Pathways to Personalized Learning

TAPPING THE POTENTIAL, REALIZING THE BENEFITS

CYNTHIA WHITE, PRINCIPAL, CLEVELAND ELEMENTARY, SANTA BARBARA, CALIF.
Hello and welcome to an era of expansion in the Center for Digital Education. As the new Executive Director, I want to take this opportunity to thank you for your continued participation as readers of our Special Reports, as active members of our surveys and awards programs, and as engaged attendees at our major conferences and research roundtables throughout the nation.

Since 1998 we have served as a catalyst to foster new leadership models and best practices as education executives rethink how to effectively meet the challenges ahead. Our roots are firmly planted in both policy and technology as a division of e.Republic, our parent company devoted exclusively to improving government and education. Our influential magazines, Governing, Government Technology and Emergency Management, along with the GOVerning Institute and the Center for Digital Government, reach over 500,000 key influencers shaping the national state and local government and education landscape.

We are more excited than ever about the perfect storm brewing in education. The changing landscape of digital content and curriculum coupled with innovative classroom technologies and a growing demand for serious change from policy-makers and citizens are creating a true learning renaissance. To this end, we continue to expand and build our team of experts in our Washington, D.C., and Sacramento, Calif., offices.

We are expanding our Senior Fellow network across the nation not only geographically but by area of expertise. We are bringing on more analyst and editorial resources. We are adding strategic event locations and will continue our ever-popular research roundtable series.

We have launched a new Digital Education Navigator tool and are expanding our Education Exchange survey capabilities. The bottom line — we are committed to this market and plan on being active participants in shaping the future of education in this country.

Please let me know what you think about our Special Report series and what other topics you would like us to cover. I am very interested in your feedback and comments and look forward to hearing from you.

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GETTING PERSONAL:
Moving Away from One-Size-Fits-All Education

When Cynthia White became principal at Cleveland Elementary in Santa Barbara, Calif., in 2012, she quickly went to work to improve academic performance—at the time, the school was the second-lowest performing in the county.

One of the first academic areas she addressed was math instruction. White piloted a game-like, personalized learning program for a month, then offered it to all classes in the school except for one that was table only (the program was not available in tablet version). In the beginning, teachers were underwhelmed. “After the first month in my pilot, my teachers said, ‘We don’t get it. We don’t see what’s really happening,’” says White.

White and the teachers looked at the program reports and saw that students had many foundational gaps. Even students in the third grade were missing kindergarten-level concepts. Students in the third grade were missing kindergarten-level concepts, making it unrealistic to expect an immediate leap to third-grade math performance.

By the end of the second month, as those gaps began to be filled, “the teachers noticed the students were more engaged and on task with math lessons, and the teachers started to see how intelligent software works with students,” says White.

To help teachers understand how to use data from the program, White paid one tech-savvy teacher to help train the others. By the end of the second month, as those gaps began to be filled, “the teachers noticed the students were more engaged and on task with math lessons, and the teachers started to see how intelligent software works with students,” says White.

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The software White chose is geared to grades K through 5. However, she suggested its use to a friend who is a junior high school principal. “I told her, ‘You’ve got students coming in to your junior high who are not performing at fifth-grade level. How are you filling in those gaps? Who is working with those students?’”

After her friend tried the program, she called White with an update. “She said one of her students who tried and tried but was just not getting math came out of a computer lab tutoring session at the end of the school day and ran all the way down the hall calling out to her: ‘I get math! I get it! I get math!’”

This is just one picture of personalized learning— an approach to education that ties learning to an individual student’s strengths, weaknesses and interests; that often lets the student work at his or her own pace, and, where possible, allows students to direct their own lessons.

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This CDE Special Report looks at the personalized learning movement sweeping through K-20 education. It will present research and firsthand accounts of how personalized learning is transforming the way we have traditionally viewed the educational model, and how leaders can overcome challenges to bring its benefits to their institutions.

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The U.S. Department of Education defined personalized instruction in its 2010 Education Technology Plan as “instruction paced to the learning needs, tailored to the learning preferences and tailored to the specific interests of different learners.”

This definition, however, leaves out one key aspect often used to describe personalized learning: that of the role of the student in directing his or her own learning. Personalized learning consultants Barbara Bray and Kathleen McClaskey point out that personalized learning is learner centered, while differentiation and individualization are teacher centered.

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THE PROMISE OF PERSONALIZED LEARNING

When we asked educators in the CDE survey to rank the benefits of personalized learning, increased student engagement was by far the top benefit, chosen by 69 percent of respondents. Other advantages include greater student retention (39 percent), improved test scores (28 percent), higher grades (22 percent) and better attendance (22 percent).

More than half of respondents who had already instituted some form of personalized learning said it had improved the performance of staff and administration — with 4 percent strongly agreeing and 41 percent agreeing. Similarly, when asked what their top reason would be to transition to a personalized learning environment, our respondents chose improved student outcomes (40 percent). Increased student engagement was second at 25 percent. Also important: student retention (13 percent) and improved student outcomes (40 percent). Increased attendance (22 percent).

While personalized instruction has been in use for years, says Fennell, “with emerging technology, it’s just better and faster and more engaging for students.” Some digital programs use game-like interfaces, creating a competitive, entertaining atmosphere for learning to occur. “It will keep them on task, whereas, ‘Hey, I want you to do three rows of problems in the book’ isn’t necessarily as exciting,” says Fennell.

PROJECT R.E.D., an organization that conducts studies on what makes technology implementations successful, found that intervention classes for English Language Learners, students in Title I schools, special education students and struggling readers were especially successful when transformed with technology that allowed students to move at their own pace, such as with electronic curriculum.

Francis (Skip) Fennell, an endowed professor of education and graduate and professional studies at McDaniel College in Westminster, Md., and past president of the National Council of Teachers of Mathematics, says “adaptive” digital math programs offer advantages over typical teaching techniques involving mathematics. (“Adaptive” or “intelligent” learning software adapts to a student’s performance while the program is in progress, offering different lessons or activities depending on a student’s responses in order to better address each student individual strengths and weaknesses.) Such programs, says Fennell, “meet the interests and the comfort level, and what students expect in terms of using technology as a tool to help them learn. Every student can be engaged.”

Students can work with digital “manipulatives,” or visual ways of seeing how math concepts and objects relate to each other. But what’s most important, says Fennell, is the personalization: letting students start where they need to start and then move along at their own pace.

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GRADES ARE GREAT EXTRINSIC MOTIVATION, BUT WHAT WE REALLY ALL HOPE FOR IS SOMEONE TO SAY: ‘I WANT TO DO THIS BECAUSE OF WHAT I CAN ACHIEVE.’

EUGENE RUTZ, ACADEMIC DIRECTOR, UNIVERSITY OF CINCINNATI COLLEGE OF ENGINEERING

Successful personalized instruction helps students develop the desire to learn for the sake of learning, adds Eugene Rutz, academic director at the University of Cincinnati College of Engineering & Applied Science. “The whole idea of student-centered pedagogy is that when students are engaged and interested in learning the content because they are doing something that they view as worthwhile, it leads to greater intrinsic motivation,” says Rutz. “Grades are great extrinsic motivation, but what we really all hope for is someone to say, ‘I want to do this because of what I can achieve.’ I believe these more personalized learning environments enable that to happen for a greater number of students.”

Many examples exist that show how a personalized approach to learning engages students and improves achievement. Here are just a few:

• One of the most well-known models of personalized learning is New York City’s School of One, a math education program in three city schools that gives students a personalized playlist of activities to complete each day based on each student’s performance and other measures. By the end of its second year, the schools were posting proficiency gains far ahead of the city and other charter schools. A spin-off program, Teach for One: Math, is being taught at schools in Chicago and Washington, D.C. Seventh graders in one of the Chicago schools gained 18 months of learning progress in less than a year.

• At Humbleton Central Regional High School in New Jersey, students work with teachers to create their own personalized learning plans, choosing what texts to read, activities to accomplish and media to use in order to meet course objectives.

• Freshmen chemistry students at New Mexico State University began using an online, interactive, multimedia-based learning program in 2012 to supplement classroom instruction. The program adapts to multiple learning styles and different learning levels. Students’ passing rates jumped from an average of 64 percent before the program to 77 percent after, with fewer dropping the course and more earning an A grade.

• Huntsville City Schools in Alabama implemented a 1:1 mobile device program in 2012 and replaced textbooks with interactive, personalized digital curriculum. Students access their digital content anywhere, anytime and are logging in as often outside school as during school hours. Test scores are up (reading by 18 percent and math by 27 percent) and discipline issues have declined.
REAL RESPONSES TO PERSONALIZED LEARNING

THE CDE SURVEY ASKED FOR OPEN-ENDED COMMENTS about the benefits and challenges of personalized learning. Here is what some of the respondents had to say:

**BENEFITS:**

"Students can learn better when they have a hand in their future and what they hope to accomplish."

"Benefits are many, especially for high achievers. For that group, personalized learning can keep them engaged."

"Developing a culture among educators that allows for creative lessons and innovative learning environments."

"Students are definitely more engaged and proud to show what they’ve accomplished with their mobile devices."

"The main benefit of a personalized learning environment is its portability into the real world. With a personalized learning environment, students learn in school much in the same way they learn outside of the classroom."

"Greater student retention of material and less apathy toward learning."

**CHALLENGES:**

"The biggest drawback is the amount of time that would be required to attain mastery of facilitating a personalized learning environment for teachers."

"In a college class, it is too difficult to cover the required material in a limited amount of time. Especially if you also have to accommodate personal modes of learning. The culture of a lecture is ingrained in too many professors."

"Relies on students to stay motivated and interactive which is an issue to a subset of students."

"As a teacher, the main drawback is that I will no longer know what my role is. This ambiguity will make it hard for me to justify my existence in the new paradigm."

"The inability of the institution to change culturally."

"Not enough technology or outdated technology — most teachers have had little or no training in the emerging technology."

"Decreased interaction with fellow students can be a serious drawback if students are isolated."

"Cost is the greatest drawback, along with the ‘we have never done it this way’ thinking as a close second."

"Students are allowed to explore topics of their choice, resulting in higher learning and personalized attention."
HOW PERSONALIZED LEARNING IS SUPPORTED BY NEW TECHNOLOGIES

The increase in mobile devices, digital content, data analytics, video tools and other technologies have helped make personalized learning much easier to accomplish. Adaptive learning programs have come into play on a user's personal interests, learning styles and gaps in knowledge, using engaging, often game-based platforms to help students grasp new material. And just as classroom technologies have been advancing, so have the administrative tools necessary to enable individualized learning. Here’s a look at some of the top technologies fostering the shift to personalized instruction.

MOBILE DEVICES. An increasing number of institutions are adopting bring-your-own-device (BYOD) strategies to make 1:1 device-to-student ratios a reality. Our CDE survey found that 27 percent of respondents offer a BYOD environment and/or have a 1:1 program already in place. Tablet adoption is steadily on the rise especially for use in education, with an interface designed just for students and instructors. They can be personalized to allow instructors to easily transfer digital content to students on an as-needed basis. The secure, Children’s Internet Protection Act (CIPA)-compliant devices are Internet-filtered both inside and outside school; inappropriate apps are blocked, and instructors can manage what students are doing during class.

In Auburn, Maine, kindergarten students are given tablets to use on a 1:1 basis. This change, along with a more personalized approach to teaching (including more small groups and one-on-one teaching), is being credited with a rise in student scores. From fall 2011 to spring 2012, kindergartners’ reading scores rose 48 percent. When the kindergartners entered first grade in fall 2012, more were prepared in reading, math and phonics than in the past.24

At Franklin Elementary School in Ludington, Mich., second-grade students were provided with tablets. Test scores rose as a result: Math scores were 6 percent higher than the district average, as well as 6 percent higher than in a previous year without tablets; reading scores were 9 percent higher than the district average and in percent higher than a previous class without tablets.25

The University of South Carolina School of Medicine - Greenville issues all medical students a laptop, tablet and classroom response device so students can use the school’s online curriculum, testing and other interactive technologies.26 Seton Hill University gives tablets to all full-time freshmen to help students be better prepared for their careers; instructors prepare lessons incorporating mobile learning tools.27

IN AUBURN, MAINE, A 1:1 TABLET INITIATIVE AND PERSONALIZED INSTRUCTION HELPED RAISE KINDERGARTNER READING SCORES BY 48 PERCENT IN UNDER A YEAR.

In what ways does your district/institution provide a personalized learning environment for students?

- Use of alternative instruction models (i.e., blended, flipped classrooms)
- Curriculum tailored to individual student needs
- Rich environment for students and faculty
- 1:1 device to student ratio
- Students participate in the construction of their own curriculum

Source: CDE Personalized Learning Survey, 2013

Digital content, including adaptive software. Educational software is being transformed by the advent of adaptive learning technologies — programs that capture everything a student does, including scores, speed and accuracy, delays, lapses, drop-offs and keystrokes. These formative assessments are collected by the program and then used to customize learning on the fly, giving students new tasks based on results, interests and learning style. Adaptive learning programs can identify students who could be placed in small groups for specialized instruction. For instance, all students who struggle with a particular element of a lesson can be grouped together (allowing other students to work on other concepts). Programs also exist for students with special needs. Students’ “social-emotional competencies,” such as developing empathy or anger management techniques, can be taught via online mobile apps. Because students may act out for various reasons, targeted lessons, aimed at the situation underlying the behavior, can be more effective. Such program interventions can also free up school staff to work in person with students with more serious concerns.

In years past, digital content came in bundles that were difficult to break apart. Today, smaller chunks of content — learning objects or modules — are available, including free and open source options. This gives educators more flexible (and affordable) content choices.

Cynthia White, the principal at Cleveland Elementary School in Santa Barbara, Calif., mentioned previously, worked as a curriculum director for her...
district and became a savvy digital content shopper. She cautions buyers to watch out for adaptive software that is lacking in key features. “Some have a lot of gaming aspects to them and not a lot of educational foundation. Some have a lot of educational foundation but they look like online worksheets, so there’s not motivation and interest,” says White.

**VIDEOCONFERENCING, LECTURE CAPTURE AND SCREENCASTS.** Students at Eastern New Mexico University taking a course in Latin American storytelling recently spent two hours in a live, virtual session with author Brianda Domecq, asking her questions and exploring ideas the class had touched on in their readings. “Hands down, it was their single favorite, most enriching experience in the class,” says Mary Ayala, dean of the College of Liberal Arts. “For students from very rural and provincial backgrounds, this was an experience they would normally not have.”

Videoconferencing can provide many such benefits, but it can also be used to provide non-academic services to students. At Wright State University in Ohio, deaf students receive drug and alcohol counseling via video, relying on high-quality video transmission to use sign language to communicate with counselors. Video presentations and lectures can be captured and recorded for later viewing. New technologies allow this captured material to be tagged, so that viewers can jump to specific spots of interest. Speakers can also be viewed at faster or slower speeds, ideal for reviewing lectures. Students can create customized catalogues of video content meaningful to them, using captured (and searchable) lectures and materials provided by instructors. A medical student studying a particular type of laparoscopic surgery, for example, could collate a variety of instructional videos in one place.

Video “learning objects” can also have data tracking enabled, so that educators can see which students watched which segments of which videos and how supplemental material was accessed. This type of usage statistic can be linked to student performance so instructors can see the relationship. IT departments can also use this tracking information to determine usage needs.

Instructors can use data to personalize future lectures by assessing if students had trouble with particular concepts — perhaps breaking down a lesson into a smaller video that describes a topic in more detail or in a different way. Instructors who otherwise only interact virtually with their students can use the face-to-face opportunities videoconferencing provides to get a better handle on what engages individual students.

Educators can also use captured lectures, webinars and video tutorials for professional development. Teachers at Lincoln Middle School in Passaic, N.J., are using their laptops to create screencasts for tutorials, says Technology Coordinator Joanna Antoniou. “Teachers are also letting students make tutorials. Students explaining something to other students is very powerful; they prefer to hear it from a peer versus an adult and learn at a much deeper level when asked to present.”

**PROJECTORS, INTERACTIVE WHITEBOARDS AND SMART TABLES.** Interactive whiteboards help meet different learning styles by being both visual and tactile. Students can use these touch-screen devices whether they are positioned on the wall or on a table. Some smart tables on the market work by having six tablets connected on the surface of the table that can share data back and forth. Students can work on small, project-based tasks together, learning collaborative skills.

Material can be sent wirelessly from tablets or other mobile devices to an interactive whiteboard for viewing by the entire class. A student presentation might be shared this way, as well as digital content provided by the instructor.

Students can take non-digital materials they’ve created — a drawing or graph, for example — and display this with a document camera and projector. At Lincoln Middle School, teachers and students can dock their laptops at a podium and have content automatically displayed on interactive whiteboards, says Antoniou.

Goshen College in Indiana gives all full-time freshmen tablets to use for core courses. Instructors are also equipped with tablets and are able to use them to project and annotate presentations on classroom interactive whiteboards. One instructor describes moving about her classroom as students work, while continuing to control the presentation remotely on her tablet. The ability to stay mobile while teaching students allows instructors to spend more one-on-one time with individual students.

“I’m more efficient because I no longer have to run back and forth from the students to the projector,” says Professor Christine Willard Noria. “Now that I’m mobile in the classroom, I have a closer presence to my students.”

**SOCIAL NETWORKING/COLLABORATION.** Digital learning programs can include social media interaction modules that allow students...
to conduct peer-to-peer learning. Instructors can also be a part of these forums. At Florida Virtual School, teachers set up Facebook pages for their students to communicate with them – but the challenge is to keep up with students’ changing preferences in social media. “This continues to evolve as we learn where students are,” says Zodi Marshall, vice president of instruction. “For example, now students are saying Facebook is for old people!” Similarly, the school used to communicate with students via calls and email, but now many students prefer text messages.18

At Eastern New Mexico University, faculty meet virtually with students inside and outside of class using online forums such as Google hangouts, group Skype and Wimba. Instructors often meet with groups of students and answer questions collectively. Not only has this reduced having to repeat the same answers in individual emails, says Dean of the College of Liberal Arts Ayala, but instructors really like the interactivity. It also allows instructors to spend more time focused on certain areas of a lesson in class to ensure every student has an understanding before moving on.

FEEDBACK SYSTEMS. Instructors can receive real-time feedback via students using handheld clickers or clicker programs on mobile devices. Results can be used to help the instructor personalize instruction, with students perhaps divided into activity groups based on mastery.

Using handheld feedback devices helped low-to-average-achieving students make three to four months of extra progress each year, according to a study issued by York University in September 2012. Researchers found that when feedback technology was integrated into teaching and learning, students became more engaged and their achievement levels increased.24 The research echoes earlier studies showing that the use of interactive whiteboards was associated with a 16-point gain in achievement — with students wearing around their necks or affixed to desks. Clicker apps on phones and tablets let students provide even more feedback to an instructor. Students might be asked to solve a problem using a feedback app; the instructor would see not just the answer, but thumbnail images of the work students are completing.

MODULES TO MANAGE STUDENT DATA. One new type of cloud-based software is geovisual analytics. In other words, a solution that helps educators interpret a variety of data in an integrated way. For example, the system can merge together maps with multiple types of data: One might show district test scores by neighborhood along with a layer showing where the WiFi access points in a district are and another layer showing where student homes with Internet access are located. This way, administrators could see patterns and perhaps work with a community partner to provide more computer time for students.

New forms of data analytics can help break down data silos, integrating social welfare data, health information and test scores, for instance. Contacts can be made on a selected, filtered basis, with email, snail mail or texts sent to just the affected students and their families.

With personalized learning evolving so quickly and more data about students becoming available through digital learning programs, it is key to have administrative tools that can handle this data and make it meaningful for educators and decision-makers.

CAMPUSS MANAGEMENT SYSTEMS. A learning management system (LMS) is an essential tool that can be used by instructors to collate student data and other analytics. These types of campus management systems can not only see what students are doing on their devices at any given time, but can also be used to distribute apps and other material. They are critical to an effective personalized learning environment. At the post-secondary level, most institutions use LMSs that have built-in analytics to show how students are progressing. If assessments are included in the LMS, the instructor can gauge where students are and use this data in the classroom to group students together and detect patterns.

Jim Jorstad, director of academic technology services at the University of Wisconsin - La Crosse, says administrators must be aware of evolving LMS technology. “Schools need to be abreast of what they are using now and think about how that is going to be usable in the next two to three years,” he says. “When groups are signing long-term contracts, it might make faculty feel comfortable and you might be able to work a good financial deal, but the technology changes so much that I think schools need to be pretty nimble.”

Jorstad suggests being aware of new products that might better serve your institution’s needs and piloting them to see what works.29

DATA ANALYTICS AND DASHBOARDS. The New Media Consortium’s 2013 Horizon Report on trends in higher education warns: “The biggest barrier to personalized learning is that scientific, data-driven approaches to effectively facilitate personalization have only recently begun to emerge; learning analytics, for example, is still in the very nascent stage of implementation and adoption within higher education.”

Indeed, data analytics software is critical to the implementation of personalized learning — providing instructors know how to use it

“The software piece gives us a little more hard data, so immediately you can see what the students are doing,” says Cleveland Elementary’s Cynthia White. “You can see how long the students are spending on the program and if they are engaged. You can tell when they signed in and out and what they did.” For busy teachers in a classroom, this is important information, since they can’t watch each child during an entire class session.

It’s also key for teachers to know if a student is only staying in a favorite online corner of a program, completing activities he or she is comfortable with, says White. If this happens, teachers can set up restrictions so students are required to choose a variety of program activities.

A user-friendly dashboard helps instructors interpret and act on the data they are receiving. One dashboard on the market today lets them see everything students are doing remotely across all applications, along with their data, which helps in student consultations and lesson planning.

“Data is one of the biggest benefits of technology because you can instantly look and see where the gaps are. In the past it took a bit of work for the teacher to see what students were missing,” says John Logan, vice president of curriculum product innovation for Florida Virtual School. “Now you can see that on this benchmark, they haven’t quite got the mastery they need. I think data is going to be a huge part of learning in the future, both in brick-and-mortar classrooms and virtual classrooms.”31

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JOHN LOGAN, VICE PRESIDENT OF CURRICULUM PRODUCT INNOVATION, FLORIDA VIRTUAL SCHOOL

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Preparing the Way to Personalized Learning

Before an institution can shift to a fully personalized learning environment and take advantage of any of the technologies outlined previously, some preparatory steps need to take place. Schools and colleges must assess their technical framework—the infrastructure needed to support increased online demand—to make sure it is strong enough. Another consideration is the physical structure: whether classrooms and the furnishings within them have been optimized to allow individualized instruction to flourish. They also need to address new models of learning, teaching and assessing student progress.

Infrastructure/IT Readiness

Much of the promise of personalized learning depends on bandwidth to handle multiple multimedia streams, including wireless network connections for mobile devices. However, up to 80 percent of school districts don’t have sufficient capacity, according to the federal government.

In June 2013, the Obama administration called on the Federal Communications Commission to build high-speed digital connections to America’s schools and libraries, with the goal of having 99 percent of schools connected within five years to next-generation broadband and high-speed WiFi (at speeds no less than 100 Mbps and with a target of 1 Gbps). Obama called for adjustments to the E-Rate program to provide more funding for these upgrades—much needed, since, according to the White House, fewer than 20 percent of educators say their school’s Internet connection meets their teaching needs.

This “ConnectED” initiative also calls for more teacher training. Businesses and communities, as well as districts and schools, were asked to support a vision of more technology in the classroom “to drive empowered, more personalized learning.” Other ways schools can find funding for infrastructure improvements include private grants, partnerships with other districts and educational institutions, and converting print textbook initiatives to digital content.

As part of readying institutions for the influx of mobile devices, IT departments also need to be concerned with security measures—authentication processes, access control, identity management, privacy protection and mobile device management. Some new tablets designed exclusively for educational use, for example, have authentication that occurs via QR codes. On first use of the device, the teacher or student presses a button, causing a camera app to launch; the QR code is scanned, credentials are transmitted and then a secure connection is made.

Mobile device management can be tricky, especially with consumer-level tablets not designed for large-scale institutional use. There are also challenges in a BYOD environment, with a variety of devices accessing networks. However, programs exist to help IT track and manage multiple devices. Additionally, as more education institutions turn to cloud apps and solutions to provide personalized learning, they have to ensure cloud security. Education institutions need to make sure they have a full understanding of external mandates for protecting information in the cloud, and how cloud service providers will comply with these mandates.

Many service providers have cloud-specific solutions to ease security concerns, including encryption, authentication and data loss prevention.

Data storage is another issue, especially given the increase in the amount of data collected by newer programs and technologies. “Big data” is presenting challenges for institutions as they figure out where and how to store it. A variety of options exist, including cloud-based data storage services.

Building and Classroom Restructuring

Reforming the way students learn also means reshaping the places in which they learn. More creative, open, flexible spaces can make individualized learning easier to achieve. Some institutions are doing this by building or remodeling structures; others are replacing or rearranging furniture, adding technologies such as whiteboard walls.

Furniture. New chairs have been designed for flexible classrooms, allowing students to glide in and out of various groupings. One such wheeled chair has a circular shelf on the bottom where students can put backpacks and other belongings, along with a swiveling seat and swiveling work surface. Another alternative: no chairs. Fourth graders at Vega Elementary School in Texas, perch on stability balls, which teachers say improve student attention (as well as posture). Students might use high desks with no chairs.

Desks can come with inputs for laptop connectivity, power connections for charging and wheels for

Advice from the Experts

We spoke with educators, administrators, IT specialists, education consultants, private sector companies and others and asked for their ideas about how best to implement a personalized learning environment. Here’s what we learned.

▸ Use a “leadership team” concept. Bring together stakeholders such as community representatives, school board members, IT, administrators, financial officers, instructors and other staff to work toward a common goal.

▸ Empowering everybody to be part of the change brings shared purpose and greater efficiency. Seek out student and parent input as well.

▸ Don’t look at devices first. The specific device you want to provide your students should be one of your last decisions. The first thing to think about is desired educational outcomes. You also need to make sure your network infrastructure, including WiFi, is in place before you bring in devices.

▸ Be clear about goals and how they will be measured. Picture the type of classroom you want to see, consider what professional development will be required and look at the tools you’ll need. Develop a clear strategy to achieve these goals.

▸ Focus on instructor development. Give instructors enough time to learn the system and tools. Develop cohorts of instructors who can be first adopters and lead others. Show instructors the benefits of personalized learning. Get as much input and feedback as possible from them.

▸ Ensure access. Find ways to provide access for students who may not have the Internet or computers at home.

▸ Understand the implications of shifting from passive to active learning. Going from instructor-driven to student-centered learning affects all departments and activities, with implications for student scheduling, instructional content, instructor collaboration and planning time, use of space, demands on IT and so on.

▸ Consider using consultants and other experts. They are familiar with school transformations and can help focus goals, develop rubrics, etc. Visit innovative schools and districts to learn what worked for them.

▸ Consider a pilot. This eases the transition. Lead with small steps.
rolling. Tables are available in different shapes, some with displays embedded in them. Walls can be made up entirely of interactive whiteboards or can include monitors, used for students and teachers to display content from mobile devices, or perhaps hooked to devices that stream YouTube or other videos.

ARRANGEMENT. Instead of a “front” of the classroom, personalized classrooms are more likely to have a central open area where group activities can take place. Movable partitions, such as floating shelves or whiteboards on wheels, can be used to easily reconfigure space. Small groups or clusters of desks can be used for small group instruction. At Albermarle High School in Charlottesville, Va., a new “Writers’ Studio” opened in August 2013—a student-centered and student-led learning space outfitted with computers, tablets, cameras, projectors, and videoconferencing and recording equipment. Furniture includes “wired couches” so students can charge electronic devices while working, plus rolling chairs and tables.

Princeton City School District in Cincinnati, Ohio, is designing a new middle school and high school with project-based learning in mind. Hallway corners will have semicircular areas cut out for booths that students can use for collaborative work. Classroom areas will have retractable whiteboards, allowing for the modification of space. Whiteboards are being created out of smaller whiteboards that can be removed for student work as needed, and then reassembled.

In 2012, the University of Wisconsin - La Crosse, opened a new $44 million building that includes four “innovation rooms,” says Jim Jorstad, director of academic technology services. The rooms were designed to be “totally flexible,” with all furniture being movable, large plasma monitors on all the walls, projectors, interactive whiteboards and videoconferencing equipment.

“The morning may start out with the first lecture being presented traditionally to the class, but then maybe 20 minutes in, all the desks might be moved around,” says Jorstad. A class on therapeutic recreation might have students dancing and sharing projects, with furniture moved to create an open space. Other classes might feature lectures, with more traditional seating.

“It’s a combination of using technology to flip the instruction, but in addition, it’s how you design the room that provides that flipped perspective,” says Jorstad.

LEARNING CENTERS. Learning centers and other spaces are coming in for makeovers as well. At the University of Cincinnati College of Engineering & Applied Science, freshmen work on projects in small groups in the engineering learning center, which is equipped with walls comprised of whiteboarded glass on which students can write. The University of Wisconsin - La Crosse remodeled its library so that the first floor includes flexible furniture to allow students to work in groups; the second floor, used by education students, has a new learning studio equipped for telepresence, with a content recorder, smart tables and interactive whiteboards that can be adjusted vertically to accommodate the height of young children who attend classes taught by education students.

Approaches to Learning

Changing the physical and technological structure of a school building is important to the success of a transition to personalized learning. But perhaps even more key is changing the culture of learning at an institution—shifting from a teacher-centered to a student-centered model, with education occurring at a student’s own pace and customized to his or her needs. This can mean shifts to models such as flipped classrooms, blended or fully online learning, and other new methods.

LEARNING MODALITIES AND CURRICULUM.

The traditional model of instruction, with K-12 students in class six hours a day or higher education students attending college for semesters at a time, is being up-ended by more student-centered, technology-enabled approaches to learning. Online instruction continues to increase in popularity, as does hybrid and blended learning, which combines both virtual and in-person instruction. These learning models enable students to progress at their own pace, dig deeper into areas of their preferences and access content when and where it is convenient for them.

Michael Horn of the Clayton Christensen Institute predicts online learning will exist in some form in 50 percent of high school courses by 2019. Virginia, Idaho, Alabama, Florida and Michigan already require students to take at least one online course before graduating. Some individual school boards have also instituted this as policy for their districts.

Blended learning programs are becoming more popular as well, which include online components and in-class features. One increasingly common model is rotational and can encompass students moving between “stations” in a classroom. Flipped classrooms are also becoming more popular, where students view lectures or other content outside of class, allowing instructors to use class time for more active, tailored learning such as discussions and project-based, small-group activities.

The University of Cincinnati College of Engineer- ing & Applied Science works with local Cincinnati high schools to teach introductory engineering courses using a flipped approach. University instructors provide content in short online instructional modules of about 10 minutes, usually containing a mix of video, text and resource links. Students view the modules on their own time, then do projects in class supervised by their high school teachers. For example, one class built a solar heating system for their classroom.

Rutz found that for high school instructors, the transition to flipped learning was initially difficult. “Every one of the high school teachers in the outreach program I’ve worked with has said the first year they did it was the hardest year they’ve ever had, but they’d never go back,” says Rutz. “They say this is the way we should be teaching.”

In a personalized environment, instructors can’t just plan a one-size-fits-all lesson and stop there. Students need to become engaged in content in multiple ways and to be involved in choosing their learning paths. Adaptive content and other personalized feedback tools make a “just-in-time” approach more feasible, allowing instructors to adjust to student needs on the fly. Learning programs can help instructors differentiate content based on a student’s learning style and strengths and weaknesses, and also help identify groups of students who share common learning traits and can benefit from small-group work together.
Project-based learning lets learners of varying levels seek a common goal. Students can work if needed with differentiated materials, such as content presented to different reading levels, but providing the same basic information. The material would appear the same on device screens, so students wouldn't realize each others' levels.

If an instructor uses a rotational model, students can be divided into groups that work on different activities. This keeps student interest and engagement up since tasks don't last too long in any one rotation. It also allows instructors to spend individual time with some students while others are engaged in group or online activities.

Rotation can also help if resources are limited, so that one segment of the class can work on devices while other groups do other activities. This allows the learning software and devices to be shared when 1:1 access is not possible.

In the revised educational model, students search for a common goal. Students can work if needed with differentiated materials, such as content presented to different reading levels, but providing the same basic information. The material would appear the same on device screens, so students wouldn't realize each others' levels.

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MASSIVE OPEN ONLINE COURSES (MOOCs).

With their massive enrollments — often tens of thousands of students — MOOCs depend on small, online student groups to form so students can discuss lessons and learn from each other. MOOCs started as free, non-credit-granting classes, but are evolving so that some grant college credit and charge minimal fees. Tiffin University in Ohio is offering a three-credit MOOC course in social sciences for $50. The course, which began in July 2013 and uses a personalized learning platform, differs from typical MOOCs in both granting credit and allowing students to attend in person.64

The University of Wisconsin—La Crosse recently began offering free math MOOCs based on online learning modules. The online learning modules are easy-to-use collections of tools such as videos, podcasts and presentations illustrating math concepts. After a first successful math MOOC in 2012, a second developmental math MOOC was planned for 2013.

A New Teaching Paradigm

Personalized learning is a transformation of the “factory-based,” decades-old educational model. Moving toward this method of learning requires a reimagining of the teacher's role in the classroom, which often means additional training to ensure a successful transition.

ROLE OF THE TEACHER. Whether in K-12 or higher education, instructors shifting to a student-centered, personalized learning environment face new roles. No longer are they expected to be all-knowing providers of information, but instead are needed as coaches and guides, leading students to actively find their own knowledge. Instructors also need to know how to use new digital tools and teaching methodology that can be startling, especially when teachers are also asked to use new and unfamiliar technologies.

The biggest challenge in implementing personalized approaches, says the University of Cincinnati College of Engineering & Applied Science's Eugene Rutz, “is the faculty and their understanding of how education is to be done.” Instructors, he notes, may have been successful teaching a certain way for 15 years and see little reason to change.

New teachers, on the other hand, often haven't been prepared by colleges of education to teach with technology. According to a 2012 Speak Up/Blackboard survey, there was a gap between what principals expected new teachers to know versus what professors were teaching them. Two-thirds of principals want teachers to know how to use multimedia such as podcasts, video and other media, but only 44 percent were being taught this. Almost half the principals (45 percent) wanted teachers to be able to incorporate students’ mobile devices into lessons but few education students (19 percent) could do this. Principals also wanted teachers to have practical experience with personalized learning techniques, such as being able to use technology to differentiate instruction and create authentic learning experiences for students.65

Professor Skip Fennell works with educators and education students through the Elementary Math Specialists and Leaders Project. He observes teacher resistance to using new technologies and new approaches “all the time.” Some teachers even resist non-technical teaching tools such as physical manipulatives to teach fractions.

“We have to educate the field,” says Fennell. “I can’t assume for a minute that teachers will say, ‘This is great, let’s try this.’ First of all, you have to understand it and then you have to have some level of comfort yourself, so there is a bit of a learning curve.”

New technology can actually help in this area if it’s intuitive and easy to implement. For instance, Catherine Twomey Fosnot, CEO of New Perspectives on Learning and the former founding director of Mathematics in the City (a nationally recognized center for professional development at the City College of New York), describes digital math software on the market that mines data about students as they are using it to automatically provide personally appropriate lessons. With the help of the software, teachers are then free to aid students one on one as issues arise: “Technology like this makes differentiation simple. Some children can be independently working on laptops with earphones while the teacher works with others. Assessment is also seamless,” says Fosnot.66

PROFESSIONAL DEVELOPMENT. Showing how new technologies can enhance learning can open instructors’ eyes, says Eastern New Mexico University’s Ayala. “The best way to get faculty excited about a new pedagogical strategy or tool is by letting them talk to or see what other colleagues are doing successfully,” she says.

For instance, her university, which offers online courses, held a new faculty workshop about distance education. “Sitting in the back, I heard a lot of mumbled grumbling about how misguided the whole distance education concept was and how you could never replicate the in-person interaction of the traditional classroom,” says Ayala.

But then teachers were given a live demonstration of an interactive online class, including videoconferencing with students. “The demo, says Ayala, “accomplished more than a year’s worth of research and workshops could have. Faculty got a good feel for the possibilities, saw a live example of best practices, and saw how their main logistical and pedagogical concerns were overcome. The insights were visible in their faces — the ‘A-ha!’ moment.”

Other professional development ideas include:

• Find early adopters to inform and excite other faculty, Lincoln Middle School’s Antoniou uses “fire-starter teachers” to pilot projects, such as the 1:1 program beginning in her school. These early adopters, who are passionate about their subjects and their new learning tools, help spread

the enthusiasm to other teachers in the building. Teachers can also be paid extra to train their less tech-savvy colleagues, notes Cynthia White, who did this in the transition to adaptive learning at her school.

- Use webinars, screencasts and other tools to show instructors how it’s done.
- Demonstrate practical benefits to instructors. “I’ll show examples where I’ll do a webstream on a specific topic and I’ll get emails from all over the world,” says University of Wisconsin’s Jorstad, who is a blogger with followers in 90 countries. “You show this to a physics professor who does research on lasers — that they can connect with others doing similar or more innovative research elsewhere — and then you can see the light bulb go off.”

- Make professional development an ongoing effort, using repeat training sessions, as well as professional learning communities, Twitter and social media groups, and other kinds of networks for teachers to stay informed and motivated. Florida Virtual School instructors meet in professional learning communities (PLCs) weekly, for example, to discuss student data, stumbling blocks and teaching strategies.

### Assessing Students

The Common Core State Standards online assessments, affecting students in the 45 states that have adopted these standards, are set to begin in the 2014-15 school year. With these high-stakes tests on the horizon, school districts are scrambling to make sure they have the technology in place to handle them. Not only will the district need sufficient bandwidth, but students will need access to devices — and not just a handful on a computer cart. These devices also must meet requirements set up by the two online testing consortia, Partnership for Assessment of Readiness in College and Careers (PARCC) and the Smarter Balanced Assessment Consortium. (Tablets, for example, are allowed but must be pairable with external keyboards.)

The technology needed for the Common Core can also be used for personalized learning. In addition, the Common Core emphasizes the type of independent, critical thinking skills fostered by personalized learning, making the approaches complementary.

However, the self-paced nature inherent in personalized learning presents a tension point. If students are to learn at their own speed, mastering concepts when they are ready to do so, then how does this fit with having all students in a specific grade expected to know the same things on a testing date?

Other high-stakes tests besides the Common Core present similar challenges. States that don’t participate in the Common Core, such as Texas, have their own standards exams before students are allowed to graduate. According to the State Educational Technology Directors Association (SETDA), 33 states have some form of online testing already in place.4

There has been a recent movement to delay or cancel Common Core standards implementation and assessments, with Indiana opting out completely.4 Still, it is unlikely to slow the near-nationwide momentum for this program and its assessments, not to mention the trend in general for online testing. Personalized learning, then, must work within a system where there are endpoints that all students — no matter the route they take — must reach at the same time.

However, a competing trend that may eventually upend standardized high-stakes testing altogether is gathering steam: that of measuring student achievement and assessments, with Indiana opting out completely.4 Still, it is unlikely to slow the near-nationwide momentum for this program and its assessments, not to mention the trend in general for online testing. Personalized learning, then, must work within a system where there are endpoints that all students — no matter the route they take — must reach at the same time.

A move by states to shift to competency-based learning in K-12 education has gained traction in recent years. Altogether, about 40 states are implementing competency education in some form, including Iowa, Maine, New Hampshire and Oregon.41 Some school districts are also implementing this approach. In Carson City, Nev., for example, students who complete their high school work before graduation can shift to college-level courses, while the Middletown district in New York lets elementary students move up a grade level whenever they master all the concepts.42

In higher education, competency education is becoming more common as well. Universities awarding credits based on mastery include Western Governors University, Northern Arizona University and Southern New Hampshire University, which offers a delivery model that directly assesses student knowledge in 120 “competencies,” without regard to credit hour. The U.S. Department of Education recently began allowing federal student aid to be awarded to students in such competency-based programs.43

In May 2013, Northern Arizona University began offering a new personalized learning online degree platform based on competency and using a subscription model instead of paying per class. The fee is $2,500 every six months, and students can skip classes if they can show mastery of the material.44

The Smarter Balanced Assessment Consortium’s Proficiency-Based Learning Task Force in 2012 endorsed a new definition of competency-based learning, noting that such instruction “is personalized, flexible and adaptable to student needs ... students both direct and lead their learning even as they learn from and with others, both within and outside of schools.”45

### What are your personalized learning investment priorities?

<table>
<thead>
<tr>
<th>Priority</th>
<th>Investment Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Development</td>
<td>58%</td>
</tr>
<tr>
<td>Network Infrastructure</td>
<td>36%</td>
</tr>
<tr>
<td>Internal Development of Curriculum</td>
<td>35%</td>
</tr>
<tr>
<td>Mobile Device Adoption</td>
<td>31%</td>
</tr>
<tr>
<td>Procurement of Curriculum</td>
<td>12%</td>
</tr>
</tbody>
</table>

Source: CDE Personalized Learning Survey, 2013
The Bill & Melinda Gates Foundation is one of many that recognizes the promise in emerging personalized learning models. In 2012, the foundation formed a Personalized Learning Network comprised of post-secondary institutions with innovative programs. One goal: to work together to share information about adaptive learning technologies. The foundation is also offering a new round of $100,000 grants for institutions with adaptive learning programs. Educators and administrators CDE surveyed say within the next year, they foresee adopting more blended learning (61 percent). Other elements of personalized learning that are likely to be seen more commonly include flipped classrooms (38 percent), as well as curriculum tailored to students’ needs (38 percent). These approaches may rely on technology, such as 1:1 devices that make it easier for students to access customized curriculum. But even more than any particular piece of hardware or software, personalized learning depends on educators being willing to open their institutions to emerging models — models that focus on students’ personal needs, abilities and interests.

In his work with Cincinnati high schools to develop flipped engineering classes, Eugene Rutz sees how excited students can get when their learning switches are turned on — when they find something in school that is relevant and interesting to them. One time Rutz was at Kings High School for an after-school meeting when an assistant principal said he had just found engineering students still in their classroom. The students told the assistant principal “we just had to figure this out,” says Rutz. “They said, ‘this is so much fun we don’t want to leave.’” This is the promise of how personalized learning can transform education.

**CHANGING THE FUTURE OF EDUCATION**

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From the Experts

“PREPARING YOUNG PEOPLE FOR THE JOBS OF TOMORROW MEANS RETHINKING OUR APPROACH TO LEARNING AND TEACHING. STUDENTS TODAY DON’T GO TO SCHOOL TO LEARN HOW TO WORK; LEARNING IS THE WORK. WE’RE FOCUSED ON HELPING EDUCATORS DIFFERENTIATE LEARNING THROUGH THE EFFECTIVE USE OF TECHNOLOGY TO ACCELERATE UNDERSTANDING, PROMOTE DEEPER LEVEL LEARNING AND CRITICAL THINKING.”
- Jim Marshall, CEO, Promethean

“WHILE TECHNOLOGY MAKES IT EASY TO COLLECT AND DISSEminate massive amounts of data, IT’S NOT ALWAYS POSITively affecting education. WE NEED TO MAKE IT EASIER FOR EDUCATORS AS WE DEVELOP REPORTS AND COME UP WITH WAYS OF VISUALIZING DATA.”
- Joel Hames, Senior Product Manager, Sungard K-12

“THE THING WE’VE LEARNED IS THAT TECHNOLOGY IS NOT A MAGIC BULLET. THERE STILL NEEDS TO BE SMART EDUCATORS AND SOLID PEDAGOGIES IN THE SYSTEM. WE STILL NEED ALL THOSE SMART TEACHERS AND INSTRUCTORS IN THE PROCESS BECAUSE NO ONE SMART TECHNOLOGY IS GOING TO SAVE THE DAY AND BE THE MAGIC SOLUTION.”
- John Logan, Florida Virtual School

“BECAUSE ALL STUDENTS ARE UNIQUE, A ONE-SIZE-FITS-ALL APPROACH IS NOT THE MOST EFFECTIVE WAY TO PERSONALIZE EDUCATION. IT’S CRUCIAL TO CHOOSE TECHNOLOGY SOLUTIONS THAT ARE FUTURE-PROOF; SOLUTIONS THAT ARE FLEXIBLE AND SUPPORT MULTIPLE DEVICES, SO THEY CAN EVOLVE AS THE STUDENTS DO.”
- Cyndy Filgas, Co-Founder, Anthro Corporation

“PERSONALIZED LEARNING CAN BE ENHANCED THROUGH THE USE OF ADVANCED TECHNOLOGY, EDUCATORS AND STUDENTS CAN BUILD A STRONG CONNECTION AND HAVE A TRULY CUSTOMIZED EXPERIENCE.”
- Courtney Behrens, Sr. Marketing Manager, Brother Online

“PERSONALIZED LEARNING PLAYS A CRUCIAL ROLE IN MAXIMIZING STUDENT ACHIEVEMENT. AS INNOVATIVE TECHNOLOGIES CONTINUE TO PERMEATE THE CLASSROOM, TEACHERS CAN FACILITATE A TAILORED LEARNING EXPERIENCE FOR THEIR STUDENTS.”
- Joe Simone, Director of Public Sector Sales, K-12 Education, CDW•G

“CLOUD COMPUTING WILL EXTEND THE ABILITY OF TRADITIONAL ON-PREMISES CAPABILITIES, REDUCE COSTS AND IMPROVE THE LMS (LEARNING MANAGEMENT SYSTEM) USER EXPERIENCE. HOWEVER, SECURITY CONTROLS THAT EMPLOY STRONG TWO-FACTOR AUTHENTICATION TO CLOUD LMS RESOURCES AND PROTECT AGAINST THE LEAKAGE OF SENSITIVE DATA IMPROVE THE PRIVACY EXPERIENCE.”
- Renault Ross, National Cyber Security & Privacy Architect, Symantec Public Sector Strategic Programs

“IT’S UNBELIEVABLE HOW MUCH THINGS HAVE CHANGED IN EDUCATION OVER THE LAST 10 YEARS. THE EVOLVING USE OF DEVICES IN THE CLASSROOM AND AT HOME IS HAVING A HUGE IMPACT ON STUDENTS AND TEACHERS – REALLY ON THE WHOLE COMMUNITY. IT’S OPENING UP A WHOLE NEW APPROACH TO LEARNING AND TEACHING.”
- Brandee Ramirez, Curriculum Consultant, ABCmouse.com

“IT’S AN EXCITING TIME IN THE EDUCATION INDUSTRY AS WE REALLY ARE JUST STARTING TO TOUCH ON THE POSSIBILITIES OF PERSONALIZED LEARNING. AS WE CONTINUE TO MOVE TO A DIGITAL ENVIRONMENT, THE ABILITY TO CUSTOMIZE THE EDUCATIONAL EXPERIENCE TO SUIT EACH STUDENT WILL HEIGHTEN ENGAGEMENT AND ULTIMATELY CONTRIBUTE TO BETTER EDUCATIONAL OUTCOMES.”
- George Moore, EVP Chief Technology Officer, Cengage Learning
Approaching the Common Core with Confidence
Technology helps schools comply with standards and personalize learning for students

As Many Schools Prepare
for Common Core State Standards and online student assessment, technology is receiving renewed attention because of its ability to promote, enhance and support personalized learning.

According to CDW•G’s new Common Core Tech report (www.CDWG.com/CommonCoreTech), which surveyed 300 IT professionals in public school districts across the country, more than three-fourths of IT professionals expect Common Core to have a positive impact on their districts.

In particular, IT professionals anticipate benefits, including on-demand student data analysis, new classroom technologies and even improved student engagement. For teachers, these benefits give them the ability to move away from the “one-size-fits-all” classroom model, creating more personalized learning experiences through one-to-one computing and the use of mobile devices, response systems and learning management systems.

Ultimately, personalized learning uses technology to meet the needs and goals of individual learners. It enables students to progress at their own pace and gives educators the opportunity to connect with every student in the classroom.

Many schools are already embracing personalized learning. In the Passaic Public School District in New Jersey, personalized learning is fully supported through intense professional development for its teachers. Earlier this year, in preparation of Common Core, the district purchased 5,500 Google Chromebooks and the Chromebook management consoles for students and teachers in grades 7-12.

According to Joanna Antoniou, technology coordinator, Passaic Public Schools, Passaic’s professional development program ensures that teachers are able to use every available tool associated with the Chromebooks to provide students with the resources they need to succeed. Critically, Passaic’s students are required to be active participants in learning so they can take ownership of their education. Passaic teachers help foster this engagement by using interactive elements in their lesson plans, helping students practice independent work skills and providing immediate feedback after quizzes and assignments.

CDW•G Common Core Tech has four key recommendations for schools to ease the transition to Common Core and personalized learning.

Move forward confidently with a strong infrastructure before bringing in new technology.

Share your vision with all stakeholders to ensure everyone is on the same page.

Focus on instruction and good teaching, so technology becomes transparent.

Embrace change; a year from now things could look very different. Continue to share best practices and borrow ideas that unify your vision.

Helping Students Become Math Masters
DreamBox Learning Math Enables Interactive, Personalized Learning

Not all students learn math at the same pace. Some understand key ideas with ease, while others need more time and help to make sense of fundamental concepts and skills. Like in any subject, a “one-size-fits-all” strategy does not work when trying to teach students with different backgrounds, prior knowledge and content familiarity.

As part of its Intelligent Adaptive Learning® platform, DreamBox Learning Math enables differentiated teaching to students’ experience lessons that are just right for them, at just the right time. By leveraging gaming fundamentals in a Web-based system, the program captures student data and adapts the experience to best suit their unique, personalized needs. Then, through fun tasks and interactive lessons, students are motivated to achieve math proficiency by continually working on problems inside their optimal learning zone.

Responsive instruction and instantaneous assessment capabilities are embedded in over 1,100 Pre-K through 5 math lessons that adapt in real time. By allowing for millions of individualized learning paths, DreamBox can tailor every math lesson to meet a student’s unique needs. With DreamBox Learning Math, every student can become a mathematician.

The DreamBox Difference
DreamBox Learning Math allows educators to:

• Equip students to master key concepts, increase achievement and boost long-lasting confidence in math
• Provide individual learning paths for truly unique and personalized educational experiences
• Leverage software and hardware already in use — no need to purchase new devices
• Use a methodology that works: A study conducted by the nonprofit research institute SRI International found that students scored an average 2.3 points higher on the Northwest Evaluation Association (NWEA) standardized mathematics test after only 21 hours using the DreamBox program

For more about CDW•G’s solutions and services to K-12 schools, please call 1.800.808.4239, email cdwgsales@cdwg.com or visit cdwg.com/k12.

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Responsive instruction and instantaneous assessment capabilities are embedded in over 1,100 Pre-K through 5 math lessons that adapt in real time. By allowing for millions of individualized learning paths, DreamBox can tailor every math lesson to meet a student’s unique needs. With DreamBox Learning Math, every student can become a mathematician.

The DreamBox Difference
DreamBox Learning Math allows educators to:

• Equip students to master key concepts, increase achievement and boost long-lasting confidence in math
• Provide individual learning paths for truly unique and personalized educational experiences
• Leverage software and hardware already in use — no need to purchase new devices
• Use a methodology that works: A study conducted by the nonprofit research institute SRI International found that students scored an average 2.3 points higher on the Northwest Evaluation Association (NWEA) standardized mathematics test after only 21 hours using the DreamBox program

For more about CDW•G’s solutions and services to K-12 schools, please call 1.800.808.4239, email cdwgsales@cdwg.com or visit cdwg.com/k12.
Educators have long known that classroom projects can enrich and personalize student learning, improve engagement and enhance collaboration skills. Now, with a push to personalize learning sweeping the country, many schools are tapping a new generation of digital video cameras and camcorders to cater to individual student needs and bring history, science, language and other core topics to life.

For example, students at Cochran Elementary School in Louisville, Ky., produced their own video podcasts about everything from the Industrial Revolution to the development of the inline skate. The kid-friendly education videos were then posted online and available to students for free.

Likewise, for a more three-dimensional understanding of history, novice videographers at Mt. Hebron High School in Ellicott City, Md., interviewed people who lived through significant events such as the Kennedy assassinations. This novel approach engaged students in important topics and created an opportunity to give them a more well-rounded educational experience.

Video and related production add another dimension “Instead of just writing a paper, (students) really enjoy producing a video,” says Mt. Hebron Media Specialist Scott Robinson. Students also discover how to share, collaborate, budget time wisely and present core subjects in a different context, he says.

Other successful Mt. Hebron video learning projects have included:
• An English literature class production of the Canterbury Tales, Pride and Prejudice and Hamlet
• A student forensics class version of the Forensic Files
• An English literature class production of the
• A TV news show in Spanish created by Spanish language students

As today’s classroom continues to evolve, the possibilities for tapping new and updated technologies to personalize and enrich learning experiences can be endless.

Committed to personalizing education

Canon is devoted to helping students inquire about the world at an ever-deepening level. Canon’s easy-to-learn and use PowerShot point-and-shoot and VIXIA camcorders take stunning HD video and still photos. They’re an ideal choice for schools pursuing projects that promote student thinking, learning, problem solving and collaboration — and mastering 21st-century technology skills.

For more details about how Canon Video products can personalize classroom learning, contact the Canon Education Department.

PHONE: 866.50.CANON
EMAIL: CIG_EducationSales@usa.canon.com
WEB: www.usa.canon.com/educationsales
PRODUCT SERVICE & SUPPORT: 1-800-OK-CANON

Confronting the Cloud

As K-20 education institutions work to offer a personalized learning environment for students, they are increasingly turning to cloud apps and solutions to provide anytime, anywhere flexibility. These cloud offerings build a foundation for many key personalized learning initiatives such as online and blended learning and bring your own device (BYOD) programs.

But there is one challenge that is a particular stumbling block for education leaders when moving to the cloud: security. In a personalized learning environment, since so many students and instructors will be accessing and sharing different types of information at different times, how do you ensure your information remains secure? How do you maintain high availability without putting too much of a burden on IT staff?

Ensuring Security with Symantec

Symantec is the industry leader in the information security space. With the backing of their Global Intelligence Network (comprised of 69 million attack centers that keep track of 40,000 vulnerabilities across 15,000 vendors), Symantec eases common cloud concerns.

From students in a distance learning program to an instructor working from home, Symantec offers innovative solutions like data loss prevention, file sharing, encryption and authentication that keep the focus on personalized learning rather than information security.

For more information about all of Symantec’s cloud service solutions, see below:

SYMANTEC O3: Reduces risk of unauthorized access to cloud assets.
DATA LOSS PREVENTION: Discovers data at rest and in motion across your network, storage and endpoints.
DEEPSIGHT SECURITY INTELLIGENCE: Enables access to the Global Intelligence Network of threat and vulnerability intelligence.
ENCRYPTION (PGP): Provides protection for laptops, desktops, endpoints, email, mobile and data in the cloud.
VERSION USER AUTHENTICATION: Provides two-factor authentication for network, Web and mobile.

Symantec is a global leader in providing security, storage and systems management solutions to help consumers and organizations secure and manage their information-driven world. Our software and services protect against more risks at more points, more completely and efficiently, enabling confidence wherever information is used or stored.

For more information, visit http://go.symantec.com/education.
Personalized learning is transforming education by increasing student engagement and achievement. And new technologies are breaking down barriers that previously inhibited more personalized education for students. However, reduced school budgets are making it difficult for schools to invest in this new technology. Until now.

Brother’s innovative OmniJoin™ web conferencing solution is cloud-based, meaning it’s a far more flexible and affordable collaboration solution for students, teachers and administrators that enables personalized learning. OmniJoin web conferencing doesn’t require a large upfront investment — education institutions can use their existing networks and no costly infrastructure components are required.

With OmniJoin™ web conferencing, education institutions can:

- Give students the best learning for their individual needs, while also providing the quality education they deserve
- Provide high-quality online meeting experience for e-learning programs, virtual classrooms, online seminars, web tutoring, professional development and much more
- Make it easy to connect and collaborate so students, teachers and administrative staff can share and markup files, and play video files virtually instantly — all with surprisingly simple desktop controls

Keeping the Focus on Student Learning

New software eases classroom management for teachers

There is no doubt that the iPad has taken K-12 education by storm. A 2012 report found that nearly 2,000 schools and districts were providing iPads to students, teachers and staff. The iPad is evolving how students are learning — they are interactive, engaging and have the ability to personalize education for students. However, after rapid adoption, teachers have also found that managing these devices in the classroom, including keeping students on task and providing access to educational content, is a challenge.

Challenge Averted: Introducing Casper Focus

Casper Focus, an innovative new solution from JAMF Software, enables iPads to live up to their full potential in education. It removes distractions from the classroom by allowing teachers to control what students are viewing at all times — all without help from the IT department.

Teachers can perform classroom management tasks from their own iPad. This keeps the focus on what is being taught versus worrying about which students are staying on task.

With Casper Focus, educators can truly use technology to support the transformation to a more personalized learning environment for all students.

To learn more about JAMF Software’s solutions, visit www.jamfsoftware.com/software/casper-focus
How can an educator facilitate individualized learning while still maintaining control of the entire classroom? Panasonic wireless projectors featuring Multi-Live Mode build the foundation for connected classrooms. By enabling whole group and collaborative learning within a personalized learning environment, projectors like the PT-VW435N give educators the control and flexibility required to support each student's needs.

Multi-Live Mode on Panasonic projectors brings cutting-edge capabilities to education by enabling seamless display of content among devices, without cables or a network connection. When students with their own devices are working in small groups or are asked to present their work to the class, they can easily transfer video and audio on their device to the projector for the class to experience. Up to 16 different personal devices using any combination of Windows, OS X, iOS, and Android platforms can all be displayed by the projector at once, all on a secure encryption. And Panasonic offers the option of wireless transmission via software download or USB stick, to accommodate your school’s policies. Imagine the learning potential of a group of students all displaying their findings to the class, then quickly pulling up supporting Excel sheets, images, and real-time motion capture all while projecting annotations made on their iOS device screen.

Panasonic eases the transition to personalized learning with projectors that are easy to use, maintain, and offer industry-leading image quality and reliability. The PT-VW435N wireless LCD projector with Multi-Live Mode features 4300 lumens, abundant analog and digital input ports needed for education, a 4,000 hour lamp replacement cycle, and stunning WXGA resolution.

Strengthening the Use of Technology for Greater Results

Panasonic is committed to helping instructors utilize projectors and other digital technology for maximum benefit to students. Its Professional Development program, run entirely by educators with teaching experience, can aid educational institutions in strengthening the quality of digital lessons through workshops focused on the implementation of personalized learning programs. Panasonic works with schools to set and achieve customized, multi-faceted transition plans.
We believe your IT lifecycle should be filled with opportunities, not obstacles.

Whether you need new systems, are looking for an innovative approach, or want help navigating the ever-changing licensing landscape, count on GovConnection to transform your IT lifecycle requirements into reality.

GovConnection’s experts can help you discern your organization’s technology needs, design innovative solutions to complex challenges, and deliver the products, services, and guidance you need to realize your goals.

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Students are growing up in an ultra-connected world and are more comfortable with technology, especially mobile devices such as tablets, than ever before. However, there can be a disconnect when they enter the education system and must conform to an unfamiliar and (increasingly) unrealistic one-size-fits-all environment that employs old techniques and potentially obsolete tools.

Samsung can help educators meet the expectations of tech-savvy students with innovative tablets that personalize and transform the learning experience, while also increasing efficiencies and classroom management. Samsung offers a variety of form factors and price points, so educators can choose the device best suited for their needs.

When teachers are equipped with Samsung tablets, they are freed to move about the classroom conducting interactive lessons and activities instead of standing stagnant at the front of the room. They also have the ability to work one on one with students who may be struggling with a particular subject.

When students each have their own tablet, lessons can be tailored to their individualized needs and interests, and they can progress through the material at their own pace. Students can learn and interact with the content however suits them best, whether it’s listening to audio recordings or reading stories. And since students are mobilized with tablets, they can easily form groups for project-based learning that improves collaboration skills.

In a non-traditional world, a traditional classroom won’t cut it. Modern students need modern tools to reach their full potential. And with Samsung tablets, K-12 schools can meet students’ needs while providing personalized learning and a 21st-century education environment.

SOLUTION SPOTLIGHT: SAMSUNG

Samsung tablets have all the features needed to support a personalized learning environment, including:

- Large, touchscreen 7", 8" or 10.1" displays
- An S Pen (offered with certain models) that allows for new and unique ways for students and teachers to interact with content
- Rear-facing cameras
- Lightweight build — some models are only 1.31 lbs
Learning is personal...

...and should focus on how each student learns best.

Constructing a classroom personalized for each learner is challenging, but essential. Today’s educators need tools and strategies to expand and create communication and feedback channels to differentiate instruction.

Technology plays a critical role in classrooms today, allowing educators endless opportunities to:

- Offer students immediate feedback providing insight into their level of success and allowing them to learn and progress autonomously.
- Uniquely connect with each learner, leveraging student contributions and data to dynamically guide and accelerate learning.
- Engage the most eager and the most reluctant students, and empower them to meet learning goals in ways that best suit their strengths and interests.
- Provoke discussion, deepen learning and meet essential learning objectives in an interactive, feedback-driven learning environment.

“Personalized learning today challenges teachers to think differently about classroom interactions, content and communications. Through technology, teachers are changing the experience—from classroom design to the flow of learning—to further customize each student’s learning path and unlock barriers to progress.”

— Steven Anderson
Director of Instructional Technology
Winston-Salem/Forsyth County Schools

Learn more about our personalized learning approach. Download case studies and additional resources at PrometheanWorld.com/Personalized-Learning or call 888.652.2848, option 2.
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