, the foundation for digital education can't be rigid, cookie-cutter solutions. Each school district has unique needs in and outside of the classroom and for this reason, the right strategy and mix of technologies requires local control combined with an understanding of what's possible today. This Center for Digital Education (CDE) handbook provides a five-step plan to help leaders begin the journey to creating digital schools that not only serve students better, but increase the effectiveness of administrators, teachers and support services for a price tag that accommodates today's economic realities.

ABOUT THIS HANDBOOK

Produced by the Center for Digital Education, with underwriting support from Samsung, this handbook takes a realistic look at how to create a framework for digital technology that solves today's challenges and evolves to support tomorrow's innovations. Integrating ideas about technology, policy and process, it includes examples from schools across the country that have successful plans for adopting new technology and ensuring that these innovations work together to achieve results that are bigger than the sum of each individual part.

Step 1:
Recognize the Rewards and Risks

With all the challenges schools face today — whether academic, budgetary or regulatory — why even devote resources to going digital? The answer is fundamental to the mission of every school: Technology offers exciting new ways to better engage students and prepare them for life in the 21st century.

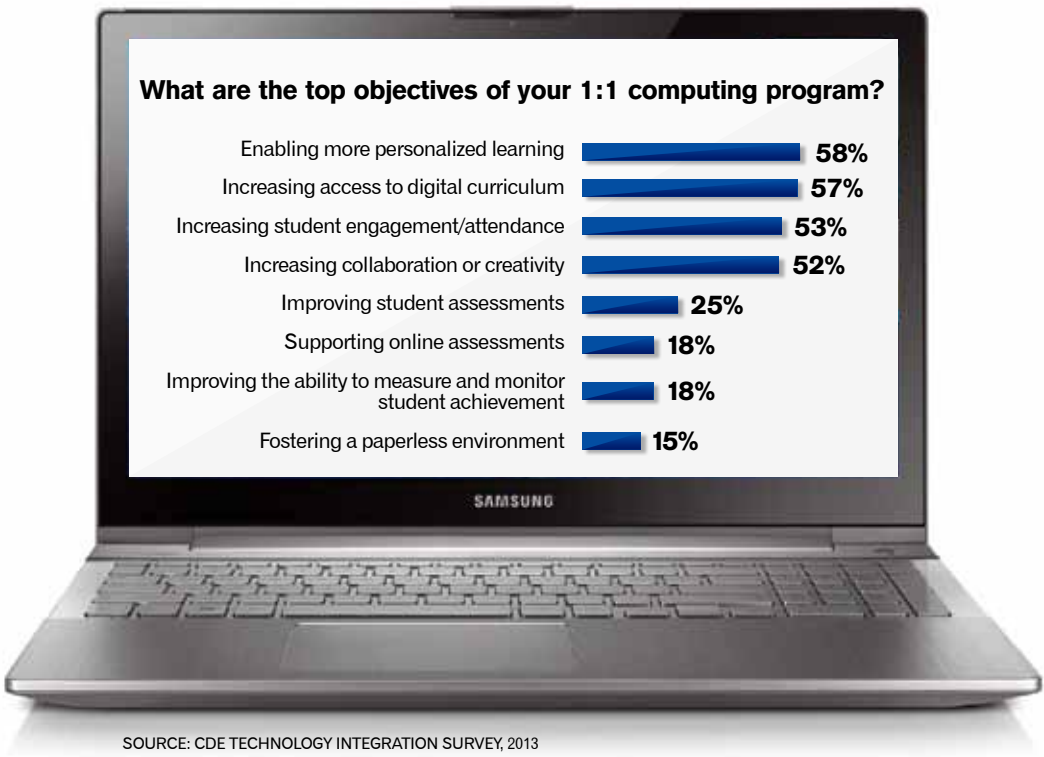
However, research over the last decade points to two clear and conflicting realities about the effectiveness of technology in education. First, and most encouraging, the tie between technology and better outcomes in K-12 education is real. In a CompTIA study entitled "IT Opportunities in the Education Market," 78 percent of K-12 teachers and administrators said technology has a positive impact on classrooms and the productivity of students. A significant majority of school leaders — about 65 percent — said that student productivity rose thanks to an increase in classroom technology.[1]

The second trend isn't so encouraging — namely that technology success isn't guaranteed. While there are opportunities for school districts to reap benefits, not all technology programs succeed or even show significant improvements. For example, five years after the state of Maine implemented an ambitious program for 1:1 computing, follow-up studies found only a slight uptick in student scores.[2]

Similarly, a *New York Times* article profiled an Arizona school district, which has spent around $33 million since 2005 on laptop computers and related technologies. Despite this investment, while teachers anecdotally report seeing more enthusiastic students as a result of the technology push, the district's administrators haven't identified forward progress in standardized test scores.[3]

What's the takeaway? In certain cases where school districts outperform others in technology implementation and integration, key factors have a bearing on success:

- Commitment from administration and other leadership from the outset for comprehensive technology integration
- A clearly defined strategy for how technology will be introduced and used, and thorough professional development for teachers
- Frequent implementation of technology into core lessons
- Innovative methods of integration both in and outside the classroom



SOURCE: CDE TECHNOLOGY INTEGRATION SURVEY, 2013

Considerations When Evaluating Opportunities and Challenges

The following is a list of considerations for school districts to address in the very early stages of identifying the risks and rewards when implementing an integrated technology framework.

- ✓ Determine how new digital tools can further the goals and objectives of the current educational strategy.
- ✓ Identify areas where the current policy requires revisions and updates to address new opportunities and innovations.
- ✓ Create an outcomes-oriented presentation that clearly demonstrates the potential benefits of the new technologies to senior school district officials and parents.
- ✓ Organize a cross-section of educators, technology staff and administrators who back the digital strategy to explain and promote the idea to others.
- ✓ Thoroughly review available industry research to understand the pros and cons of digital classroom models.
- ✓ Check with your state's department of education to see what advice or support it can offer.
- ✓ Consider how to integrate technology in all aspects of the district, not just the classroom (covered in more detail in Step 4).

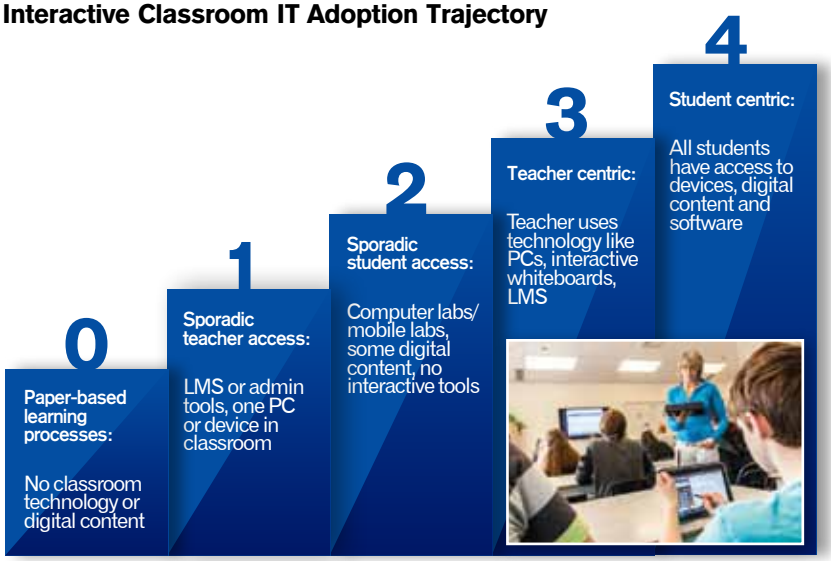
Step 2: Develop a Roadmap

It's not enough to merely introduce the latest and greatest technologies into classrooms. School districts must craft a careful strategy that seamlessly blends technology into the district environment, and then merge that with the right education plan and professional development activities within each school. According to a recent CDE survey on the status of technology integration in K-12 education, 56 percent of respondents stated that it takes more than 12 months to fully implement a district-wide technology initiative, so it is important to have a well-thought-out strategy from the start.

ASSESS THE CURRENT ENVIRONMENT AND DEVELOP A VISION

To start, school districts should first determine what stage they are currently in when it comes to technology integration. IDC Government Insights provides a framework to help schools districts do just this. In its white paper, "The Next-Generation Classroom: Smart, Interactive and Connected Learning Environments," IDC outlines five stages of technology integration starting with paper-based learning, where there is no technology in the classroom, and moving all the way up to student-centric learning, where all students have access to a device and digital content/software. (See figure below for all five stages.)[4]

Interactive Classroom IT Adoption Trajectory



SOURCE: ADAPTED FROM IDC GOVERNMENT INSIGHTS WHITE PAPER, "THE NEXT-GENERATION CLASSROOM: SMART, INTERACTIVE AND CONNECTED LEARNING ENVIRONMENTS"

Districts also need to assess their current IT infrastructure and identify what upgrades are needed to prepare for the onslaught of technology and higher traffic volumes to support fast and reliable communications. Particular attention needs to be paid to Internet capabilities, including the main public connection, and wireless access points in classrooms and other areas of the schools. Addressing these needs and building the appropriate support structure will build a foundation that can scale into the future.

Once districts have identified where they are in the technology integration process and have addressed infrastructure needs, it is then equally important to outline what they ultimately want to achieve with their technology implementation. Innovative school districts are purchasing interoperable solutions that put tools such as content sharing, polling and surveys; and device management into the hands of teachers and students via tablets, laptops and interactive whiteboards to truly transform learning inside and outside of the classroom.

START SMALL TO BUILD BIGGER

If your district is still closer to the paper-based learning stage, start by piloting tablets in the classroom, or if you are further down the 1:1 computing path, start looking at ways to expand technology outside of classroom walls.

For example, Richland School District Two in South Carolina is improving the classroom experience with digital tools. Instructors and students connect to the Web using Samsung Chromebooks for research and to access online applications and class assignments.

"With the mobility of the Chromebooks, we can push together the tables in the classroom or gather in a circle on the floor to allow students to easily work together on a project," says Diane Gilbert, a sixth-grade teacher for language arts and drama in Richland's Kelly Mills Middle School. "This is a much different experience than what I would've had with desktop PCs, which took up a lot of space and couldn't be moved easily."[5]

An initial Chromebook rollout worked so well, Richland Two increased its commitment to 14,000 devices for the 2012-13 academic year. The project is helping the district stay on track with a 1:1 strategy it began more than a decade ago, which had the eventual goal of providing a computing device for students in every grade level.

"In our district, the responsibility for instructional technology is in IT, not in academics," adds Debra Hamm, CIO. "But we all know that while specific devices can make a difference, it's really all about the learning that they enable."

While a Chromebook deployment and 1:1 strategy are steps toward the right direction, they are only a part of becoming a fully interoperable and interactive classroom learning environment.

IDC Government Insights believes that, "School education is at an inflection point as classrooms that embed technology into the core learning processes and curriculum become what we call a Smart Classroom."[6]

A smart classroom takes implementation a step further with tools like tablets, interactive whiteboards and software designed to provide better student-teacher interactions and improved classroom management. A smart classroom strategy also needs to be applied in the context of the entire school or district.

A guided and methodical approach to a smart school strategy can be measured and controlled, and proper support can be given at each phase. It can take a school environment that is paper-based with limited technological access to teachers and students, to a school that is student centric and fully interactive. This type of cohesive framework not only improves student learning, but creates positive effects throughout the district as a whole.

Roadmap Considerations

- ✓ Interview schools that have already implemented digital classroom strategies to learn from their experiences.
- ✓ Establish a vision and develop an internal impact study to identify potential gaps in infrastructure (ensuring networks can support increased traffic), staff training and other resources that must be addressed.
- ✓ If new investments in technology, infrastructure and training will be required, clearly document the costs and then support the proposals with a return on investment (ROI) analysis.
- ✓ Identify resources that will be easily adapted to class instruction with a concentration on providing measurements of success.
- ✓ Decide on the best way to roll out new digital tools — start with small pilot projects in designated classrooms, and eventually build to reach the entire school and district.

SMART CLASSROOM IN ACTION

Shelby County Schools in Tennessee provides a perfect example of how a smart classroom platform can enable a more interactive and engaged learning experience.

The 6th-grade math class at Geeter Middle School, part of Shelby County Schools, has adopted the Samsung School solution. The class uses 35 Samsung Galaxy Note 10.1 tablets, a 65-inch Samsung interactive whiteboard and a wireless printer. Instructors are leveraging the digital resources to lead interactive lessons and real-time group activities thanks to integrations that allow teachers and students to share screens and content. Learning management tools included in the solution give students access to course materials, as well as general school notices through their tablets.

"Samsung School is the perfect opportunity to nurture our students' growth through interactive technology, which helps the teachers to track individual progress, as well as enabling dynamic lesson plans," says Cleon Franklin, director of instructional technology for Shelby County Schools.[7]

Because teachers no longer have to stand near traditional chalkboards during their presentation, they can interact more with students by roaming the classroom while displaying content from their touchscreen tablets.

The tablet's stylus, or S Pen, is an ideal solution for math students as they can write directly onto their tablets in numeric notations. Franklin says a math class was chosen for the pilot because in many ways the subject presented the greatest challenges for getting students engaged and overcoming study anxiety.

"The most powerful thing for me was how re-energizing this was," Franklin says. "During one math class, I heard a student say, 'This was the best day of my life.' How often does a student feel that way about a learning environment? The typical answer you get is, 'I hate school.' As an educator, that reminds you about why you do this work and why you put in the extra hours."

Samsung School has not only helped Geeter achieve a more participatory, engaged learning environment, it's also allowed the teacher to better track progress. "Typically, teachers don't get feedback until the class is over and they grade a test," Franklin says. "With this solution, the teacher gets the feedback right away, so they can tell if the students didn't grasp the concept and need to revisit it."

Step 3: Prepare for Using Technology in the Classroom

When students and teachers have access to interoperable digital tools in the classroom such as tablets, Chromebooks, laptops, printers and interactive whiteboards, learning is transformed. Specifically, a smart classroom with these tools enables:

Collaborative, circular learning. When students and teachers can easily share content via mobile devices, it enables greater collaboration or circular learning. This type of learning encourages students to work in teams to share ideas and solve problems. It also hones the communication and interpersonal skills that will help today's learners function more effectively in their later professional lives.

Personalized learning. New digital tools allow teachers to personalize lessons to meet students' unique learning styles. It doesn't have to be a one-size-fits-all model anymore. And when teachers can view in real time how students are doing on a certain subject, they can intervene and make corrections based on individual student needs at the first sign of a struggle.

When students and teachers have access to interoperable digital tools in the classroom such as tablets, Chromebooks, laptops, printers and interactive whiteboards, learning is transformed.

Blended learning. Blended learning combines online instruction with some form of student control over pace, path or time. When teachers and students have access to mobile devices, teaching and learning can be extended outside of classroom walls. This type of learning also raises student engagement: Seventy-seven percent of teachers said students are more motivated to learn thanks to technologies that enable blended learning.[8]

INVEST IN PROFESSIONAL DEVELOPMENT

These new ways of teaching and learning will require a significant investment in professional development for teachers. The CDE survey on technology integration found that professional development was in the top three challenges to implementing a 1:1 computing program, with 52 percent of respondents stating this. To overcome this challenge, schools and districts should focus on two areas — helping instructors become proficient in handling new teaching methods and changing classroom dynamics, and aiding them in developing skills to use the latest technologies effectively. District-wide professional learning communities can help in the first area by encouraging teachers to share lessons they've learned as they expand digital classroom strategies.

Districts can augment these sessions with input from other digitally advanced schools and with professional development services.

In other instances, the information technology or instructional technology department will take charge of the skills development necessary for new technologies. Fortunately, extensive in-depth training may not always be necessary, since many of the hardware and software interfaces take advantage of touchscreens and other innovations that simplify interaction with the applications. Nevertheless, hands-on sessions can help teachers and administrators become familiar with the devices and answer any initial questions. Outside of the classroom, similar professional development will also need to take place for administrators and staff using new technology to increase efficiencies in their schools.

Passaic City Public Schools in New Jersey implemented a 1:1 computing initiative for nearly 5,000 middle and high-school students. Previously, none of the district's classrooms had wireless Internet and up to half of its students didn't have access to the Internet at home. The district needed to prepare its teachers and staff to effectively use the new technology to reach students in ways not previously possible.

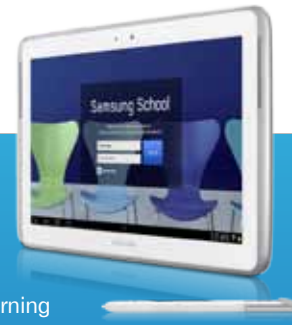
"What we wanted to avoid is having teachers use the Chromebooks as just a digital version of their textbook, says Joanna Antoniou, technology coordinator at the district's Lincoln Middle School. "The Chromebook isn't a really expensive pencil."[9]

In order to make sure teachers and staff were prepared for the new technologically advanced learning environment, Passaic City Public Schools held a series of workshops to target key areas of concern. The workshops targeted the changing dynamics between teachers and students, the importance of students understanding the impact of their digital footprint, and the guidelines for taking and posting pictures, among other things.

Considerations for Professional Development

- ✓ Educate instructors about the three transformational learning models.
- ✓ Facilitate discussions with instructors to address questions and concerns about new teaching methods and use this feedback to create an overall change-management program to help staff members accept and adopt the new methods.
- ✓ Consider organizing a focus group with select students to introduce the new learning models and solicit feedback; use the insights to develop plans for rolling out the changes to the larger student body.
- ✓ Set aside time and resources for workshops and other training to help instructors understand the opportunities of digital classrooms, and consider putting professional development modules online for just-in-time viewing.

- ✓ Consider professional development for administrators and other staff, which may need to hone new skills and adjust their role within school systems.
- ✓ Make the expertise of the IT staff available to teachers and administrators via internal wikis and blogs. These central resources for addressing common questions and concerns grow over time and can incorporate lessons learned from teachers and administrators.
- ✓ Create a best practices handbook based on interviews with vendor reference accounts.



SAMSUNG SOLUTIONS DELIVER:

✓ **Interoperable Digital Learning Environments**
Samsung School harnesses Samsung's latest technology to create the ultimate interactive learning environment. Built for the Galaxy Note 10.1 tablet, the solution provides interactive teaching tools and an intuitive learning management system that helps empower teachers and engage students in digital learning.

✓ **Mobile Devices**
Samsung offers a full-range of mobile computing devices, from Samsung Chromebooks to Android-powered Galaxy tablets and Windows 8-based ATIV notebooks, tablets and hybrids.

✓ **Interactive Whiteboards**
Samsung interactive whiteboards support multiple points of touch and are interoperable with classroom computing devices, providing a focal point for learning and energizing classroom discussions.

✓ **Cloud Displays**
Samsung Cloud Displays are all-in-one zero-client solutions that are an ideal solution for crowded computer labs, reducing cable clutter and IT support time.

✓ **Digital Signage**
Easily share information within schools and with the larger community with LED-lit digital signs and video walls.

✓ **Output Devices**
Samsung's multi-function and networked printers help schools reduce printing costs and better manage information.

For more information, visit www.samsung.com/education.

Step 4:
Innovate Outside the Classroom

All of the action in digitally empowered schools isn't confined to classrooms. Computer labs and libraries, as well as administrative offices and support services, are all part of the education ecosystem benefiting from today's digital tools. These areas of support have their individual needs and challenges, and can benefit significantly from an interoperable technology plan.

ARM THE ADMINISTRATION

Because of administrators' responsibilities to teachers, students and parents alike, they need powerful tools to perform various tasks — tools to help them streamline their workflows, improve decision-making and receive real-time access to critical data.

The latest generation of tablets is fulfilling these needs for administrators. Unlike original tablets that ran stripped down operating systems, newer devices can support standard Microsoft Windows business applications. This enables administrators to consume and create content using a variety of input methods, such as touchscreen interfaces, digitized pens or optional Bluetooth keyboards. Docking stations turn the tablets into full-powered notebooks, complete with high-performance processors found in the fastest desktop machines. This use of new technology is connecting administrators to teachers, students and parents in ways not possible before.

At Franklin County School District (FCSD) in North Carolina, administrators are using tablets as part of a more effective teacher evaluation process. Following the state's adoption of online teacher evaluations, administrators wanted a more efficient process than lugging heavy laptops from classroom to classroom or transcribing handwritten notes after observations. The solution the district chose was to equip each administrator with a lightweight wireless tablet.

"We had been looking at different tablets to build cases for instructional use and to help administrators increase their productivity," says Christopher Shearer, FCSD chief technology officer. "We targeted this problem as something that could be solved through wireless tablets."[10]

The tablets reduced the amount of time it took administrators to complete evaluations, and decreased the amount of errors by eliminating the previously manual process.

IMPROVE SCHOOL-WIDE COMMUNICATION AND COLLABORATION

New interoperable technology solutions not only make it easier for schools to communicate effectively to teachers, students and staff, but also enable collaboration — two core tenets of effective education environments.

Large-format digital displays are bridging the communication gap typically present in schools. Displays can be used to deliver messages about upcoming events for the school and community at large, deliver important bulletins to the study body or even to show the lunch menu in the cafeteria.

New interoperable technology solutions not only make it easier for schools to communicate effectively to teachers, students and staff, but also enable collaboration.

Hall County Schools' Academies of Discovery in Georgia recently outfitted its hallways with LED-lit LCD displays that provide event information and showcase student projects. Staff can easily upload video clips or slide shows by connecting a USB stick.

The Academies of Discovery is also using displays to create shared collaboration zones outside of the classroom. It outfitted the Learning Commons — a two-level lounge area for students — with collaboration stations equipped with 55-inch displays that allow up to 16 students to connect their individual mobile computing devices and share their work. The lounge also has a video wall comprised of nine LED-lit LCD displays,

which is used for a variety of visual communications and also serves as a backdrop for student presentations and performances.

"LED large-format displays were the perfect solution for our needs as they allow our students to work together in a much more direct and engaging way," says Dr. Aaron Turpin, executive director of technology at Hall County Schools.[11]

School libraries are also encouraging collaboration through technology with display screens in table tops that students can navigate using touch or a variety of pointing devices. These technologies let multiple students see and respond by touching the objects and digital tags.

INCREASE BACK-OFFICE EFFICIENCIES

Despite the transition to digital tools, many schools and districts still operate in a paper-based environment. This leads to timely manual processes and makes it difficult to manage and access needed information. However, new generations of printers — specifically, multi-function printers (MFPs) — are enhancing efficiency and access to digital content, and doing so in cost-effective ways.

MFPs enable schools to easily convert paper records into digital formats, and play a pivotal role in achieving document management goals. Lifecycle

management tools can characterize and store data by when it was created, and by whether certain regulations require any special management and retention policies. As document management and workflow applications apply these rules to individual records, the data automatically moves to the most appropriate storehouse, such as front-line education applications or archival systems, enabling greater access. In addition, print management solutions can remotely monitor and manage printer fleets to help reduce costs through consolidation and optimization of the print environment.

Software solutions that combine with MFPs to automate testing and grading create additional efficiencies. For administrators, this type of automation is a welcome time saver — the latest test scores flow directly to the school's student information system, where officials and instructors can analyze areas for improvement when it comes to standardized tests and regulatory requirements.

EASE IT MANAGEMENT AND ENSURE SECURITY

The increase in digital tools coupled with tight resources presents management, maintenance and security challenges for IT teams. Fortunately, technologies are also emerging that provide solutions to these issues.

Desktop virtualization is one such solution by allowing IT departments to centrally manage computing resources. This centralized management enables better security because IT managers can apply security patches and updates to anti-malware programs to all devices simultaneously versus maintaining each end-user device individually.

Cloud displays offer centralized management and use a secure connection to designated portions of the public Internet — all according to management and security policies enforced by the school's IT department.

Desktop virtualization also eases device deployment. Aledo Independent School District in Texas realized this benefit and much more when it implemented VMware virtualization software and Samsung Cloud displays. "Deploying a Samsung Cloud display was as easy as installing a monitor," says Brooks Moore, manager of technology services. "All we had to do was take it out of the box, plug in the keyboard, mouse, LAN cable and point it to the VMware broker. Instead of spending 90 minutes for a PC deployment, we were out of there in just 5 minutes."

Moore also says that his staff is fielding fewer support calls compared to what other schools running traditional PCs might face. Reduced electricity costs are another plus. The school estimates the cloud displays are cutting the power bill by 60 percent versus traditional PCs and monitors.[12]

Cloud displays, similar to what Aledo Independent School District deployed, are becoming the device of choice when outfitting computer labs and provide similar benefits for IT. The displays pack computing power entirely within the monitor enclosure for all-in-one units that connect to a cloud-based application center to access content. They offer centralized management and use a secure connection to designated portions of the public Internet — all according to management and security policies enforced by the school's IT department. When students shut down their devices for the day, all the data is erased from the individual machines but stored safely in the cloud, easing security concerns.

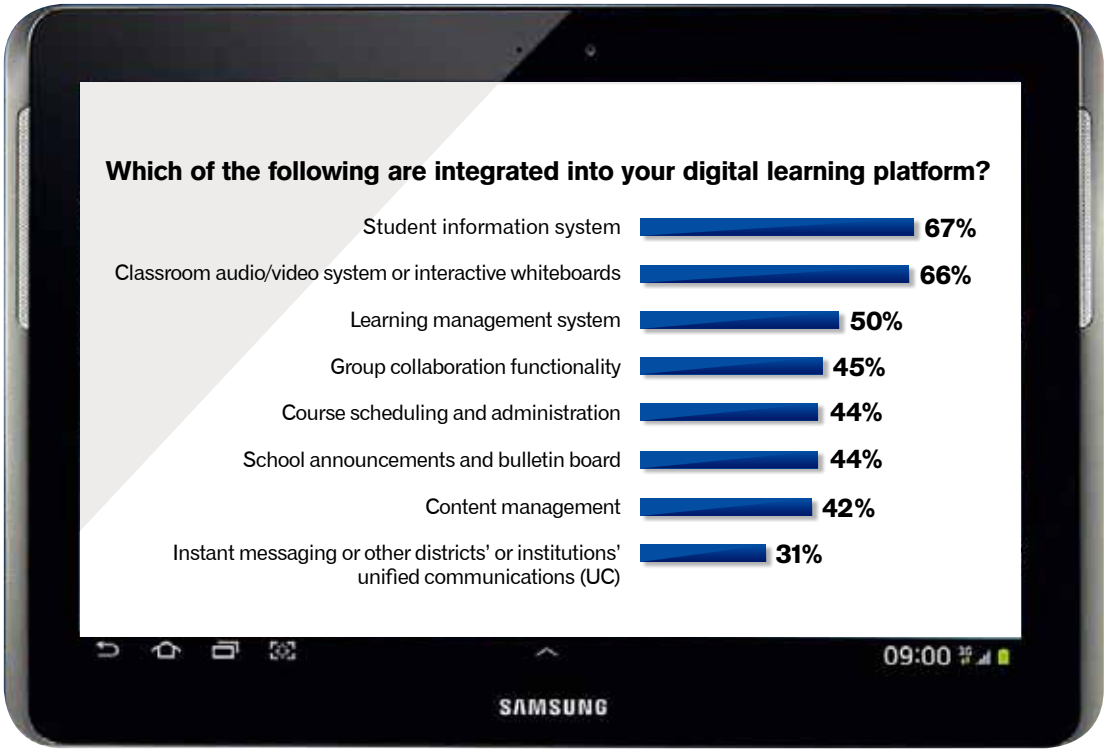
Considerations for Innovations Outside the Classroom

- ✓ Identify areas for increased efficiency at the administrative level — to improve decision-making and access to data.
- ✓ Poll students, teachers and staff to discover how school-wide communication and collaboration can be improved.
- ✓ Develop a cost analysis to determine the value of transitioning traditionally paper-based tasks to digital processes.
- ✓ Assess ways to simplify management and ensure security of the current IT environment.

Step 5: Opt for an Integrated Solution

As schools and districts expand their use of digital technologies, best practices are emerging to help ensure success. When creating a plan for more effective use of technology throughout a district, it's important to remember that technology isn't monolithic. Solutions are multi-faceted and each piece of the digital classroom platform must be integrated into a larger, smoothly operating whole.

The fastest way to achieve this integration is with a complete solution that is designed specifically for education environments. The best choices offer a comprehensive range of technology components for classrooms, administrative offices and support services. Suppliers should handle the upfront integration work, so each individual technology piece performs its job and works together with each related piece of the total solution. So, for example, the default settings on classroom tablets automatically connect the devices to a secure wireless network and communicate with the nearest multi-function printer



SOURCE: CDE TECHNOLOGY INTEGRATION SURVEY, 2013

with little investment from the IT staff. This saves time and money during the implementation process and assures that schools quickly see the value of their technology investments.

Districts and schools should look for three important components when evaluating integrated solutions:

64% of respondents to the CDE Technology Integration survey strongly agree or agree that creating an integrated digital learning environment using interoperable technologies is a top priority within their district.

1. **Interactive Management System (IMS)** — An IMS should offer a way for instructors to efficiently deliver the learning materials that students will use during class time. For example, an instructor could use an IMS to share images on his or her own computer display, or content from a student's device, to initiate a class discussion. Similarly, instructors could use IMS collaboration and interactive technology tools to manage small group, circular learning activities, field tests or instant polls, or if necessary keep the class on track by centrally locking student screens to refocus attention to the task at hand.
2. **Learning Management System (LMS)** — These systems should provide a reliable way for instructors to distribute course materials, assignments, schedules, school bulletins and other essential content to students or parents in a way that makes the information available in class or after normal school hours.
3. **Student Information System (SIS)** — Instructors need to monitor student attendance, track grades and motivate students with recognition awards or disciplinary demerits. SIS tools should provide a digital platform for managing these important areas.

Considerations for Integrated Solutions

- ✓ Send requests for information (RFI) and requests for proposal (RFP) to vendors of integrated solutions and use the replies to develop a short list of candidates.
- ✓ Ask short-list vendors to install a digital classroom test bed using all the relevant hardware and software to show teachers, administrators, IT staff, students and parents the technologies in action.
- ✓ Obtain customer references and schedule interviews.
- ✓ Work with selected vendors to develop implementation plans.
- ✓ Negotiate service and support agreements with solutions vendors.

Stepping into the Future

The age of digitally delivered education is here. Comprehensive, integrated technology solutions make it possible for school districts to adopt the latest innovations to better engage students, improve classroom dynamics and help administrators meet demands for additional services while closely managing tight budgets. But no technology comes with a guarantee of success. Schools and districts need to develop a workable roadmap for digital education, then choose and implement their solutions carefully. For a growing number of schools, this upfront work is paying off, and the biggest winners are those who need it most: today's students.

ENDNOTES:

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