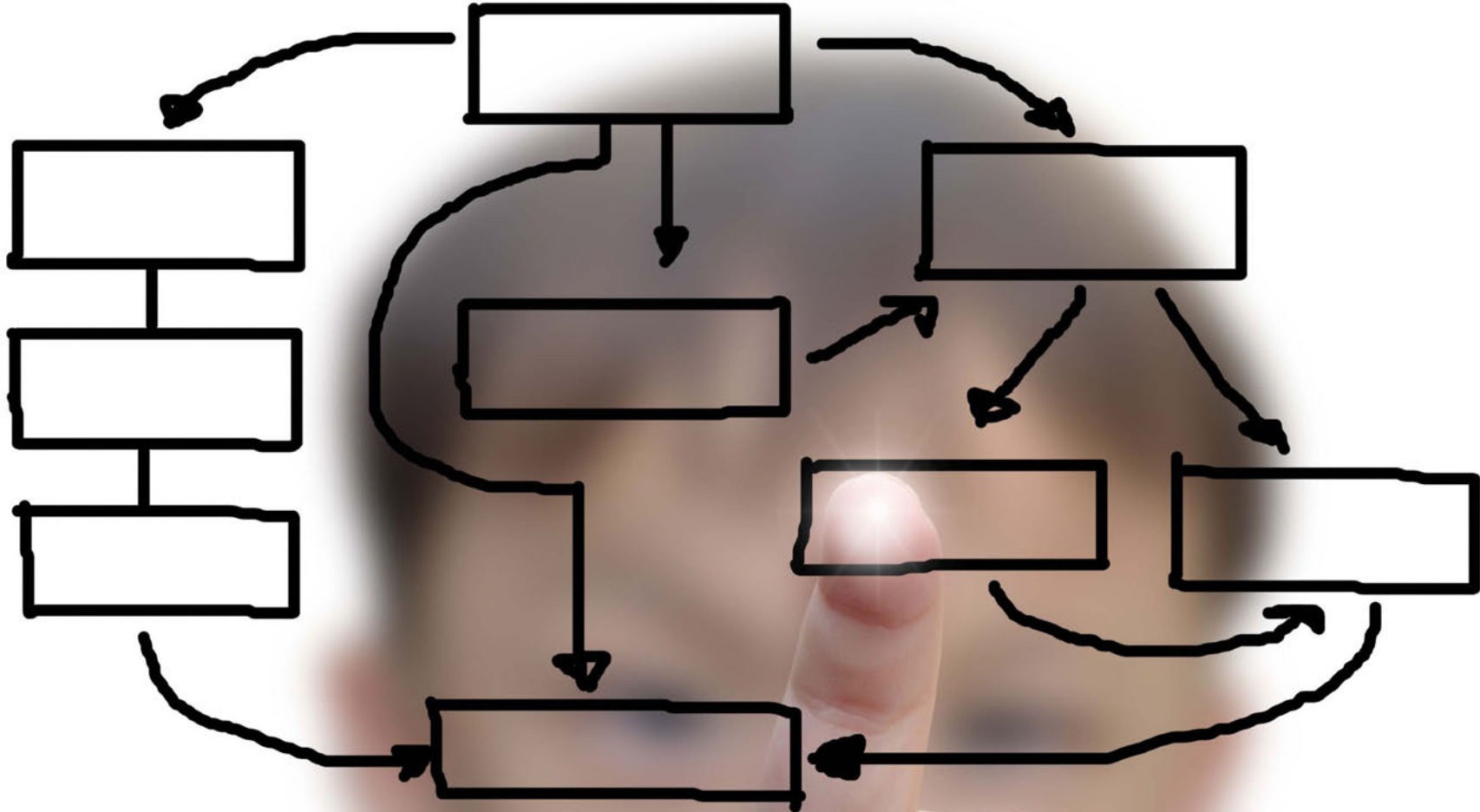


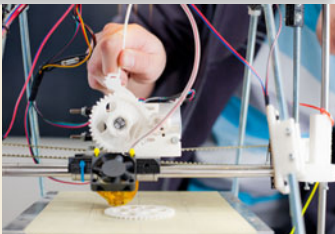


Adaptive Learning: Are We There Yet? ▶▶

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Christopher Piehler, Editor in Chief



The two controversial social initiatives have both been hampered by rocky rollouts.

Common Core, Obamacare and the Numbers Game

With field tests underway, will CCSS reach the same tipping point that the Affordable Care Act has?

THE COMMON Core State Standards and the Affordable Care Act have a few big things in common. They are both enormous social initiatives that began with noble goals. (Despite the current hyperpartisan political climate, I think we can all agree that developing 21st century educational standards for our public schools is a good idea, as is improving access to healthcare.)

Both CCSS and the ACA have, of course, faced political opposition. Many of the ACA's most vocal critics have called it an intrusion of federal power into a state-level issue. I believe this reaction helped create some of the opposition to Common Core, which is based on the misconception that the standards are a federal initiative. This backlash led to Indiana's recent withdrawal from the standards.

Both CCSS and the ACA have also been hampered by rocky rollouts. The troubles with the healthcare.gov website have been covered ex-

haustively, and the Common Core assessments have had their share of troubles, including opposition from parents and teachers, postponed field tests and states switching assessment providers.

Despite its troubles, the ACA reached a tipping point at the end of March. With more than 7 million people signed up for health insurance through the exchanges, the law now has millions of citizens on its side, not to mention a deep-pocketed healthcare industry that is welcoming all those new customers.

Common Core (which has its own powerful allies in the business world) also reached an important milestone at the end of March, by which point PARCC and Smarter Balanced had administered hundreds of thousands of field tests of the new assessments. The assessments certainly face more obstacles on the road to implemen-

tation next spring, but as more educators get comfortable with them, Common Core is looking like it, too, will win the numbers game.



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American Students Ahead of the Curve on PISA Problem-Solving Scores

By David Nagel

There's actually good news about American education coming out of the Program for International Student Assessment (PISA), the triennial international assessment that ranks countries based on their students' proficiency in math, science and language arts (as measured by standardized tests).

In data released this month from the 2012 international assessment, on average 15-year-old students from the United States showed a greater degree of proficiency in problem-solving, in particular on tasks for which they are required to uncover information in order to solve the problem, than their peers from other countries.

U.S. students, with an average score of 508, didn't



rank highest in problem-solving, but they did beat the average proficiency score (500) of

OECD has made a handful of sample questions from the problem-solving test available to the public.

the 85,000 students who participated in this particular assessment. Those students represented 44 nations that participated in the 2012 assessment, most of whom are members of the Organization for Economic Cooperation and Development, also known as OECD.

The complete numbers, which can be found on nces.ed.gov, show that about four-fifths of American 15-year-olds are at or above minimal proficiency (proficiency level 2) in problem-solving, with the remaining 18.2 percent below that level.

According to a report released by OECD, "Fifteen-year-olds in the United States perform strongest on interactive tasks, compared to students of similar overall performance in other countries. Interactive tasks require students to uncover some of the information needed to solve the problem themselves. This suggests that students in the United States are open to novelty, tolerate doubt and uncertainty, and dare to use intuition to initiate a solution."

On the downside, when American students were compared to those from the highest-performing nations (Singapore, Korea and Japan), the largest gaps were seen in "tasks where students must select, organi[z]e and integrate the information and feedback received in order to represent and formulate their understanding of the problem." [Read the full story.](#)



Social Learning: From Web 2.0 to Social 3.0



Mobilists Cathie Norris and Elliot Soloway discuss mobile education's

shift from the asynchronous conversation of Web 2.0 to the synchronous conversation of what their colleague Kevin Crosby has named Social 3.0. The new paradigm includes video chatting on mobile devices using FaceTime, Skype or Google Hangouts — as well as Norris and Soloway's new free app YesWeKhan, which allows students to chat while watching the same Khan Academy video.

[webinars]

Is Your WiFi Network Ready for Online Testing?

As the fall deadline for Common Core testing approaches, school districts need to make sure that their network can handle the deluge of devices and traffic that the new assessments will create. Get a game plan for putting your network in order with help from Jeffrey Jennings, SLED Contracts/E-rate Manager at Xirrus.

Sponsored by Xirrus

New and archived webinars are available at thejournal.com.

{win big!}

STEM Fuse Asks Students: 'Got Game?'



Curriculum development company STEM Fuse has invited middle- and high-school students to compete in its 2014 Spring Got Game? Competition. To enter, students create games using GameMaker Studio or GameMaker Lite. (The Studio version is available as a free download [here](#).) The game must be original work by the student(s) submitting the entry, and each student or team can submit only one game.

The competition is open to students from fifth through 12th grades, competing in two divisions: Fifth-through eighth-graders compete in the Junior Division, while the Senior Division is for ninth- through 12th-graders. STEM Fuse will judge each

game on originality, overall design and quality, complexity and enjoyment, as well as through voting on the [STEM Fuse Arcade](#). First prize includes a \$250 Best Buy gift card and a free STEM Fuse course subscription (a \$1,499 value). Game submissions will be accepted through May 31, 2014, at 5:00 p.m. Central, and winners will be announced on June 6.

breaking news

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9/10

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OF PUBLIC SCHOOLS

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[industry update]

Teachers Honored for Innovative Use of Tech to Teach Science

Explorations of friction and rocketry were two of the projects that won an annual competition put on by the National Science Teachers Association (NSTA) and Vernier. All of the winning educators were selected based on their use of data-collection technology in science classes. The six winners in K-12 were honored during this year's NSTA National Conference and received \$1,000 in cash, \$3,000 in Vernier products and \$1,500 toward travel expenses to attend the event in Boston.

One winner was Bill Burton, a science teacher at the Lamplighter School in Dallas, who used a Vernier Force Plate to help his first-grade students learn about friction. In the experiment, they experienced the forces required to overcome friction as they pulled themselves across different surfaces, including several hundred tennis balls. The Force Plate collected real-time data that was projected on the classroom's interactive whiteboard for discussion. Burton had demonstrated his lesson during last year's NSTA conference and then wrote an article about the experiment for the NSTA journal, Science and Children.

Another winner, David Auerbach from Cardigan Mountain School in Canaan, NH, put on the "C-Prize" project, a takeoff on the X-Prize. To learn about speed,



Lamplighter School teacher Bill Burton teaches students about friction.

velocity and acceleration, students constructed and tested rocket prototypes. The experiment included developing hypotheses and analyzing data that students collected with the use of a Vernier Photogate, a timing device used for precise measurements of high-speed or short-duration events. You can read about all of the winners here.



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See how Canvas can help you transform learning and find out more about Sweetwater Union High School's experience with Canvas at instructure.com/technology or by calling **855.308.2804**.



Product Roundup

Editor's
Picks

The latest hardware, software and services



The **Echo Meter Touch** bat detector is a key-fob-sized, ultrasonic module that plugs into an iPhone or iPad. Paired with a free app, it allows users to hear and record bats in real time. [Read the full story.](#)



Casio's new **XJ-UT310WN** ultrashort-throw projector is lamp-free. It provides 3,100 lumens and supports wireless delivery of images from computers as well as Android and iOS devices. [Read the full story.](#)



The **Ruckus ZoneFlex R700** is a new three-stream 802.11ac access point. It features dual-band (5 GHz/2.4 GHz) operation and uses six antenna arrays to maintain fast throughput. [Read the full story.](#)

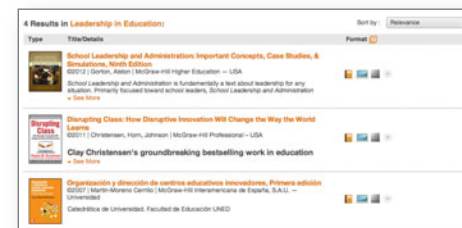
new releases



Sookasa Cloud Compliance Service is a "compliance-as-a-service" tool that helps schools maintain FERPA compliance by encrypting files on cloud services and mobile devices. [Read the full story.](#)



Nuance's **Power PDF** is a PDF-creation tool designed as an alternative to Adobe Acrobat. The tool was created to support document-sharing and collaboration within an organization. [Read the full story.](#)



McGraw-Hill's custom-publishing tool, **Create**, allows educators to select and sequence archived or original materials to create customized print or electronic books. [Read the full story.](#)

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JOE MAZZA, DIRECTOR, CONNECTED TEACHING, LEARNING & LEADERSHIP, NORTH PENN SCHOOL DISTRICT, LANSDALE, PA

INNOVATOR

>> TOOLS FOR TRANSPARENCY

Much of what I'm now doing is working across 18 buildings, 2,500 teachers and 100 administrators to build capacity for using social media tools to be more transparent in our approach. The idea is not only to provide for current teachers' professional development, but to let the community see a new way of teaching, learning and leadership on a daily basis. I've been working with schools on things such as embedding Twitter feeds on teacher websites. Sounds simple, but not a lot of teachers are doing that, and unless your parents are tweeting, how are they seeing everything you're sharing on social media on a daily basis?

>> DO AS THEY DO

I'm a big believer that principals, superintendents and other leaders are dealmakers or dealbreakers in terms of this connected teaching, learning and leadership. If they can visualize how this works and how it takes the organization to a new level, they're more likely to model those tools and experiences, and that will take some pressure off of teachers to have to be trailblazers in their schools. It's up to all of us to model digital citizenship, to show kids what lifelong learning means, what it means to be a curious, inquisitive person who's always trying to find

more information and to connect and collaborate, even from 10,000 miles away.

>> MAKING CONNECTIONS

I have a Twitter account that I use to share different chat topics that relate to our school and organizational goals. I use the hashtag #ff to suggest innovative teachers that people in the district should follow. I blog, sharing stories about where I am in the district and what the teacher I'm with is working on. I identify best practices in family and community engagement, as well as digital citizenship and where we can be more innovative in our policies. We're planning a 1-to-1 BYOD rollout next year, so I'm going out to other districts, seeing what people are doing and leveraging human experience and expertise.

>> CASTING A WIDER NETWORK

The biggest positive I've seen in my four years of being on Twitter as a connected leader are the relationships. I know so many people on just about every continent who can help me with just about anything. These are people you develop a relationship with because you've helped them with something, and it's about paying it forward online. A network for principals used to be the other six principals in your district. Now, your network consists of thousands of

MY TOP 3



Watch Mazza's tips on creating a connected learning environment.

people. It's that culture where you can tweet something to your network and within minutes have more resources than you know what to do with.

>> PASSING THE SCREEN TEST

The best thing about these social media tools is that your principals and teachers are exposed to passionate educators. I want to send my child to a school where people are always trying to be better. To me, an innovator is someone who constantly has two screens up: The screen on the left is what he's using to do a good job on that day, and the screen on the right is looking at what we can do tomorrow, next week, next year, to improve. 

The Maker Movement Connects to the Classroom

A hands-on approach to STEM engages students, but how does project-based learning connect with standardized testing?

Whether it's a paper airplane or a robot that walks, kids have always wanted to create functional objects with their own two hands. These days, many educators are channeling that natural urge to build with help from the wider "Maker Movement," which has spawned Maker Faires and dedicated "maker spaces" in classrooms and media centers around the country. Pam Moran, superintendent of the Albemarle County Public Schools (VA), contends that American classrooms of the past regularly fueled this type of creativity, and now is the time to bring back that spirit of innovation. "I see the maker movement as being a reconnect, both inside schools, as well as in communities, to redevelop the idea that we are creative individuals," Moran said. "We are analytical problem-solvers, and we are people who, in working with our hands and minds, are able to create and construct. We are makers by nature."

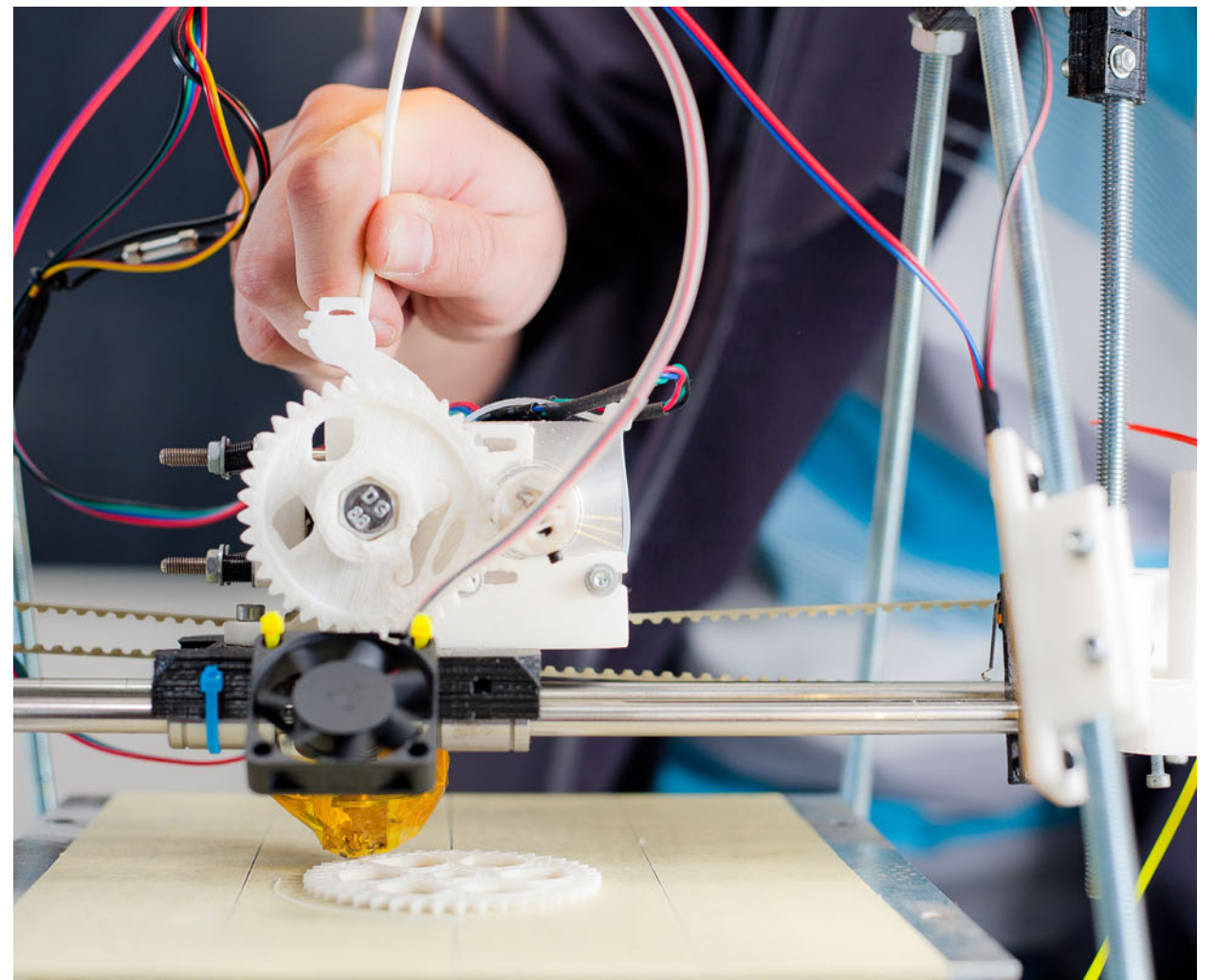
Glen Bull, a professor of STEM education at the University of Virginia, Charlottesville, agreed that while the urge to create endures, the tools available to students

have changed. He said that the current maker movement "is buttressed by accessible technology, both in terms of cost and ease of use. You can go all the way back to the 1950s and find that they had numerically controlled milling machines, but they were expensive. Now you can get reasonably priced 3D printers and computers."

From Club to Classroom

After-school Lego Robotics clubs have been a mainstay in many districts for years, but Moran and others believe it's time to bring these hands-on activities into the classroom during regular school hours. In Albemarle, Moran is working to engage some of the district's 13,000 students in 26 schools by offering customized

options and pathways. "We have two public charter schools," Moran enthused. "If you went to one of our community charter middle schools, you would see



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kids engaged in an arts-infused curriculum in which they are making. In our regular schools, you would see the same thing. If you went to one of our 16 elementary schools, you would find maker spaces permeating classrooms where kids can work on projects and use tools. We had four of our elementary schools that ran maker schools instead of traditional summer schools.”

For one recent project, Moran said, a student used a 3D printer in the library to produce a new case for her iPhone — which the school’s principal posted on the school’s Twitter account. “When kids and teachers are given an opportunity to make, to create,” Moran said, “all of a sudden you see people becoming passionate about who they are as learners.”

While new technology can engage students, Gary Stager, co-author (with Sylvia Martinez) of *Invent to Learn: Making, Tinkering, and Engineering in the Classroom*, pointed out that maker projects don’t require costly machines. “We see teachers and students working with traditional materials combined with new materials — even cardboard construction,” he said.

Martinez added, “There are new conductive materials, conductive tapes where you can paint a picture that actually does something, such as lighting up. These materials draw people in in ways they don’t expect. One person might be interested in building a

robot, but another might be interested in building a glove with a sensor on it.”

Charlottesville City Schools (VA) has invested in creating spaces and purchasing equipment that support maker activities for middle- and high-school students. According to Gertrude Ivory, associate superintendent for curriculum and instruction in the nine-school district, “We renovated our science lab at the middle school, and we are renovating an atrium

“When kids are given an opportunity to make, to create,” said Pam Moran, “all of a sudden you see people becoming passionate about who they are as learners.”

space. In our high school, we took a portion of the media center. We’ve taken about one-third of the library space, carved that out, and added two levels with the classroom — plus spaces for collaboration between students and teachers.”

In partnership with the University of Virginia, middle school students in the Charlottesville district are using 3D printers in courses specifically designed to incorporate those tools into science classes. “We have other projects where students publish or print their artwork and sell postcards,” Ivory said. “We have

something for students with disabilities that exemplifies the maker concept. They make pastries and sell them throughout the school.”

Stager hopes that maker concepts will eventually be seamlessly incorporated into the curriculum. In making the case for “tinkering and engineering” throughout the school day, Stager and Martinez believe that keeping maker spaces separate from the classroom is less than ideal. “When computers first came into schools,

they came in through the classrooms of interested teachers, and then they all got rounded up and segregated and we made computer labs,” lamented Stager. “It wasn’t very successful to have everything separated out, and we don’t want to make that mistake again. We make the case that this kind of learning can happen in every subject area and in every classroom.”

Coexisting With Standardized Tests

The cold realities of end-of-year assessments can conflict with high-minded learning philosophies. In

Charlottesville, Gertrude Ivory makes every effort to reconcile so-called traditional teaching methods with maker concepts and project-based learning (PBL), but she admits that it's not easy.

"The standards don't necessarily lend themselves to the kind of teaching that goes into the maker activities," Ivory said. "Teachers sometimes have a really hard time embracing the project-based activities, because they feel so compelled to get students ready for standardized tests. We have a few teachers who do understand, and are risk takers, and they see the payoff.

She added that, with PBL, "The students remember more. We're seeing some of that with our science and engineering classes, but the teachers are a little reluc-

tant to let go of the traditional, tried-and-true practices because they're afraid until they have a lot of success with it."

According to Sylvia Martinez, "PBL takes experienced teachers, but in the long runs it is actually easier."

Superintendent Pam Moran called herself a "fierce opponent of letting tests dictate the work that teachers do with kids," but conceded that making time for maker activities remains a challenge. "Like everybody else, we have to be sure our kids are ready for those Virginia tests in the spring," she said. "Teachers stand with one foot on one side of a stream that is about testing, and another foot on the other side about making sure what kids do is worthy of their learning."

According to Sylvia Martinez, research shows that PBL leads to deeper understanding for students, and yet it's still all too rare. Why? Martinez believes it comes down to training time. "PBL is more difficult, and it takes experienced teachers," she said. "But in the long run it is actually easier, because kids are working on things they care about, and when they do that, they are empowered to really make a difference."

Moran has seen teachers get excited, too, when they get hands-on experience with 3D printing, com-

puter assisted design (CAD) programming and using Google Apps in powerful ways. "We sent a team of teachers to Chicago Children's Museum, and they

worked with the people who helped to design and implement maker labs," she said. "Those teachers came back absolutely jazzed. They were fearful of turning young children loose with some of the tools, such as glue guns, drills or saws, but after they went up there and saw that happening in a public museum, they came back and said, 'We know how to make this work.'"

As maker projects are getting more time and space in classrooms, they are also gaining acceptance as proof of learning among elite universities. According to Stager, "The admissions department at MIT has been traveling the country telling parents and kids that they want makers at MIT. They've added a space on the MIT application for makers to submit a portfolio of what they have made." 

Greg Thompson is a freelance writer based in Fort Collins, CO.

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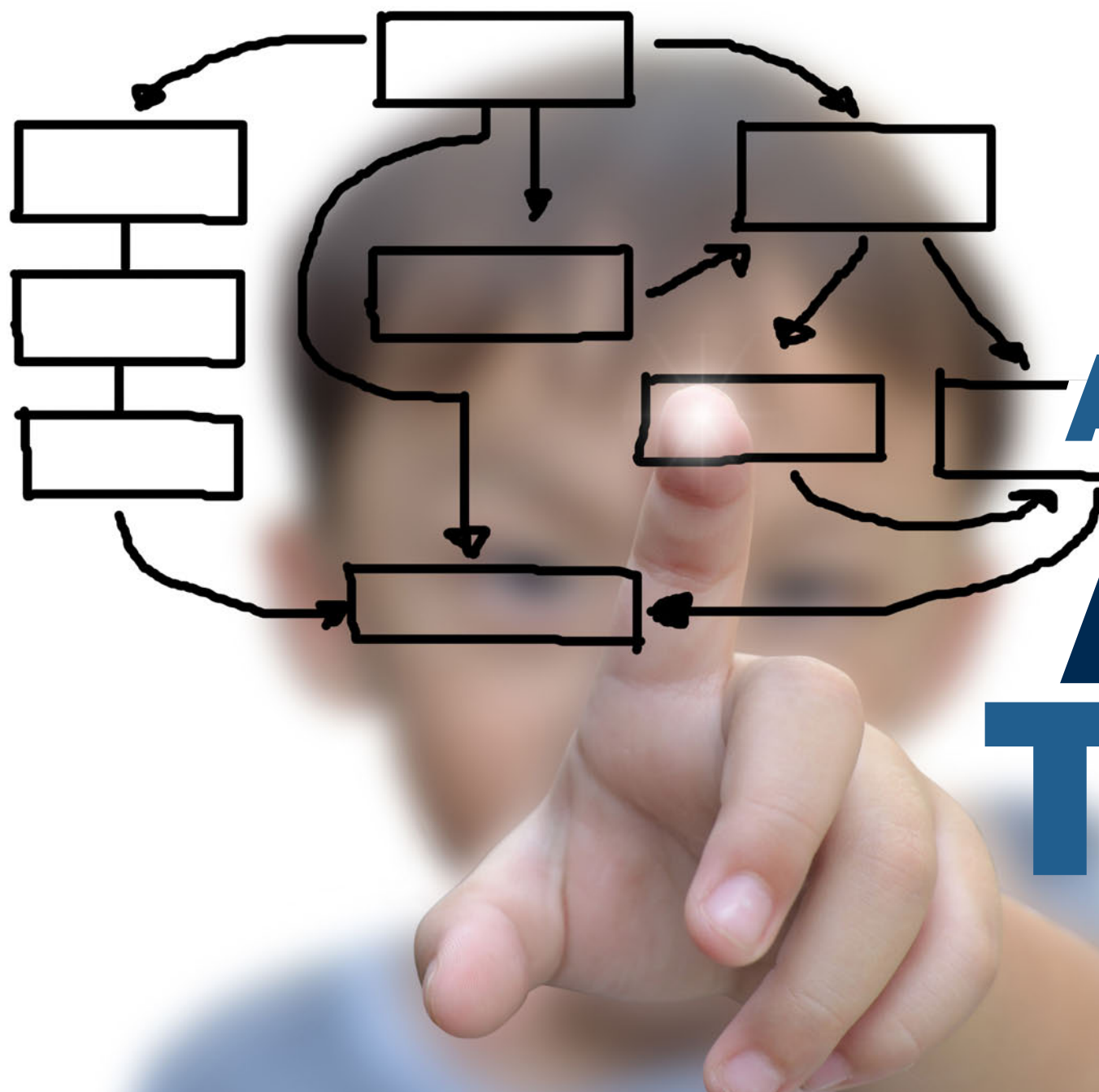
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Tech companies and publishers are working to transform an ed tech buzzword into a classroom reality. But, as one expert says, “It’s going to take some time to get it right.” **BY JOHN K. WATERS**

ADAPTIVE LEARNING: ARE WE THERE YET?

FOR MORE THAN A DECADE, K-12 educators have been hearing about the potential of adaptive learning, an approach to instruction and remediation that uses technology and accumulated data to provide customized program adjustments based on an individual student’s level of demonstrated mastery. But interest in adaptive learning has been heating up in the last couple of years, thanks to new attention from the Bill and Melinda Gates Foundation, new partnerships among education publishers and adaptive platform providers, and a growing list of product vendors. Along with that increasing interest and expanding vendor landscape has come a fair bit of confusion about exactly what the term “adaptive learning” means. To some, it’s almost synonymous with “personalized learning,” but in practice, these are different concepts, and K-12 districts investigating systems that promise to deliver adaptive learning should understand that difference. ►►

What Is Adaptive Learning, Exactly?

According to Adam Newman, founding partner of Education Growth Advisors (EGA), a strategic advisory and consulting firm and investment bank focused exclusively on the education sector, “ ‘Personalized learning’ is really an umbrella term.” In two recently published white papers commissioned by the Gates Foundation (“Learning to Adapt: Understanding the Adaptive Learning Supplier Landscape” and “Learning to Adapt: A Case for Accelerating Adaptive Learning in Higher Education”), Newman and his colleagues defined “personalized learning” as a “pedagogical method or process that draws on observation to inform tailored student educational interventions designed to increase the likelihood of learner success.” As Newman said, technology isn’t actually required for personalization, but the tech makes it possible to personalize at scale.

K-12 educators have been personalizing learning for decades: If Jesse is having trouble reading, the teacher assigns her some extra reading in Chapter Two. Personalized learning covers a range of approaches, Newman said, including competency-based learning, differentiated instruction and tutorial models — as well as true adaptive learning.

In “Learning to Adapt,” EGA researchers went on to define “adaptive learning” as a method that employs “a sophisticated, data-driven, and in some cases, nonlinear approach to instruction and remediation, adjusting to a learner’s interactions and demonstrated performance level, and subsequently anticipating what types of content and resources learners need at a specific point in time to make progress.”

The EGA researchers divided adaptive approaches into two categories: “Facilitator-driven” systems provide instructors with actionable student

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and cohort profiles, typically via a dashboard; while “assessment-driven” platforms provide dynamic adjustments to the instructional content as students interact with it. Facilitator-driven systems provide information that instructors act upon; assessment-driven systems make their own adjustments and allow students to move through the course individually or in a group, without instructor interaction. The two approaches are not mutually exclusive, Newman said, and both might be found in a single product or system offering.

BEYOND THE BUZZWORD



VIDEO: HMH's Mary Cullinane says that adaptive learning will only improve student outcomes if technology is paired with the right content.

Partnering to Adapt

One recent trend that promises to advance adaptive learning in K-12 is partnerships among educational publishers and adaptive learning platform providers, such as [CogBooks](#), [CCKF](#) and [Knewton](#). This year, Knewton announced a partnership with Microsoft, which will make the Knewton API available to “its vast partner and publisher ecosystem.” And in 2013 K-12 content company [Macmillan Education](#) announced plans to build new digital products using the Knewton API. Knewton has also been working with [Triumph Learning](#) and [Houghton Mifflin Harcourt](#) (HMH) to add adaptivity to their K-12 learning products.

Triumph is using the Knewton API to enable adaptivity in new digital products aligned with the Common Core. Triumph is set to launch these products this year in multiple subject areas. HMH worked with Knewton in a previous collaboration on a project to provide adaptive learning in math, science and language arts to incarcerated K-12 students. HMH is now using the Knewton platform to bring adaptive learning to its mainstream K-12 content in math, reading and other core subjects. The publisher is currently in the process of adding the Knewton-powered adaptivity to its GO Math! program.

[McGraw-Hill Education's](#) 2013 acquisition of [ALEKS](#) gave the publisher its own adaptive intelligence engine.

ALEKS, an acronym for “Assessment and LEarning in Knowledge Spaces,” is a Web-based, artificially intelligent assessment and learning system that uses “adaptive questioning” to determine what a student knows and then select the topics he or she is ready to learn. The system reassesses periodically and adjusts the learning pathway. McGraw-Hill is currently offering a range of ALEKS-based K-12 online math courses.

Adaptivity in Action

Mary Cullinane, chief content officer and EVP of corporate affairs at HMH, said, “There has been a lot of noise in the marketplace around adaptive learning, but so many of the offerings are just binary ‘if you get this question wrong you go here; if you get it right, you go there’ kinds of things. True adaptivity isn’t just about understanding that the kid got the question wrong, but *why* the kid got the question wrong.”

The Knewton platform, for example, is a set of adaptive learning infrastructures designed to allow third-party vendors to add adaptivity to their products. The platform collects and processes data from real-time streams and maps the relationships among individual concepts within the learning content, which are integrated into taxonomies, learning objectives and student interactions. It then uses this data to evaluate student

proficiencies and generates “insights” and predictions that lead to recommendations. The goal is the creation of an individual “learning path.”

David Kuntz, Knewton’s VP of research and adaptive learning, explained, “Our partners are the experts in their target market. They create the application and pass us the data. We process that data and make a set of actionable inferences about the students, and then pass those back to the application, and the partner decides how and when to render those for the student.”

HMH is currently taking its adaptive math program for a test drive with more than 2,000 students in California, but the company is keeping the details of that “closed pilot” test under wraps for now. Cullinane said, “We’re still in the early stages, and we want to be super-honest about that. But we do feel that this is technology that can actually deliver on its promise. It’s going to take a little time to make sure that we do it right.”

Rather than using content from third-party publishers, Australia-based Smart Sparrow’s Adaptive eLearning Platform supports educators in creating their own adaptive courseware. The educator-created content then responds to students by providing feedback that is unique to the individual. Using this “adaptive feedback,” the system presents differentiated learning sequences for each student.

Smart Sparrow’s founder and CEO Dror Ben-Naim said, “I’m a big believer that we should not take the teacher away from the teaching process. We should build the technology around the teachers to empower them and put them at the center of the story.” Smart Sparrow grew out of years of research at the University of New South Wales in Sydney, which is currently collaborating on a project with Arizona State University and other universities to build adaptive online courseware for high school students.

The Holy Grail of Data

Data collection is essential to any adaptive learning system, of course, but according to Kuntz, such a system applied in a K-12 environment presents a unique opportunity. “One of the great things about K-12 is that students spend a long time there,” he said. “You get to collect data from students year after year as they progress through the curriculum. You get to see them in all of their classes with all of their teachers and all of their proficiencies, what they’re prepared for and not, what



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kinds of things engage them and how that develops over time.”

“You could call it the holy grail,” Newman added. “It’s this idea of being able to build a learner profile, such that the instructional pathway the student pursues over his or her lifetime is being dynamically modified and adjusted based on a whole bunch of data and information.”

“The truth is, we’re just scratching the surface,” Kuntz said. “When we start to see students from early in their educational careers into adulthood — that’s when we will be able to gain truly deep insights into how people actually learn and how they develop over time. We’ll be able to discover, say, whether that thing you learned in third grade actually mattered, in terms of your preparedness for higher-order concepts later on. That picture of each individual student and how it changes over time will be invaluable.”

The result, in theory, will be that the more a student interacts with an adaptive product, the more individualized that product will become. Cullinane said, “I might be looking at 10,000 students for whom a particular piece of content is working. When I see the 10,001st student with the same set of characteristics, I have a much better chance of pointing that student to the appropriate content. I guess you could say that, as the platforms become more adaptive, the content is getting smarter.”

“A Premise, Not a Panacea”

Because students undergo cognitive development as they progress through the grades, an “assessment-driven” approach to adaptive learning makes sense in K-12. As the EGA researchers pointed out, the more sophisticated solutions “model and categorize learners through the aggregation of cognitive *and* non-cognitive data, resulting in a more three-dimensional ‘profile’ of the learner.” This learner profile enables a solution to personalize a student’s experience. As the researchers wrote, “This approach requires the greatest degree of technical acumen, as the system must monitor, track and analyze extensive, large-scale data ranging from previous learner/s’ experiences to cognition, modalities and social learning, among others.”

This observation points out an aspect of the adaptive learning landscape that might not be immediately apparent: There are varying levels of adaptivity. A product or platform isn’t simply adaptive or not adaptive. The differences, Newman said, boil down to understanding what the end goals or learning objectives are, and the level of granularity with which those goals are captured.

“Let’s say we’re talking about a student’s path through Algebra I,” he said. “Some of the courseware products will give that student a diagnostic that says he needs to work on quadratic equations. But those

products might not know what it is about quadratic equations that’s challenging to that student, personally. More sophisticated approaches we’re seeing now seek to provide an understanding that it’s not just that the student doesn’t understand quadratic equations, but that it’s these three steps in solving for quadratic equations that really trip him.” Then the focus becomes building the student’s mastery of just those steps.

To get to that level of granularity, an adaptive system must break down the learning into building blocks. The more sophisticated systems understand which blocks are prerequisites to larger concepts. The current crop of adaptive solutions that get to this level of granularity, Newman says, are mapping to a set of known, required objectives or competencies.

“Whatever the approach,” Newman said, “the essential premise of adaptive learning — and it is a premise, not a panacea — is that it holds the promise of a more outcomes-oriented system that is more efficient in the use of time and resources.” He concluded that adaptive learning “has a lot of promise. It can be powerful, but there are lots of options that an organization can explore.” 

John K. Waters is a freelance journalist and author based in Palo Alto, CA.



Digital Citizenship for the Real World

The Digital Driver's License is helping students prove that they're ready to navigate the hazards of the Internet.

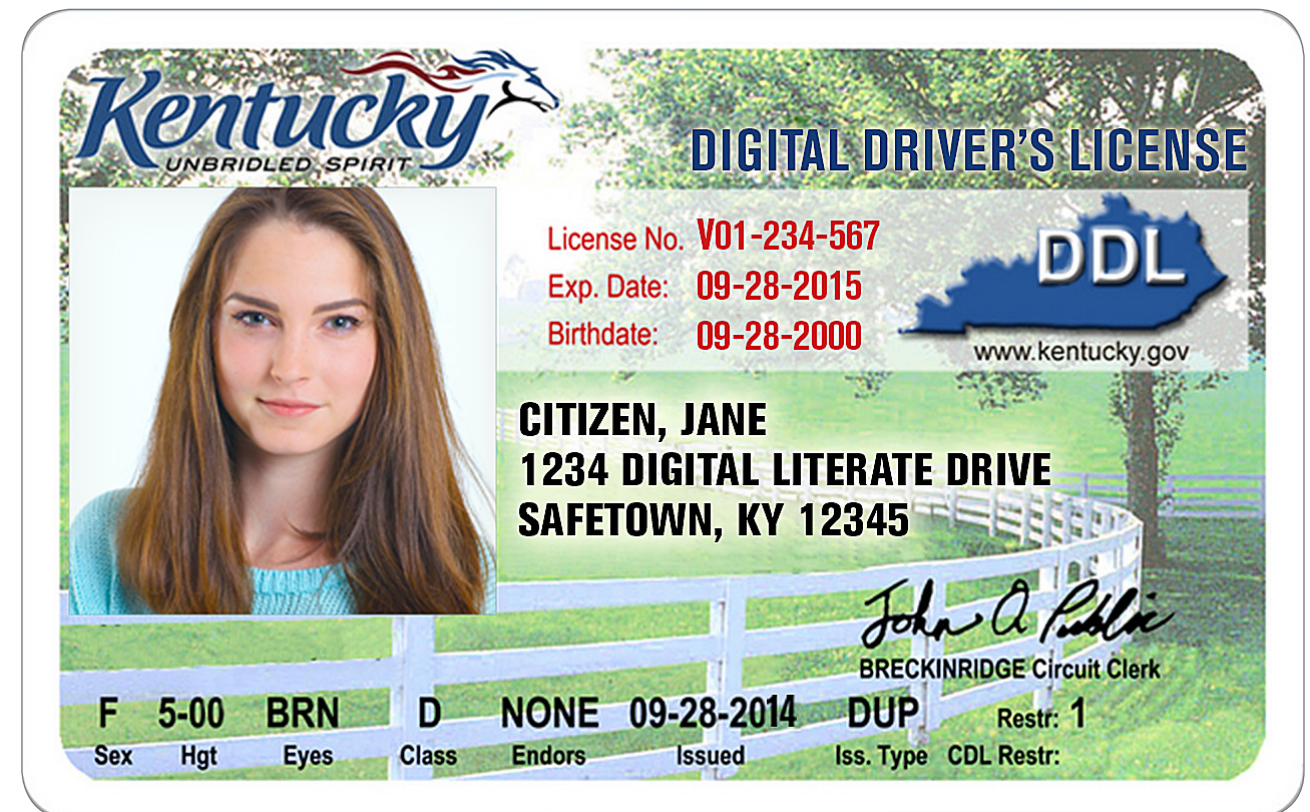
Every new driver takes a road test before ever taking the wheel. With so much at stake, it would be reckless not to. So it's something of a mystery why, in the age of increased attention on cyberbullying and online predators, schools aren't doing more to prep students for the inevitable realities of the Internet.

Too often, digital citizenship topics like student safety and proper research methods are reduced to brief lectures that get wedged between keyboarding and software tutorials in catchall computer courses. Sometimes the digital component to the lessons is missing altogether. But with BYOD and 1-to-1 programs blossoming around the country, the subject is at least getting a second look from educators.

According to Marty Park, chief digital officer at Kentucky's Department of Education, 21st century topics require 21st century teaching methods. "We can either take the approach of 'we have to sit people down and say the same things or watch the same PSA video,' or we can take a different approach and try to really engage in the online space where students want to be."

Park is a pioneer of the latter approach. Three years ago, with input from approximately 20 K-12 educators, Park first applied the driver's ed model to digital citizenship when he co-designed the Digital Driver's License as part of the OTIS initiative at the University of Kentucky.

The Digital Driver's License, which was partly inspired by Mike Ribble and Gerald Bailey's ISTE publication Digital Citizenship in Schools, is an online tool that takes students through a series of hypothetical, real-world scenarios related to digital literacy and safety. The tool has been designed to encourage independence and caution among digital learners, much the same way a driver's ed course prepares drivers for dangers that might pop up when they are alone on the road.



In 2011, the program debuted in a handful of local Kentucky classrooms. Since then, more than 600 districts (and about 60,000 students) have discovered it. Park said that the tool has reached not only traditional school districts, but also home-schooled students and adult learners. "We try to take a really proactive approach, but also a performance angle, and try and look

at scenarios that not just students, but that we all find ourselves in,” Park said.

Today the Digital Driver’s License, or DDL as it’s commonly known, features about eight scenarios, tailored by age level, that cover topics including what constitutes copyright violation and how to stay safe online. Each student registers individually and then progresses through background material related to a given scenario, which might include a video or examining a given situation.

When a student feels confident she has mastered a topic, she can take a “prove it” quiz that puts her knowledge to the test. A passing score is 80 percent or greater. Scores, answer resets and attempts are logged for educators, who can follow each student’s progress in an admin toolbar. Educators can further specify which scenarios will be required to earn a DDL.

Designed as an open educational resource — and thus free from the beginning — the DDL stresses more than just engagement and relevance for students; it’s also about flexibility of use and self-directed learning. “We wanted schools and districts to be able to use whatever they wanted, however they wanted to, and we’re seeing a lot of different types of implementation,” said Park. “The idea is that the student or the learner really owns their own path.”

The open source nature of the DDL doesn’t just mean that it’s free; it also means it’s open to meaningful contributions from educators who have something of value to add. Gerry Swan, a professor at the University of

In response, Payne told Marty Park that he should consider adding a middle school component beyond basic cell phone etiquette — and he in turn suggested that she write it. Payne ended up completing two sec-

The DDL stresses more than just engagement and relevance for students; it’s also about flexibility of use.

Kentucky and director of OTIS who co-created the DDL with Park and is responsible for much of its structural support, said that the DDL is “open in that not only can everyone use it, but everyone can contribute to it and make it better.”

Middle Schoolers and Mobile Devices

When Henderson County Schools (KY) was looking to develop a BYOD program for interested classroom teachers, Linda Payne, the district’s technology instructional coordinator, knew that students first needed a grounding in digital citizenship to prepare them for using their devices in an academic setting. Payne had been one of the first to sign on to the DDL program back in 2011, but, she said, “When our middle school was the only school using the Digital Driver’s License, the high school part,” which was the only comprehensive course available at the time, “was a little over their heads.”

tions. “Educate Yourself, Connect With Others” covers social networking and online safety, while “Protect Yourself, Protect Others” deals with digital commerce and online scams. “The content there helps to cover the nine sections of digital citizenship that are commonly referenced nationwide,” she said.

Payne’s work obviously struck a chord with educators. According to Park, “Just a week after publishing her cases, there were thousands of attempts on assessment.”

Many Roads to Learning

The flexibility built into DDL means that, by design, there is no one model for using it with students. “If teachers are gung ho about their classes getting a Digital Driver’s License, some of them will allow the students to use class time,” Payne said. “But most of the students do a majority of that on their own time.” As students complete cases, Payne and a colleague go through and check

DIGITAL CITIZENSHIP

their success. Once they pass all the sections, students get an embossed “DDL” decal on their planners and are given access to the school’s network.

By contrast, students at **Carson City School District** (NV) move through DDL units with their teacher in a special “academic intervention” class and then work individually on the prove-it assessments in class. Lead technology integration specialist LeAnn Morris, whose district has incorporated the tool into a comprehensive digital citizenship course for fourth- through 12th-graders to prepare them for a 1-to-1 laptop program, said,

EARNING YOUR LICENSE



VIDEO: Co-designer Marty Park walks educators through the process of registering for the DDL and setting parameters for students.

“We want to make sure the students actually do the lessons so we have it a little more structured with the teachers at this point.” Morris noted, however, that the program is still finding its footing, and the district may shift more responsibility onto older students to complete the cases on their own time.

That’s the strategy currently favored by the **Raymore-Peculiar School District** (MO), which is using the DDL to revamp its digital citizenship curriculum to prepare students for an expanding BYOD rollout. Ryan Gooding, the district’s director of technology, said, “In the middle school and above, we kind of put it on the students to get it completed,” adding that in the fifth and sixth grades, “Teachers walk the students through the sections they thought were age-level appropriate.”

In his interactions with students who have gone through the program, Gooding has been “surprised” by the response. With a school full of digital natives, “I thought I would get a lot of, ‘This is ridiculous,’” he said, “but a lot of them actually talked about things they had learned, or that they had gone through the first section and gotten a score of one out of 11 and went back and watched it again.” Sections on copyright and plagiarism particularly struck a chord with high schoolers. “It’s a big thing with teens right now. Hopefully they’re going to be able to apply that as they make

choices as far as where they go on a network and what they do on the Internet for the rest of their lives.”

Continuing the Conversation

Right now, Park and Swan are tweaking some basic usability features based on feedback they’ve received from educators, and they plan to refresh some of the digital citizenship content this summer. They also have plans to expand the “driver’s license” model to other areas (such as standards-based grading for professional development), operating under the assumption that, as Swan put it, “If it’s good for students in digital citizenship, it might be good for other topics and areas.”

While the founders agree that the model provides a good basis for engaging students, they stress that digital citizenship doesn’t end with the DDL — just as developing good driving skills doesn’t end with an exam. “The DDL is not, as we like to say, a Roomba,” said Park. “You don’t just turn it on and hopefully your house is clean. It’s very much a conversation. That’s one thing we like to be very upfront about. It’s not a self-graded computerized thing you’re going to walk away from and now, magically, your students are going to do the right things.” 

Stephen Noonoo is a contributing editor based in Los Angeles.



5 Reasons Schools Still Need Desktop Computers

Despite the growth of mobile learning, desktops still play important roles in the 21st century classroom.

Desktops aren't dead. Even as schools increasingly implement 1-to-1, bring-your-own-device (BYOD) and other mobile device initiatives, many are choosing to retain at least some desktop computers — and others are even upgrading to swanky, top-of-the-line machines. Keeping at least one desktop computer in each classroom is a common practice, and some schools are keeping their dedicated desktop labs, either for general use or for specialized classes. It seems that some classroom needs are still better served by a desktop computer than by a laptop or tablet. Here, school technology leaders from around the country share five reasons why you might want to keep at least some desktop computers around.

1) Processor Power

Schools that offer classes in video editing, engineering or CAD drawing need computers with scads of power because the software required for those classes is processor-intensive. For instance, **Chico**

Unified School District (CA) has labs for AutoCAD and video production classes that are outfitted with high-end desktops. According to Jason Gregg, director of information services for the district, "Although you can buy laptops that are able to run that software, they're a lot more expensive, so that's definitely a place where it's more cost effective to have desktop computers."

2) Screen Size

The classes that benefit from the powerful processors also tend to benefit from large computer screens. John Orbaugh, executive director of technology at **Tyler Independent School District** (TX), said, "If I'm sitting down in an AutoCAD lab, I don't want to really do that much AutoCAD on a laptop screen, I want a 24-inch monitor in front of

me where I can have a little more screen real estate to work on my project, or if I'm editing video I want to have a little more space than I would find on the typical laptop."

In video editing or CAD drawing classes, it's important for students to be able to see the visual details of their work, and larger screens make that easier. And



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HARDWARE

while it's possible to connect a larger external monitor to some laptops, districts find that it's often more practical and cost effective to stick with desktop computer for those situations.

3) Ergonomics

Screen size is essentially an ergonomic issue, but it's not the only one. Some schools are sticking with

or iPad-type keyboard. We use the extended keyboards on our desktops so students have the numeric keypad there on the side."

Susan Plante is a teacher and the director of technology at **Eagle Hill Southport**, a school in Southport, CT for students with learning disabilities. She said some of her students find it easier to work with a full-sized

For AutoCAD, video production and classes that deal with spreadsheets, desktop computers are still the right tool for the job.

desktops so they have more control over the placement of the monitor and keyboard, and to provide students with full-sized keyboards with integrated number pads. Phil Hardin, recently retired executive director of technology at **Rowan-Salisbury School System** in Salisbury, NC, said, "Dealing with spreadsheets and numbers is inefficient on a typical laptop

monitor and keyboard and to use a mouse. The separate keyboard also makes it easier to teach typing skills, in Plante's opinion.

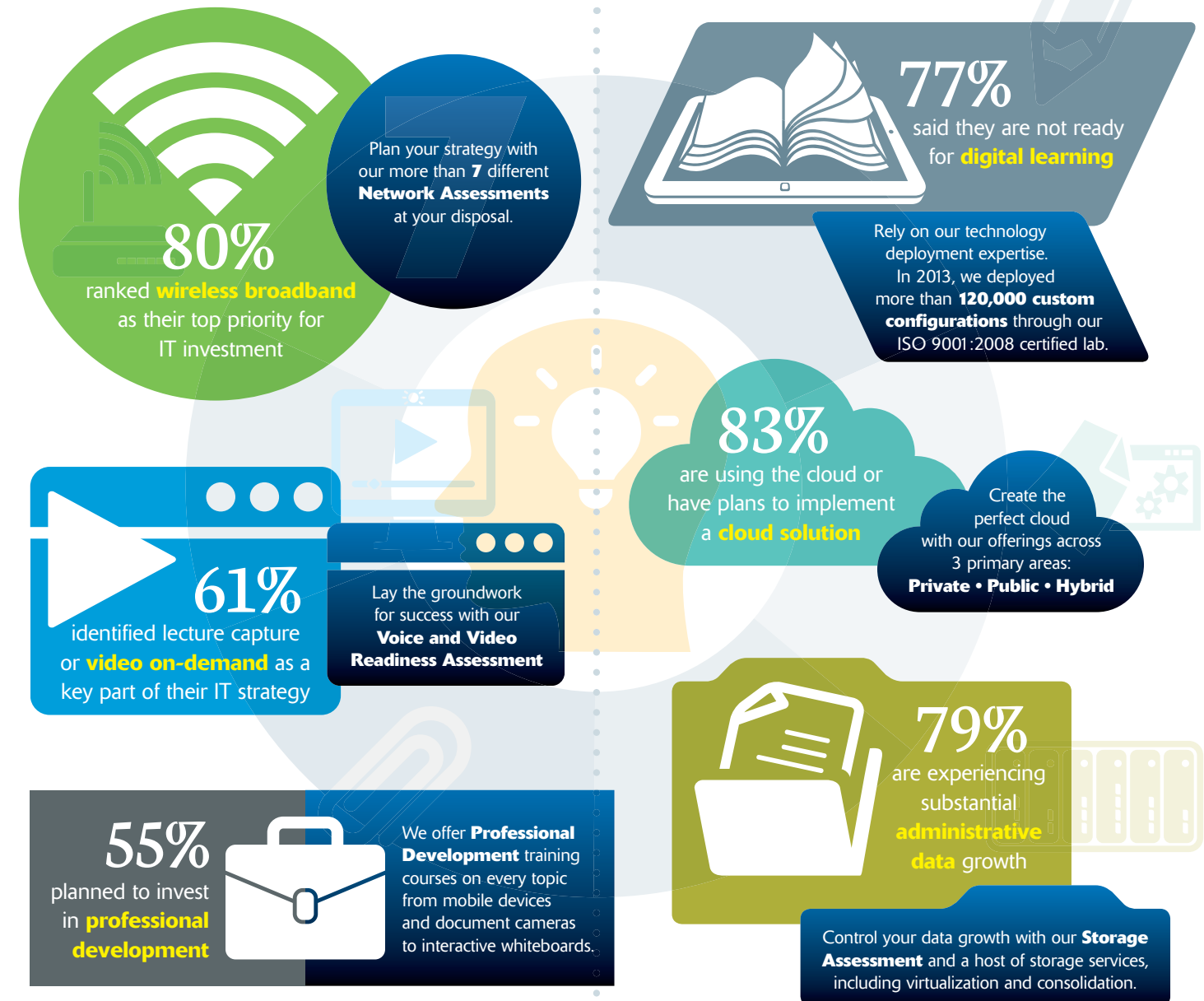
"I focus on kids with learning disabilities, but I think teaching typing is so beneficial for any student in today's world," she said. "It is so much harder to teach them to type when things are all connected. We want them not to

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look at the keyboard and we want them to look at the screen. It's so much more challenging to say don't look when everything's all connected, whether it be a tablet or a laptop."

4) Wired Connectivity

Those engineering and graphics classes are demanding. Not only do they require powerful processors and large screen sizes, but they also generate huge files. When those files need to be transferred over the network, wireless connections are often too slow or unreliable. Consequently, many schools prefer to use wired connections, and while many laptops support wired Ethernet, it's often more practical to use fixed wired connections with desktops because they can stay plugged into the network all the time.

Ann Dunkin, chief technology officer at Palo Alto Unified School District (CA) said, "If students are pulling big files down off the server to work with, in some cases you want to put them on the wired network because they really do have some very high data transfer needs."

Another common reason why some schools are sticking with desktops for wired network connectivity is video streaming. "For us, there's still no substitute for having that hardwired connection to our network

when we're streaming video, especially as it keeps getting more and more into the high definition video," said Orbaugh. "To make it a nice experience where something's not stopping, pausing, queueing up a little bit and then playing and pausing, for us right now in our environment, the best way to accomplish that is with a hardwired connection."

5) Dedicated Usage

Oak Knoll School of the Holy Child in Summit, NJ, recently dismantled its computer labs and switched to carts of mobile computers that can be used anywhere in the school. But they didn't get rid of those desktop computers. Instead, they repurposed them.

dents at inopportune moments. To resolve the problem, the school moved the desktop computers from the labs into the classrooms and gave each classroom a computer to be used exclusively with the IWB.

Alex Podchaski, director of technology at the school, said, "We've now created a specific purpose for that desktop in a classroom, so we can make sure that the smartboard is always connected and always ready, and we manage the software. So we've taken the desktop in a very specific direction and have been using it for very specific, dedicated purposes."

Ultimately, the decision of whether to use desktops, laptops or tablets is all about practicality. As Orbaugh put it, "What's the job that you're trying to accomplish,

John Orbaugh said, "There's still no substitute for having that hardwired connection to our network when we're streaming high definition video."

The school has interactive whiteboards in each classroom, and teachers used to connect their laptops to the IWBs to display materials to classes. But that solution wasn't always ideal: Sometimes a teacher would forget to close her e-mail application before class and e-mail alerts would pop up in front of stu-

and what's the best end-device to help you accomplish that work?" In some cases, a desktop computer may still be the best solution. 

Leila Meyer is a technology writer based in British Columbia.



Helping STEM Take Root

Private and public sector groups are joining the effort to steer students toward tech education and careers.

It has been nearly five years since President Obama launched Educate to Innovate, an effort to push American students from the middle to the top of the heap in science and math achievement. Through this initiative, the federal government, companies and nonprofits have moved into the K-12 STEM arena in an attempt to broaden the nation's tech-minded talent pool.

The goals of these groups go beyond just ensuring that today's kids are exposed to STEM subjects in school. They're also helping students select careers in growing industries that pay well. According to a recent Mashable article, "The 10 Fastest-Growing Job Titles Are All in Tech," job-matching service TheLadders says that the fastest-growing jobs (which include DevOps engineer, iOS developer, data scientist and staff accountant) require "deep educational qualifications and specific skills in the areas of science, technology, engineering and mathematics."

To help students get started on the path to these opportunities, organizations like Siemens Foundation,

Junior Achievement, Microsoft, Girls Inc. and Discovery Education have rolled out ongoing and one-time events focused on stoking interest in STEM. The Siemens "We Can Change the World" Challenge, for example, encourages K-12 students to develop and share environmental solutions. Developed in conjunction with Discovery Education, the effort has attracted more than 80,000 participants, who are using scientific investigation and Web-based curriculum tools to find solutions to local environmental issues and take on global energy challenges.

Discovery Education has also worked with Girls Inc. to make STEM resources more available to girls. According to Girls Inc., women employed in STEM fields earn on average 33 percent more



than those employed in non-STEM fields, yet women represent only a quarter of all workers in STEM-related jobs. In September 2013, the two organizations

STEM

provided STEM-related professional development opportunities to educators and mentors and introduced a series of standards-aligned STEM curricula designed around the National

you how many kids leave here saying that they had no idea science and math were this much fun.”

That “fun” component plays an important role in JA’s STEM efforts, ac-

“Kids had no idea science and math were this much fun,” said Becky Harding.

Academy of Engineering’s grand engineering challenges.

Turning Fun Into a Career

Junior Achievement of Utah is involved with a number of STEM-related initiatives. Its JA City Career Exploration Center offers in-class programs that prepare students for future jobs in STEM by teaching problem-solving skills, creativity and “thinking outside of the box,” said Becky Harding, director of the center. Four-hour science camps, for example, give K-12 students hands-on lessons in subjects that they may have typically shied away from. Harding said, “I can’t tell

cording to Harding, whose team tries to infuse as much enjoyment as possible into the center’s activities and events. Giving students projects that actually relate to the real world — such as building a model of a bridge and then testing it to see how much weight it can hold — helps build confidence levels and breaks down historical barriers and perceptions that may have kept kids from exploring STEM careers.

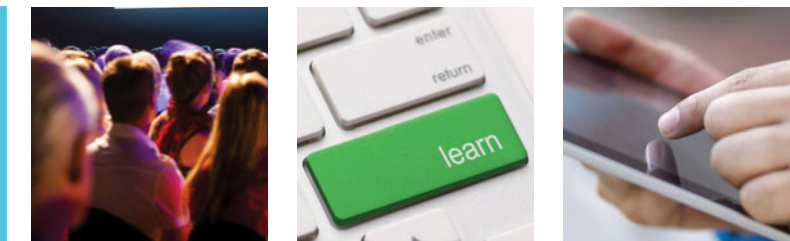
“We’re supplementing what they’re learning in the classroom without any huge risk on their part,” said Harding, who recently observed an apprehensive 9-year-old taking apart a



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computer and putting it back together again without much trouble. “There’s a student who isn’t going to be afraid of technology.”

Linda McCracken, president and CEO of Junior Achievement of Northern California in Walnut Creek, said that the organization’s own research shows that in 2013, 46 percent of students were interested in STEM careers — a 15 percent decrease from 2012. In most cases, she says confusion over exactly what a STEM career is can impact a student’s interest level.

“They need to understand their own roles in society and where their job opportunities are,” said McCracken, whose organization has created entry-level math classes to teach young children basic financial practices; middle school programs that encourage kids to explore prospective workplaces; and high school “job shadow” initiatives that give students a chance to interact with current employees. “Many of the shadowing opportunities are prioritized to STEM companies,” said McCracken, “with the goal of exposing students to one of the most demanding and rewarding career paths in today’s economy.”

Planting the Seeds of STEM

With a vested interest in helping to boost the number of students who take an early interest in STEM education

and careers, Microsoft has launched an initiative called Technology Education and Literacy in Schools (TEALS), which places computer scientists in high school classrooms across the country, either in person or virtually using Lync. The company also sponsors summer camps designed to grow girls’ interest in STEM-related careers and supports Code.org’s Hour of Code program, which encourages kids to spend an hour of their time learning how to write code.

Sid Espinosa, director of corporate citizenship at Microsoft Silicon Valley, said that the company’s focus on STEM goes beyond promoting careers in computer science. “We want to make sure students get the education they need to get into the fastest-growing jobs, which are all STEM-related and computer-focused in some way,” said Espinosa, who also pointed out that the U.S. continues to fall short in this area. “The bottom line is that we are *not* doing a good job of prepping our youth for the jobs of the future. As a technology firm, we’re highly concerned about that.”

And, true to the stereotype, tech continues to be something of a boys’ club. According to Espinosa, a high percentage of female students lose interest in math and science in middle school. By high school, most lack any interest in such subjects. “That number continues to dwindle in college, where the number of

female STEM graduates is unbelievably low,” he said. To help boost those numbers, Microsoft partners with groups like the Society of Women Engineers and runs programs like DigiGirlz, which gives high school girls the opportunity to learn about careers in technology, connect with Microsoft employees, and participate in hands-on computer and technology workshops.

According to Espinosa, Microsoft is also working to increase the amount of computer science taught in high school. Currently, Espinosa said, just 5 percent of students have access to these classes. “Some of the wealthier schools offer computer science as an elective, but it rarely counts toward graduation requirements,” he explained, noting that Microsoft has been working to change that at a policy level without impacting current graduation requirements for math.

To other groups looking to help promote STEM across the country, Espinosa said that tackling the problem with little steps in the right direction is the best approach. “There are no quick fixes to these issues, so it’s best to just get started,” he said. “Talk to other organizations, learn what’s going on at the local and state level, and find a way to get involved.” 

Bridget McCrea is a business and technology writer in Clearwater, FL.

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