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TRANSFORMING EDUCATION THROUGH TECHNOLOGY

May 2013 • Volume 40, No. 5

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ARE BADGES THE BEST WAY FOR STUDENTS TO PROVE WHAT THEY'VE LEARNED IN—AND OUTSIDE—CLASS? p.14

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Christopher Piehler, Executive Editor

We share the goal of helping students conquer their world.

Meet the Ed Tech Superheroes

JUST IN TIME FOR A SUMMER blockbuster movie season that's sure to serve up the usual parade of comic book heroes, *T.H.E. Journal* is proud to introduce our own version of the Avengers or the X-Men: our new advisory board. This dream team of educational technology leaders comes from all over the country. They represent a diverse group of K-12 districts and organizations. But they share one simple goal: helping students use technology to conquer their world.

Therese Mageau, editorial director of 1105 Media Education Group, the publisher of *T.H.E. Journal*, has this to say about the new advisory board: "We are about to complete our first year as a completely digital magazine and we are ready for a new set of minds and sensibilities to help us serve our readers in ways that are congruent with 21st century teaching and learning. The board that we have assembled is truly exemplary in their individual and combined experience in leveraging technology to deliver world-class education and educational experiences. We expect them to help us deliver the same to our readers."

We are incredibly excited to welcome these nine leaders to the *T.H.E. Journal* team. We look forward to working with them, and you can look forward to hearing more from them in the near future. (After all, what's a superhero story without a sequel?)

Meanwhile, in the May issue, our cover story (p. 14) on digital badging grapples with the issue of how to best recognize the feats of education that students achieve in and out of class. Digital badges hold the promise of giving students not just a report card, but a detailed record of their lifetime achievement. The big question, though, is how can these data-rich marks of merit be integrated into a traditional educational structure?

Speaking of traditional structure, it used to be that students with special needs could be marked as different by the assistive technology that they required to reach the same educational goals as their peers. But that's changing. Our feature on p. 31 details how, thanks to new hardware and apps, more and more students with learning challenges are joining the educational mainstream. How's that for a special effect?

Continue the conversation.

E-mail me at cpiehler@1105media.com.

Here & Now

Tech + Online + Industry + Partnership

[news]

District Use of Social Networks Up 44 Percent in Two Years

The Center for Digital Education (CDE) and the National School Boards Association (NSBA) have released key findings of the latest Digital School Districts Survey and have named top-10 districts in three classifications.

Social networking is up significantly, according to the survey, with 74 percent of respondents reporting that their district maintains a presence on at least one social network, an increase of 44 percent over two years. Use of microblogging platforms such as Twitter increased 38 percent over the same period, according to the report, with 69 percent of those surveyed stating their district uses one.

Other key findings included the following:

Nearly all respondents, at 94 percent, reported that their district allows teachers to use web 2.0 tools, up from 82 percent two years ago.

Logging a 6 percent increase since last year's survey, 71 percent of those surveyed reported that their district had a "digital content strategy" featuring tools such as digital textbooks, web 2.0 tools, educational games or simulations, video, or audio.

The biggest obstacle in preparing for upcoming Common Core online assessments, according to 32 percent of the respondents, is a lack of computers.

Twenty percent of respondents said they didn't know what the largest challenge for online assessments was, while 19 percent said that their largest assessment challenge was that they lacked technical support and expertise. Another 17 percent said their district doesn't have enough internet access or bandwidth for the assessments.

Only 9 percent of respondents reported having no bring-your-own-device (BYOD) program in their district, with 41 percent reporting a current implementation and 50 percent saying that they were either planning or in the process of implementing a BYOD system.

Among the districts that reported having active BYOD programs, 84 percent included grades 9 to 12, 72 percent included grades 6 to 8, 58 percent included grades 4 to 5, and 44 percent included grades pre-K to 3.

CDE and NSBA have also named 30 districts "that most fully implement technology benchmarks in the evolution of digital education, as represented in the survey questions," according to a news release from the organizations.

[industry update]

This summer, Vernier Software & Technology will offer 25 full-day, hands-on training institutes designed to help science teachers nationwide integrate data-collection technology into their science curriculum. During the institutes, teachers will work alongside a training specialist and use Vernier's hardware and software to explore classroom-ready labs and activities for a variety of grade levels and disciplines. More information and the complete schedule are available here.

This Dec. 2 and 3 in Atlanta, the International 1:1 Computing Conference will offer educators the opportunity to meet and share with other district leaders implementing 1-to-1 technology, including representatives from Project RED Signature Districts. The event will feature an "unconference" developed on-site by attendees. Strands will include Edcamp, Leadership, Instruction, Technology, Canadian Education Issues, and Project RED.

The Consortium for School Networking (CoSN) has issued a refreshed acceptable use policy (AUP) guide, titled "Rethinking Acceptable Use Policies to Enable Digital Learning: A Guide for School Districts." Provided through CoSN's Participatory Learning in Schools initiative, The guide tackles key questions and offers solutions to help districts update their AUPs.

Here & Now

being mobile

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Educational Pricing for Data Now!

Following their keynote at the IADIS Conference on Mobile Learning in Portugal, Elliot Soloway and Cathie Norris assert that, as mobile devices get cheaper and cheaper, voice and data plans are the last financial barrier to implementation of cellular devices for teaching and learning. To overcome that barrier, Elliot and Cathie call for the FCC to step in and mandate educational pricing for cellular data plans.

PRESS PLAY

breaking news

Live Feed

- Report: Parents See Benefit of Mobile Tech, Want Schools To Take Better Advantage 05/02/13
- Chief Intros Integrated System for Epson Projector 05/02/13
- Maine Learning Technology Initiative Dumps Exclusive Apple Contract for Microsoft 05/01/13
- Arizona Schools Receive State-Wide License for GIS Software 05/01/13
- Des Moines Public Schools Adopts Web-Based Workforce Management Tool 05/01/13
- Impulse Point Intros Identity Based BYOD Registration Solution 05/01/13
- Edgenuity Offers New Suite of Curricula for Career and Technical Education 05/01/13
- Schools of Education To Offer Free Teacher Professional Development on Coursera 04/30/13
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- Metro Nashville Schools Use ... ool To Identify Best Practices 04/29/13
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- Common Core Falters in Michigan 04/25/13
- Schoology Adds IMS LTI Compliant Integration 04/25/13
- STEM Education Company Offers Summer Data-Collection Training for Educators 04/25/13
- Texas' Ridgegate Elementary Sticks with Digital Intervention Tools for Math and Literacy 04/25/13
- Edgenuity Launches Suite of Blended Courses 04/25/13
- Sony Expanding Educator Ambassador Program; Handing Out Tablets 04/25/13
- Scholastic Platform Delivers Learning Programs for Global Regions 04/25/13
- eInstruction Rolls Out Entry-Level Clicker 04/25/13
- Varsity Tutors now Accepts Bitcoin Payments 04/25/13
- Starboard Adds Three New Hybrid Storage Systems to Product Lineup 04/25/13

More news

Here & Now

{win big!}

Broad Prize for Urban Education Announces Finalists

The Eli and Edythe Broad Foundation has announced the four finalists for the 2013 Broad Prize for Urban Education, a $1 million award given annually to the four urban school districts in America that have made the greatest improvement in student achievement, particularly among low-income and minority students. This year's four finalists are **Corona-Norco Unified School District** in Riverside County, CA; **Cumberland County Schools** (NC); **Houston Independent School District**; and **San Diego Unified School District**.The winner will be announced on Wednesday, Sept. 25, in Washington, DC, at the Library of Congress. The winning district will receive $550,000, and each of the three finalists will get $150,000.

[webinars]

The Power of the Web for Teaching and Learning

In this webinar, you'll hear directly from administrators at **Richland School District Two** in Columbia, SC, about how they successfully built and launched a 1-to-1 computing initiative with Google Chromebooks and Apps for Education for their 26,000 students. **Sponsored by Google**

The Power of the Pen: Next-Generation Tablets for the Classroom

The unveiling of Samsung's Galaxy Note 10.1 — with its advanced S-Pen and multitasking capabilities — signals a new generation of tablets that empower teachers and engage students in the K-12 classroom. **Sponsored by Samsung**

New and archived webinars are available at thejournal.com.

Here & Now

K-12 Mobile Classroom **offers a compendium of all the news, information, and insight that K-12 educators need to stay current on the best ways to serve their students and their communities.**

EDITOR: STEPHEN NOONOO

K-12 Mobile Classroom

Tips for Effectively Managing Your iPad Classroom

BY DIAN SCHAFFHAUSER

Sam Gliksman runs iPads in Education, a Ning network that has drawn several thousand educators and other people interested in exploring the use of iPads in schools. He has captured much of what he's gleaned from working with schools and teachers on their iPad programs in a new book, *iPad in Education for Dummies*. Recently, he shared with *T.H.E. Journal* his best advice on what to do before a rollout and how to help an iPad classroom run as smoothly as possible to let teachers focus on the learning, not the technology.

1. iPads Aren't Meant to Be Shared

From its earliest days, the iPad was designed for personal—not "institutional"—use, Gliksman says. It caches the user's information, which means that the next time it's turned on, the user sees whatever was left by the person who used it previously. Also, neither the iPad nor "the vast majority" of apps have login procedures.

"In grades one, two, and three, you're probably fine with that. Nobody's putting anything too sensitive on there," he adds. But as the students get older, work tends to be more personal and private and requires a higher level of security.

Gliksman's advice: If you're thinking about implementing a shared iPad program in a classroom fourth grade and above, "you're much better off with a 1-to-1" that uses some other kind of device that will be more manageable.

2. Figure Out Workflow

According to Gliksman, what catches most schools up is that they buy iPads "and just assume that it's a different form of computer and they can handle them the same way—and they simply can't." After all, he points out, there's no USB drive, no login, no wired connection to a network, "none of the mechanisms that [people] are used to for keeping data safe and secure and backed up and private."

When schools look at deploying iPads, IT needs to examine the "infrastructure element." This involves a number of essential components. For example, iPads operate wirelessly and most schools recognize the importance of having a robust wireless infrastructure. A second element that is often overlooked is the planning and organization of content workflow. How will information and work be distributed, shared, and collected? He recommends the use of cloud-based services, where work can be stored, collected, accessed, distributed, and shared. Among the most impressive right now: Evernote and Google Apps for Education.

Click to read the full article online at thejournal.com.

On May 16 at 4 PM EDT, learn more about Sean O'Neil's innovative use of technology in an edWeb.net webinar hosted by *T.H.E. Journal*'s Christopher Piehler.

INNOVATOR

SEAN O'NEIL, TECHNOLOGY COORDINATOR
ANTIOCH HIGH SCHOOL, ANTIOCH, CA

>> ENHANCING COMMUNICATIONS

I was always a tech hobbyist, dating to my GATE program in seventh grade, when we would work on little Timex Sinclair 1000 computers and do IF-THEN statements, back in the 1980s. I was theatre arts director at **Antioch High School** from 1996 to 2012, and am now the Media/Tech Academy director. When our district started moving toward themed academies, it was obvious to everyone that one of them should be in technology/media because of my work and the steps we had taken to improve communications with parents and between students and teachers.

>> GAMES STUDENTS PLAY

I teach a graphic design class in a computer lab, but deliver most instruction online through the 3D GameLab LMS, which means taking curriculum from the National Academy Foundation and "converting" it to a quest-based format while integrating it with lessons on Google Apps. It's a gamification system in which everything is broken into connected tasks so that you can't unlock the higher-level tasks until you've mastered the lower-level ones. It's about differentiating through instruction so that students are spending time and attention on the problems and skills they have more trouble with.

>> ONLINE SHAKESPEARE

My penchant for technology and communication first collided with the creation of ShakespeareCast.com in 2005, in which students podcast Shakespeare plays. iTunes had just opened up podcasts, so I talked to my students and we decided, "Why not do the performances live but also record the audio and put it out there." We ended up with listeners from as far as Thailand and a contract from what is now Mevio in which we got a percentage of the sales. It wasn't a lot of money, but it was great for the kids to get sponsored, and it got us a new laptop and sound mixer. It became a great tool for other classes, so that instead of just reading *Romeo and Juliet* they could listen to it being performed.

>> UN-APPED POTENTIAL

Last year we decided we needed a mobile app for our school. I had no knowledge of coding but spent a weekend looking up some tools and putting together our app — the first in our district. That got me thinking: Why weren't our students doing this? We have students struggling to make PowerPoints, but apps are what they're using on their phones all the time. So I brought my advanced acting class to the library, got them online, and spent two class periods on one of the online app-building programs.

Click for Mac

MY TOP 3

Sean O'Neil screencasts his favorite tools to help gamify your classroom. *Click here for the captioned version.*

I taught them about RSS feeds and had them create a mobile app about a celebrity. These are apps that can stay updated with Twitter, Facebook, and news feeds.

I thought, why can't this be used across the board? Anything you can put into a regular binder that you would turn in at the end of a semester, you could put into a mobile app. It doesn't take up space, and maybe the students end up maintaining it. It also becomes a potential tool for other students to learn from. Now I'm writing my first book, *Appademics*, on why and how students should be making apps in every subject to demonstrate proficiency. the

COLLABORATIVE TECHNOLOGIES

David Raths

Crossing the Device Divide

With the help of browser-based software, students in BYOD districts can be on the same page even if they have different devices.

This is the fifth in a six-part monthly series examining how different technologies can help schools enhance collaboration among students. Previous installments have covered social media, configurable furniture, interactive devices, and apps to make iPads collaborative.

When school district leaders talk about the potential benefits of "bring your own device" programs, they often mention budget savings and promoting personalized, mobile learning. They note that BYOD can expand the boundaries of learning beyond the classroom. But not many of these leaders mention enhanced student collaboration as a benefit of BYOD. This is partly because, when students come to class bearing devices on multiple platforms, sharing resources can get complicated.

Doug Johnson, the director of libraries and technology for the **Mankato Public Schools** (MN), says his district has been experimenting with BYOD this year. To ease collaboration issues, Mankato has teachers using device-neutral platforms, including Google Apps and Moodle. Teachers and students use the Moodle LMS to share assignments and syllabi. Students use Google Apps for e-mail, document storage, and collaborative writing projects, and Poll Everywhere for a student response system. These browser-based apps are compatible with a range of devices and operating systems, Johnson says, adding that teachers are still struggling with the more basic issue of how to adjust when students fail to bring their devices to class.

So far, although 90 percent of Mankato high school students surveyed before the BYOD project said they had their own devices, many fewer seem willing to bring them to school on a regular basis. Students end up having to collaborate by sharing devices or using devices the school owns. "Some teachers are shy of BYOD because they can't count on the students to bring them," he says. "It may be that a 1-to-1 program will make more sense eventually."

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Device-Neutral Platforms

Meanwhile, many instructional technology leaders in BYOD schools and districts are working through issues around access to devices and shared curriculum resources to find new ways to help teachers foster

COLLABORATIVE TECHNOLOGIES

collaboration. They are out to prove that students can work together even if they aren't all carrying the same devices into class. For the most part, this means finding device-neutral, browser-based applications.

Paso Robles Public Schools (CA), for example, are taking advantage of a cloud-based solution from Lightspeed Systems called My Big Campus. Described as part learning management system, part social network, and part content management system, My Big Campus lets students collaborate, store documents, and work on projects in a safe environment, says Scott Knuckles, the district's director of information and technology.

In a recent Education Talk Radio interview, Knuckles named the top benefits of his district's BYOD effort — and collaboration was right near the top of his list. Besides working with classmates during school hours, Paso Robles students can now work together on homework or comment on each other's work in My Big Campus. Knuckles describes it as "a combination of Facebook and Moodle, and BYOD fits right in with it. Anytime, anywhere, and with any device they are able to collaborate on projects. It has been fun to watch it grow, and it has been student-driven."

Knuckles recalls seeing six students in a high school library working on a project on Thomas Jefferson. "There was an eclectic mix of devices being used: I saw two iPod Touches; I saw an older MacBook; I saw an old laptop. And they were collaborating."

Blendedschools.net, a not-for-profit based in McVeytown, PA, offers schools hosted K-12 curriculum, learning technologies, and professional development. It works with 180 districts in six states. Of those, approximately 30 are BYOD environments, says Mark Gensimore, vice president of business. To foster collaboration, most of those BYOD

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districts use Blackboard Mobile to allow students to do journaling and participate in discussion boards. "Students can submit their work directly into Blackboard, and teachers can set up groups of students so group work can be submitted that way, too," says Gensimore.

Blackboard Mobile also provides students using Android or iOS smartphones with mobile access to the LMS, enabling them to participate in discussions or activities wherever and whenever they want to.

Bishop O'Dowd High School in Oakland, CA, also relies on Blackboard as the centerpiece of its BYOD program, but complements it with other device-neutral platforms. "Before we launched the BYOD program, we thought this question of collaboration would be a much bigger issue, but teachers and students figure it out," says Romeo Baldeviso, CIO at Bishop O'Dowd. "Our teachers rely heavily on discussion groups in Blackboard," he says.

Most student collaboration takes place between Blackboard and Google Apps for Education, but several Bishop O'Dowd teachers also use peer assessment to teach writing. To ease collaboration, they use Turnitin.com, which besides its tools to help check for plagiarism also has peer-editing capabilities. Turnitin's web-based PeerMark lets students anonymously evaluate each other's work and learn from their classmates. Teachers can create questions to help students rate elements of a paper, and the writer gets peer feedback before submitting the paper for grading.

To help students give each other feedback on their writing, **Holy Trinity Episcopal Academy** in Melbourne, FL, leans heavily on the device-neutral Edmodo in its BYOD setting. Russell Deatherage, a computer science teacher, says each of his students is required to contribute a blog post on Edmodo each day and must also comment on two other students' posts.

"They are required to contribute to the conversation by adding meaningful responses or thought-provoking comments about the entries," Deatherage says. "It's a great way to get the students engaged right away." Deatherage also uses mobile devices for polling (through Edmodo or Poll Everywhere). "Polling is a wonderful conversation starter when starting or reviewing a topic," he says.

Projects in the Cloud

Forsyth County Schools (GA) also has a list of device-agnostic, web-based tools — including Edublogs, Wikispaces, Socrative, and VoiceThread — that it supports in the classroom and integrates into its lightweight directory access protocol (LDAP) in order to enable single sign-on. Tim Clark, Forsyth's coordinator of instructional technology, says that BYOD has gone hand-in-hand with the district's shift toward project-based learning. "It changes the work environment into a modern-day digital workplace that encourages higher-level thinking," he says.

DIGITAL WORKPLACE

VIDEO: Tim Clark from Forsyth County Schools tells how his district uses apps and software to foster collaboration in a BYOD environment.
Click here for the captioned version.

COLLABORATIVE TECHNOLOGIES

Forsyth has recently redesigned its media centers with collaboration spaces set up to support BYOD. "The biggest challenge for teachers is to redefine their role," Clark says. "It makes much less sense to lecture in that environment." Forsyth's experience has been that students need to develop their capacity to teach each other and their teachers how to use their technology and become accustomed to being part of a collaborative learning community. To that end, Forsyth is moving toward a cloud-based platform that offers personalized learning plans for students. The district has launched a five-year public/private partnership with the digital learning platform developer itslearning to create an instructional framework to connect the data silos that are often created by student information, assessment, and learning management systems. The district expects the integrated system to provide standards-based learner plans for each student.

Desktop Virtualization and BYOD

Three years ago, when launching a BYOD project in their district, instructional technology leaders at **Avon Community School Corporation** (IN) were concerned about how students were going to access the resources they needed to collaborate. "Because of the way our network was set up, their devices had access to the internet only, not to our network's resources," explains Jason Brames, director of technology. "We needed a mechanism for them to gain access to shared network drives for storage and to specialized applications that they could access without purchasing their own license. For instance, we have an engineering program and one in web design that use specialized applications."

Avon turned to desktop virtualization using VMware View to allow students to log into those applications from a variety of devices. "We have a limited number of virtual desktop licenses, so we don't have students log into it automatically," Brames says. "We have them log in only when they need access to applications or services on our network." When they do log in, they have access to shared drives, network drives, and network applications that they are used to seeing on school-owned computers. And the district expects to save money because it will need to buy fewer licenses for specialized applications in a virtual environment.

COLLABORATIVE TECHNOLOGIES

SHARE

Teaching Real-World Skills

Several instructional technology leaders mentioned that choosing which device and applications to use for each assignment (and how to share resources among devices) can be part of the learning experience itself. Susan Bearden, director of information technology at Holy Trinity, says that if teachers want students to create a presentation, they can give students the project requirements without specifying what software or platform to use. "We've had teachers do that, and the kids end up using a variety of platforms for their project — PowerPoint, Keynote, Prezi, and others. The kids enjoy the flexibility and come up with some amazing stuff!"

Likewise, Lisa Nielsen, an education blogger and coauthor of *Teaching Generation Text*, says she doesn't believe teachers need to have standardized software for students in BYOD settings. Instead, she recommends talking to students about the tools they own. "It is interesting to see which tools students will pick. They might surprise you," she says. "For instance, many students are more comfortable writing on their phones than on laptops. They type incredibly fast with their thumbs, and they like taking notes on their phones. This is really about teaching real-world skills of picking devices and applications."

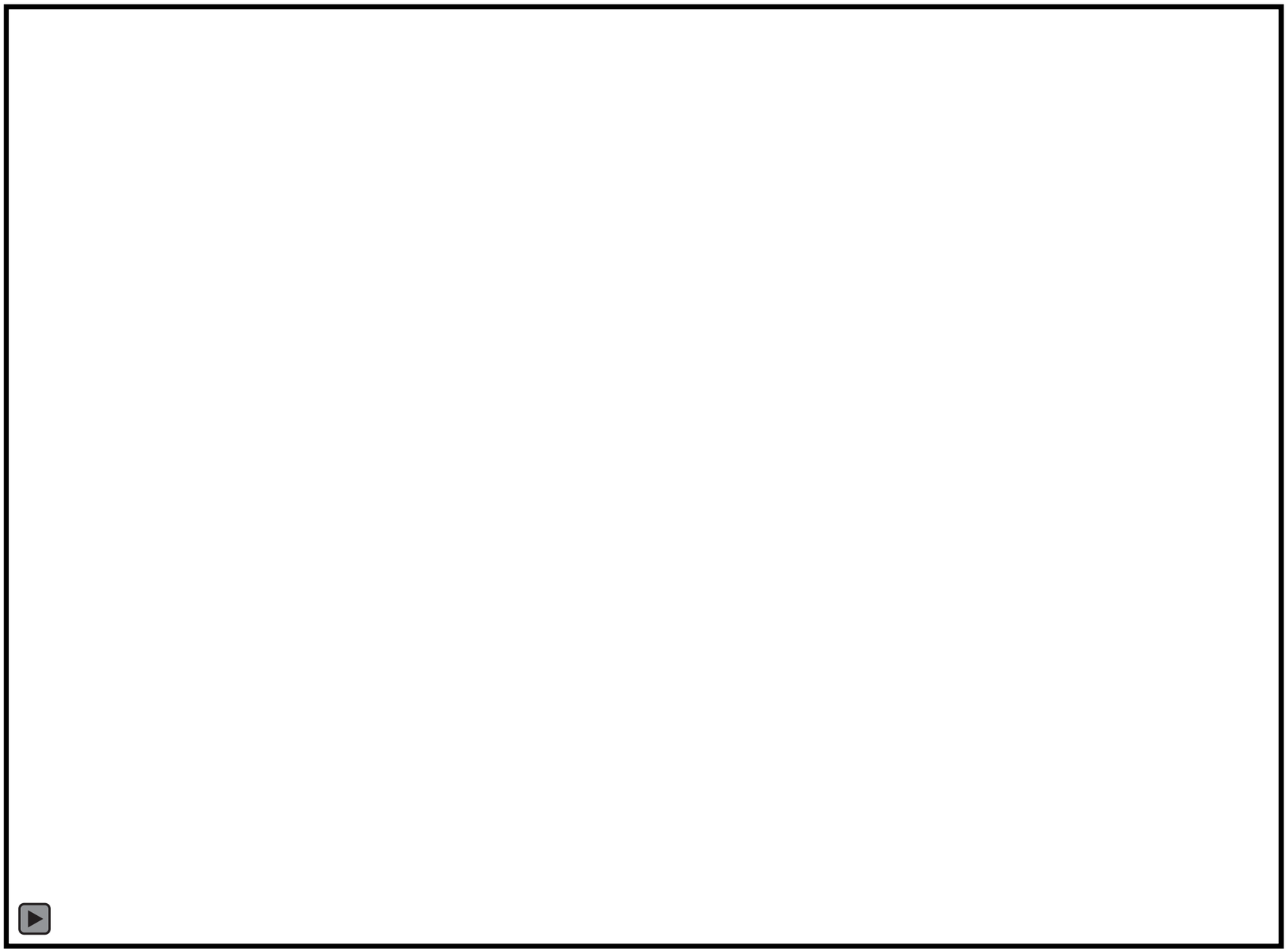
Some have argued that BYOD will dumb down work to suit the least powerful technology in any given class. Nielsen disagrees. "Students working collaboratively share and swap devices," she says. "They bring more technology to the class and update the systems and applications they use much faster than the technology refreshes districts can do."

David Raths is a Philadelphia-based freelance writer focused on information technology. He writes regularly for several IT publications, including *Healthcare Informatics* and *Government Technology*.

With new programs and standards emerging, digital badging is helping students prove what they've learned in—and outside—school.

By John K. Waters

MARCH WAS A BIG MONTH in the world of digital badging. The MacArthur Foundation showcased winners of its Badges for Lifelong Learning competition at the Digital Media and Learning Conference in Chicago — one year after awarding those winners $2 million worth of development grants. The city of Chicago itself announced that badging would be a key component of its Summer of Learning program, which is being called the largest citywide learning campaign in the country. And after 18 months of development and testing, the Mozilla Foundation, maker of the Firefox web browser, unveiled version 1.0 of its Open Badges Infrastructure (OBI) specification.



Graye Smith

These developments signal the fast approach of a tipping point for digital badging in K-12 education. According to Sheryl Grant, director of social networking for the Digital Media and Learning Competition, "I think it's fair to say that most of the discussion and on-the-ground building of badge systems so far has been about K-12. We're seeing a substantial use of badging at the K-12 level, partly because many of the developers of badging platforms and systems are focused on that level, but also because K-12 educators have proved to be open to badging."

Grant works for the Humanities, Arts, Science, and Technology Advanced Collaboratory, better known as HASTAC (pronounced "haystack"), which administered the most recent MacArthur competition, the first to focus on digital badges. Cosponsored by the Bill & Melinda Gates Foundation and the Mozilla Foundation, the competition drew nearly a hundred competitors. A long list of organizations committed to providing resources for the development of badge-related content, including Intel, Microsoft, NASA, the US Department of Veterans Affairs, and the 4-H Council, among others.

Why are all these organizations using their considerable weight to promote the development of digital badges? "People are very excited about the possibility of opening up new pathways for learning, of making it possible for students coming out of high schools — but not necessarily going to college — to show competence," says Alexander Halavais, associate professor in Arizona State University's School of Social and Behavioral Sciences. "The college career path is a very narrow one, and it's expensive. Everyone shouldn't have to go down the same road, and digital badges have the potential to provide a system for giving credit for doing valuable, marketable things outside of school."

That idea seems central to the support digital badges are receiving from the Obama administration. US Secretary of Education Arne Duncan called badging "a game-changing strategy," and offered a $25,000 prize for the best badge concept serving veterans seeking skilled jobs.

"Badges can help engage students in learning, and broaden the avenues for learners of all ages to acquire and demonstrate — as well as document and display — their skills," Duncan said when the MacArthur competition was announced.

What's a Digital Badge, Anyway?

These are still relatively early days in the evolution of the digital badge, and Grant admits that the recent storm of activity might have increased, albeit temporarily, the level of confusion about what it is we're talking about when we talk about "badging." On its Summer of Learning website, the city of Chicago defines a digital badge as "a validated indicator of accomplishment, skill, quality, or interest that can be earned in any learning environment." That's a good definition as far as it goes, but what it (and many others) leaves out is the essential technology that makes such a validation possible.

Grant suggests that the best way to think of a digital badge is as a computer icon combined with metadata. A badge is an interactive image posted on a web page and connected to a rich source of information. "It's a direct link to criteria, evidence, issuer information, time of issue, even an expiration date," Grant says. "Because it

can be linked to actual evidence of experience, a badge has the potential to bestow a credential that can truly validate a skill set or a level of knowledge mastery."

In other words, says David Theo Goldberg, director of the MacArthur Digital Media and Learning Research Hub at the University of California, Irvine, and co-founder of HASTAC, unlike a grade or even a diploma, a digital badge has the ability to identify what a student has learned along the way. "If you say, 'I passed Physics 101,'" Goldberg says, "the question remains: How much do you really know about physics? What did you actually do, learn, or master in that class? [Digital] badging can answer that question in a way that a grade or, ultimately, a certificate or diploma cannot."

Grant adds, "You don't often see actual proof of learning attached to a résumé, but you do with a badge. You can click through and actually see the curriculum. You could see the rubric, the multiple-choice test, a detailed portfolio. You can show a learning pathway. And there are a lot of different types of assessment you could tuck into a badge. It doesn't have to be tied to anything that we are already familiar with. This technology is giving people an opportunity to ask, 'How are we sure that we are truly assessing learning?'"

Of course, no one expects badges to replace diplomas or résumés any time soon. But this still-evolving technology has the potential to drive the development of new ways of assessing K-12 students. Grant says. "We seem to be assessing knowledge, but are we really figuring out how people are learning? And that they're doing a good job of learning?"

Badges are currently being used in K-12 schools primarily in two ways: as motivational tools (like gold stars), and as evidence of proficiency (like merit badges). Halavais is worried about the former application, but thrilled about the latter. "I'm very skeptical of the use of badging for motivation," he says. "That could produce a negative outcome. If acquiring the badges becomes the goal, then they become this extrinsic motivator that nobody really wants. The people who are designing these badges have to think very seriously about whether they are recognizing authentic learning, or just giving people a gold star, which we know doesn't work in education."

According to Goldberg, "We've seen much more evidence of innovative experimentation and development in the extended K-12 space, starting largely outside formal institutions, edging their way in good part through the [MacArthur] competition initiative into the formal schooling space." And therein lies what is likely to be the most significant impact of badging technology on K-12 in the long run: its ability to allow certification to come from somewhere other than a school.

Connecting Two Worlds

Among the winners of the MacArthur competition is a good example of what Goldberg is talking about. Created by LearningTimes, the BadgeStack project is a set of plug-ins for the popular open-source WordPress content management system. The plug-ins allow any organization to design and manage its own badges. Jonathan Finkelstein, CEO of digital credential provider Credly and director of the BadgeStack project, says, "The question we all seem to be trying to answer right now is, 'How can we make it possible for learners in the K-12 age range to tap into learning experiences that happen outside traditional classrooms and use badges to connect those two worlds?'"

Current users of the BadgeStack platform include the Smithsonian Institution, which began employing it last year to develop badges for its new Smithsonian Quests program, an offshoot of its SHOUT environmental education program. Lynn-Steven Engelke, director of programs for the newly renamed Smithsonian Center for Learning and Digital Access (formerly the Center for Education and Museum Studies), says the Institution uses badges to enable people to "drive their own learning experience with our resources."

"Badging works perfectly for this," she says. "Students work at their own pace, and they choose what

they want to work on. And it's designed to allow them to use our resources to do something in their communities. The badges connect the museum with students' communities and classrooms."

Quest participants — mostly students, though it could be anybody — earn digital badges by proving their knowledge of a range of topics. For example, to earn the "Community Historian" badge, students attend the "Civil Rights: From Lincoln to Today" session of the museum's online education conference series, and then write their own lyrics to the tune of a familiar song. To earn the "Portrait Reader" badge, students choose one of the 22 portraits and mini-biographies featured in the Smithsonian's National Portrait Gallery exhibit website, and then record and upload a short audio description of the figure in the portrait, including the person's name and "the role they played in making the United States a more inclusive and democratic nation." Other badges issued by the museum include "Arts Advocate," "Dirt Detective," "H2O Hero," and "Symbols Spotter."

While Finkelstein says that the goal of the badge ecosystem is to tap into educational resources wherever they may be, badge issuers like the Smithsonian need a common standard if the badges they issue are going to be recognized as valid. That's why so many badging advocates are excited about the launch of Mozilla's OBI.

Setting the Standards

"A common standard helps to create a movement around alternative forms of recognition," Finkelstein says. "We're all saying that there are other ways we can recognize learning, but the OBI gets us all on the same page, issuing compatible badges — which means that, when a learner gets certified, the badges they earn aren't going to be isolated or siloed, and that they can use them to tell the full story of who they are, what they've accomplished, and what they can do."

The OBI comprises a set of technical specifications that allow badges to interoperate, a framework for badge repositories (dubbed Mozilla Backpack), and a set of application programming interfaces (APIs) designed to support the portability and verification of badges. The Mozilla spec is open source and free, and it's the ground in which the badging ecosystem is already growing. According to Sunny Lee, product lead for the Open Badges initiative, the project has been under way for more than 18 months, and by the time the 1.0 spec was announced, more than 600 independent issuers of digital badges had already aligned close to 65,000 badges with the OBI.

Lee says, "Our intention is to make all these various recognition systems, whether they're badge systems or certification systems, speak a common language and interoperate within an ecosystem for the benefit of the badge earner who is gaining recognition from a variety of different environments."

Creating an open standard for digital badging has game-changing implications, says HASTAC's Grant, not just because it gets everyone on the same page, but because of the way it mobilizes the validating data. "What an open, digital badge allows you to do is to take that standardized metadata — and the reputation you build with it — with you as you move around the web," she explains. "Now you have the agency to show evidence of your learning, as opposed to a third-party issuer who says you have a diploma or a degree."

A standard also connects users, Goldberg says. "Teachers can now plug into the OBI. There's a community now, and tech support. There's a set of experienced people, and more are emerging every day. You're not on your own any longer. It's a joint undertaking."

Lance Christmann, executive director of EffectiveSC, a nonprofit that works with technology to raise social awareness, sees the Mozilla spec and the community that is forming around it as critical to badging's acceptance among educators. "To establish an open certificate that is commonly agreed on by a wide range of people is a difficult thing to do," Christmann says. "But it's essential to make sure that this form of credit is transferable

among districts, and that it's something a student can use throughout his or her academic career and beyond."

Badges in the Real World

EffectiveSC is also another winner of the MacArthur competition. The company describes its project, called LevelUp, as "a learner-mentor connection platform that bridges the content and experiences students have anywhere in life to the reporting and progress required in school." EffectiveSC partnered with game maker Intrific and **Adams County School District 50** in Westminster, CO, to develop a LevelUp-managed game that awards badges to students who apply algebra and geometry standards from the 8th- and 9th-grade math common core. Based on Intrific's "Outpost," but renamed "Space Wolf" for the **Westminster High School** Wolves, the game challenges players to apply math principles to determine the distances and angles among moving objects at particular points in time in order to "correctly laser meteor chunks that threaten human life." The game was developed with math curriculum experts at the University of Denver.

Adams 50 is a public school district that operates on a competency-based system. According to Kevin Byers, project manager for the Gates Foundation grant that the district won in the MacArthur competition, "We are in a unique position to work with badges here at Adams 50. Our students move at their own pace through the content," he notes.

Byers says, "They can progress through all their subject areas at their own pace. And that means that we can absorb these pieces of data from outside the system into a portfolio of proficiency that we're building for students. The game we developed works well for us because it has the infrastructure that allows us to attach to a badge an understanding of proficiency based on standards." Byers adds, "If a student gets a bronze badge for a geometry game, for example, we confidently trust that the student has skills associated with three or four common math standards. It's evidence that validates this proficiency."

The Adams 50 project is one of relatively few cases where badging is being applied to in-school resources. Byers admits that the process becomes more difficult when a teacher is asked to integrate the points of data that a badge represents into a student's grade. He says that there's no clear way "to make those badges valuable in the class, other than as motivators. That's why a lot of the badging projects out there are the motivating force and the seal of approval at the end of an activity, and it stops right there. But we think it could be more than that."

EffectiveSC's Christmann agrees. "This is a tough nut to crack for a lot of people," he says, "because a traditional course is not set up for awarding credit for competencies." Which raises a knotty questions about the future of digital badges in K-12 education: Can a method of acknowledging extracurricular learning and creating an alternative learning pathway actually find a place in a system that measures progress by seat time rather than competency?

CREDIT CHECK

VIDEO: Kevin Byers, project manager for Adams County's Gates Foundation grant, talks about integrating badges into a traditional grading system.
Click here for the captioned version.

Goldberg says it can, and he cites an example that may point the way. "Pathways for Lifelong Learning" is a badge system created by the Providence After School Alliance, working with the city of Providence, RI. The system, which was among the MacArthur winners, was designed to "expand and improve quality after-school, summer, and other expanded learning opportunities for the youth of Providence." The district was one of the first in the country to give academic credit to its 23,000-plus students for skills and achievements acquired outside the classroom. Providence's Rhode Island College has agreed to accept the district's badges on college applications as evidence of learning experiences and skill acquisition.

Now that the MacArthur competition has "seeded the ecosystem," says Mozilla's Lee, badging has momentum — which allows her organization to turn to other concerns. "For example, we need to create tools and services for the people who need to review the badges, so they can do that efficiently. Having more information out there associated with the badge is great, but it also puts a lot on the reviewer of the badge, who has to parse that information. We need to provide the tools for badge reviewers and potential employers. That's high on our agenda."

And HASTAC's Grant admits that the education community still has a lot to learn about badging for K-12 students. "There are things we just don't know yet about how badging is going to impact the schools," she says. "But in the meantime, our community is made up of the advance teams that are going to make sure that digital badging is grounded in real practice and real use and real needs."

John K. Waters is a freelance journalist and author in Mountain View, CA.

Next-generation programming languages for children are taking up where Logo left off and teaching young students how to code to learn. By Margo Pierce

Digital Progression

Forty years ago, when large mainframe computers roamed the earth, few experts gave much thought to how these mammoth machines could be used for education, and fewer still about how they could help young learners create, explore, and learn through technology. At the time, highly trained programmers still worked in inaccessible languages that mainly processed numbers. But all that changed with a turtle. In 1967, MIT professor Seymour Papert and colleagues developed Logo, an early language for children. Its main innovation? A small robot—the turtle—that students as early as fourth grade could program to move or rotate. For the first time, kids got instant feedback and a physical response to their commands to create something using technology.

While Logo's use spread in the 1970s, programming never achieved the influence that Papert had envisioned. It wasn't considered a viable educational tool—certainly not for students in middle grades or younger—until schools had routine access to computers.

Even now, at a time when computers are pervasive in everyday life, many educators still question the value of children becoming articulate in the language of technology — programming. But as STEM and Common Core concepts—with their emphasis on math, science, and critical thinking skills—begin to shift curricula across the K-12 spectrum, coding in class is sparking renewed interest.

"We really need to broaden, to rethink what it means to be fluent in today's society," says Mitch Resnick, the LEGO Papert Professor of Learning Research at MIT. "The ability to program, the ability to code, is an important part of being 'fluent' today. In the same way that learning to read opens up opportunities for many other things, and learning to write gives you a new way to express yourself and seeing the world, we see that coding is the same."

In schools where programming is taught, it often acts as a stand-alone class or as part of an after-school program. According to Susan Einhorn, the chair of the management team that runs Papert's company LCSI, part of the reason programming hasn't seen greater integration is that there is no consensus about where it fits within the educational curriculum. The lack of qualified computer-science teachers and educators comfortable enough with technology to teach programming —particularly at the middle school level—is another barrier, as is resistance to a class that looks more like fun than substance.

"Just because something's fun doesn't make it easy. Seymour would describe it as 'hard fun,'" Einhorn says. "We learn through hard fun. We have to stop seeing learning as rote. It is an active, participatory thing. When you're engaged in something, then you learn the most because you are exploring it."

Papert also contends that people learn better when they're engaged in creating something that is personally meaningful to them. To that end, MicroWorlds, LCSI's current iteration of Papert's programming language for children, encourages curiosity and experimentation beyond the precise syntax and complex character strings demanded by languages like Java and C++.

With MicroWorlds and languages like it, students can drag and drop commands and test their creations without miring themselves in the minutiae of precise syntax and complex character strings.

With MicroWorlds and and other languages like it, students can drag and drop commands and test their creations without miring themselves in the minutiae of syntax, which can be confusing for both students and teachers.

The strategy isn't new — it was all part of Papert's educational philosophy developed in the time of Logo. "'Constructionism' was a term invented by Seymour Papert," says Einhorn. "It means that, if you're

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constructing something externally, you help build that knowledge within your head, so that it's not just abstract.… You're also gaining new ideas about how the world works and new understanding."

Coding to Learn

Like Papert, MIT professor Resnick has learned the value of keeping kids interested while teaching them the fundamentals of technology.

EASY ANIMATION

VIDEO: A screencast made by two students shows how the Alice language teaches programming concepts using simple menus.
Click here for the captioned version.

In 1989, he cofounded Computer Clubhouse, a Boston-based club for a group of kids who were curious about creating with technology but were otherwise underserved by the local community. This experience also underscored the need for a free programming language that was both accessible and capable of helping students create a wide range of projects.

When Resnick first started working with schools, kids weren't using any programming languages to create projects. They used software programs such as Photoshop to create collages, music software to orchestrate compositions, and video programs to bring the different elements together. Contemporary, general-use programming languages were not user-friendly for young people or teachers, and other kid-friendly languages were somewhat limiting, so Resnick and his team decided to create the next generation of constructivist programming language for kids. Their language, Scratch, was released in 2006. Like other languages aimed at kids, Scratch's interface is based on a drag-and-drop, building-block approach that lets users experiment with variables and conditions in an intuitive way.

"We wanted to have a programming language [with which] you could build your projects and your programs by tinkering, the same way you do with LEGO bricks," Resnick says. "That led us to the graphical programming approach that we use."

In the seven years since its release, Scratch has become a community, thanks to social media tools that bring together students from around the world. Today, enthusiasm among teachers is growing as Scratch users share their experiences, lessons, and challenges with each other via ScratchEd, Facebook, and personal connections made at MIT trainings, meet-ups, and other Scratch-based events.

"We felt the best learning experiences happen when kids are interacting and sharing and collaborating with one another," Resnick says. "Our goal is not to help kids to learn to code but code to learn. The coding or the programming is not the end goal; it's more a means of learning many other things."

Tools to Create

Engaging kids on a personal level is part of what's made Joanna Boyd's computer programming class at **Bob Miller Middle School** in Henderson, NV, so popular that it expanded from a nine-week experiment to an 18-week, project-based course. Boyd uses a number of programming languages designed for young learners, including Scratch and Alice (See "Learn the Languages," p. 23). She teaches students to develop their

LEARN THE LANGUAGES

The history of computer languages designed with kids in mind dates back to the 1960s. Here are three popular iterations that students are currently exploring.

Alice: Created as a way to teach programming theory to young students, Alice lets users experiment with 3D animations, games, and videos through drag-and-drop programming of interactions between virtual people and objects in a 3D world—making it especially useful for storytelling exercises.

MicroWorlds: Using the Logo language designed by Seymour Papert, LCSI's flagship software, MicroWorlds EX, is designed for children starting in fourth grade. Still based around—but no longer limited to—Logo's famous turtle, the program lets students command an object, animate it, or have it interact with other objects.

Scratch: Developed by an MIT team led by computer science professor Mitch Resnick, Scratch is a colorful, easy-to-learn programming language used by children as young as 5. Users drag and drop blocks, stacking programming fundamentals, such as conditions and actions, on top of each other to create animations or other types of programs—without regard to syntax and other hallmarks of advanced computer languages.

project ideas, created on a storyboard, into finished products that they present to the class.

Rather than inventing and assigning new projects for students, Boyd encourages students to create their own programs around what they're already learning in other classes. While some students might create a program around the structure of DNA that they're learning in science class, others take an opportunity to bring their understanding of books like *A Wrinkle in Time* to life. "Now I've got the hook of what they're doing every day, what they're the experts in, and then I'm giving them the tool of Alice to create," says Boyd.

That hook can also provide a level of excitement and engagement that students might not otherwise get from the curriculum. Namely, Boyd says, they're having fun. "I really believe it's exciting their brain — that part of the brain that education doesn't give them," she says. "I think we're so driven by standards and curriculum and teaching to the test that we've lost the creativity of education."

When a student hits a snag in programming, Boyd engages the entire class to figure out how to resolve the problem. Another student might have already encountered the same issue and can walk through the solution. Although she lets the students choose projects that interest them, as the facilitator she provides resources for researching and learning new programming concepts and does what she can to use programming to further their overall education.

"These students do not know how to connect the subject areas with each other. I try to do that in this class. I make it a relationship," Boyd says. "You need to see the whole picture in order to accomplish the task. You need to strategize, and that's what I feel I'm giving at this level, which is a more teachable level."

The result is increased self-esteem, shy children "getting out of their seats," and special-needs children participating with other students. According to Boyd, girls are outperforming boys in mastery of the language and quality of work. She adds that the shared experience of working with technology leads students to connect with their parents in a way she hasn't seen with other subjects. For example, she recalls a father who works at the Hoover Dam bonding with his son over a programming assignment. But it's not all work, all the time.

"Programming gives the students a logical method to present themselves in a creative way and own their learning," Boyd says. "Logic to a lot of people means math, but it really is math being creative. That's what they do in programming. They get to be logical and creative at the same time." the

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1-TO-1 COMPUTING

Jeanne Hayes &
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Project RED's Tools for Success

A 1-to-1 initiative is only as good as the planning and leadership behind it.

Educators have seen the excitement and focus that students show when using digital devices. In hopes of increasing attendance, reducing dropout rates, and improving learning overall, more and more superintendents are driving their districts toward a 1-to-1 environment in which students take control of their own learning. The question is no longer whether districts should move to digital learning, but how they can do it well, what they should focus on to help students learn, and when they should adopt it.

To help schools answer these questions, in 2010 Project RED conducted a survey of technology programs in 1,000 US schools. The survey was the first and only national research focusing on academic results and financial implications of education technology. The research shows that, if effectively implemented, 1-to-1 technology programs can lead to improved student achievement and significant return on investment. Based on those findings, Project RED has created a replicable design for school districts to make the best possible use of technology in a learning environment to help improve student achievement and offer significant return on investment.

The Project RED research reveals that most schools' planning is less comprehensive than it should be. To help schools get ready, Project RED has broken down its research into advice and downloadable tools, which are available for free on its website. (Registration is required.)

Pillars of Success

There are four pillars for planning a 1-to-1 program that can mean the difference between success and failure. Project RED has a tool for each planning step. (Examples of all four tools are on page 26.)

Click for Mac

VIDEO: In a video made with Intel, teachers and students from Poway Unified School District (CA) present their successful 1-to-1 program.
Click here for the captioned version.

1) Assess your district with the Project RED Readiness Tool.

Is your district ready to embark on a 1-to-1 implementation? Have you already begun, but are starting to realize the complexity of the process? Recently, when a superintendent asked us for help in implementing his 1-to-1 project, we asked when he was planning to start

1-TO-1 COMPUTING

the project. His answer was a shocker: He said that the students and the teachers would all be getting their laptops at the same time — in one month. He, in turn, may have been shocked by our answer that he was on a track for failure. And indeed, things didn't work out as he had hoped.

This disappointment could have been avoided. By guiding you through a self-assessment of your district's current readiness, the Project RED Readiness Tool will alert you to crucial areas that you may not have previously considered in your project plan, including leadership, funding, technology and learning, and infrastructure. Leadership and funding are particularly mission-critical; you must be prepared for action in these areas or your plan is likely to fail.

2) Calculate the real cost with the Project RED Implementation Cost Comparison Tool.

Every superintendent will require a comprehensive cost plan in order to figure out the long-range costs and to justify these costs by explaining to the school board and the community the expected return on investment from a new initiative. In getting started, the most difficult aspect of planning is figuring out the "real costs" of implementation, whether in a BYOD program or with a school-supplied device. While a statewide program, such as the one implemented by Maine, may have lower average costs, this tool provides a broad array of costs to consider, based on the experiences of real school districts.

The cost of technology implementations can vary widely. For example, reported costs for 1-to-1 implementations range from $250 to more than $1,000 per student per year. The chart in the slide show represents nationally averaged technology implementation costs for a traditional school setting (a 3-to-1 student-to-computer ratio) versus a 1-to-1 setting. Since 2011, when this data was collected costs have been trending down in most areas. There are also more open educational resources than there were. On the cost increase side, more districts are hiring professional project managers to help with the process. However, these numbers are a good general guide to your overall costs.

3) Fine-tune your plan with cost-avoidance strategies using the Project RED 1-to-1 Cost Savings Calculator.

While there are many factors to consider in analyzing costs, Project RED's research provides you with 14 specific areas where you could reduce costs and repurpose funds for other investments. Few districts will be looking at all 14 areas of savings, but this tool will help your team prioritize the areas that you are actively considering. It is significant to note, however, that successfully implemented 1-to-1 districts consistently find some of the same savings. These include reductions due to disciplinary actions, as well as cost reductions

in printing costs for supplemental curriculum materials, reduction in assessment costs, and reductions in mailing costs to parents. One North Carolina district reports saving roughly $15 per student by eliminating mailings to parents, now that every student has a computer. Recently, a Project RED Signature District (one of 20 1-to-1 districts selected through a competitive application process) reported that the increase in state funding associated with an increase in the numbers of students transferring into their district because of their 1-to-1 program funded their entire non-personnel technology budget.

LEADING THE WAY

VIDEO: Leaders from Richland School District Two (SC), a Project RED Signature District, discuss how they train administrators and technologists.
Click here for the captioned version.

4) Create a realistic plan for implementation using the Project RED Sample Implementation Timeline.
How can you plan to ensure success? Your plan works when it engages all stakeholders and focuses on the total learning environment. Preparing for a 1-to-1 implementation requires many steps. The Sample Implementation Timeline provides guidance on the timing and steps that districts should take to launch a successful program. Note that the sample timeline extends over many months and takes slightly more than one school year from planning to implementation.

A Model Project Plan

Many of you have started at least one initiative to use digital devices. And you may have felt under pressure to personalize learning in order to improve the active learning environment in your school. But America's Digital Schools 2008 found that two-thirds of initiatives didn't improve learning. So the smart leader will look at what has worked and learn from others' successes and failures.

In the view of Project RED's expert team, the single biggest problem with large-scale initiatives is the lack of a comprehensive project plan and the marshaling of resources to ensure that the plan will be adhered to.

The RED Design Model Project Plan can give you an idea of how all the pieces will fit together. This 1,501-line Gantt chart may seem intimidating, but it has proven to be a useful road map for a thoughtful, detailed implementation. The RED Design Model Project Plan offers you the ability to lead and manage your plan. Even better, your district can customize the Model Project Plan to reflect the unique needs, culture, and organizational structure of your school. As you go through the plan, you will find sections you can eliminate (such as bond funding) because they may not apply to your situation. The remaining plan is generally very manageable. Also, as you go through the plan, keep in mind that the person who acts as project manager (a vitally important position) will divide the plan into much smaller sections that will be assigned to different individuals.

Why use the RED Design Model Project Plan? Our research has shown that in every implementation, there are eight crucial success factors:

1) Secure funding source(s) for three or more years
2) Use of key implementation factors as identified by Project RED (See page 28 for all of these factors.)

3) Use of standards-based, digital curriculum resources
4) Hiring a trained, dedicated project manager
5) Use of a comprehensive project plan, either the Project RED Design Model Project Plan or one that is comparable in scope
6) Substantial and sufficient professional learning for all stakeholders, including change management for leaders
7) A focus on cost savings and long-term financial sustainability
8) Formal program evaluation

The Project RED Design Model Project Plan will walk you through these eight factors. A successful superintendent will treat a digital implementation as he would treat the construction of a new high school — and that includes working from a strong, focused, benchmarked, on-time, on-budget project plan. The Project Plan is not just applicable to new implementations. One district with several years of experience reported that when they went back through the plan, they found several areas in which they could improve their current system.

Tom Murray, director of technology and cyber education at **Quakertown Community School District** (PA), the Project Plan has "helped us take a closer look at everything we are doing, from policies to procedures. It has helped us to confirm what we are doing well. Now we can say that this is a research-based practice we are doing. And it challenges us, in areas where we were not performing as well, to do better."

The Nine Key Implementation Factors

Project RED research findings demonstrate that schools employing a 1-to-1 student-to-computer ratio and key implementation factors outperform other schools. The KIFs also offer significant opportunities for improving education return on investment by transforming teaching and learning.

Please note that the KIFs are an overall look at schools and cover all grades, subjects, school sizes, and demographics. If we had selected KIFs for elementary schools versus high schools, the results would be different. Likewise, statistically, KIFs for urban schools may have been different than KIFs for rural or suburban schools.

Here, in order of predictive strength, are the nine KIFs that are linked most strongly to educational success. More information on Project RED's education success measures is here.

1) *Intervention classes: Technology is integrated into every intervention class period.* Assuming we are talking about personalized, blended learning, and not the old drill and kill, technology is highly effective for intervention classes, but it is more broadly applicable — and useful — to all types of classes.

2) Change management leadership by principal: Leaders provide time for teacher professional learning and collaboration at least monthly. When a principal is properly trained (see KIF 9), they implement effective change leadership programs among all stakeholders in a school. This includes teachers, but goes beyond, to parents, staff, students, etc. This is almost a binary KIF. Without it, failure is all but certain.

3) Online collaboration: Students use technology daily for online collaboration (including games/simulations and social media). Online student-to-student interaction builds on the well-known benefits of student collaboration in the offline world. With online, the barriers of time, distance, and cost disappear.

4) Core subjects: Technology is integrated into core curriculum weekly or more frequently. It is always a shocker when you see a school spend millions for technology and then it is not used in one or more core subjects, which happens almost half the time across the US.

The root cause of failure here is the lack of a proper plan. Usually teachers were not trained, or curriculum materials not available, or school/district leadership was incapable.

5) Online formative assessments: Assessments are done at least weekly. If every student has a device, continual formative assessment should be automatic. Here's an outstanding example: A teacher in **Los Angeles Unified School District** (CA) gave a two-question math test every day via the LMS. When they arrived to class, students were to have their computers out so they could take the test before the bell rang. Meanwhile, the teacher automatically took attendance, and he knew where each student was in the learning continuum. Almost every student who came to class passed algebra. Previously every student had failed twice.

6) Student-to-computer ratio: Lower ratios improve outcomes. Project RED's sample size was large enough to add research value to a frequently discussed topic. Across all 11 education success measures, those schools with at least one device per student outperformed schools with higher ratios. The claim that it is enough that a student "has access when they need it" is apparently not supported by the research. It may have to do with the student ownership effect, as well as the ability to use a computer on a moment's notice.

7) Virtual field trips: With more frequent use, virtual trips are more powerful. The best schools do these at least monthly. Our speculation on the correlation between field trips and success is that they conjure significant interest and motivation for the students.

8) Search engines: Should be used daily. There is a high correlation between the number of times a student uses a search engine each day and student performance. We asked a sixth-grade girl from a low-income school what the main difference was in a laptop school versus a book school (her terms). She said with her laptop she could get the answer to any question in a minute. Before, she couldn't get answers to questions. Surprisingly some schools ban search engine use during the school day, with predictable academic outcomes.

9) Principal training: Principals are trained in teacher buy-in, best practices, and technology-transformed learning. We have never seen a successful implementation where the principal was weak or did not have change management/change leadership skills. The most challenging KIFs are related to change management and change leadership. These are critical to the success of any technology transformation initiative.

In our opinion, there are few districts that get this right. In part this is because the concept of transformative change is new to school leaders. Few of their peers have mastered the topic, so help is hard to come by. We believe that over time this will change. the

Jeanne Hayes has 25 years of experience in tracking the ed tech market, first in her role as founder and CEO of Quality Education Data, Inc, and second in her current role as a consultant to ed tech products and services companies.

Thomas W. Greaves, chairman of The Greaves Group, LLC, is coleading the district implementation phase of Project RED. He has been involved in hundreds of large-scale technology projects and 1-to-1 initiatives. With Jeanne Hayes, he coauthored the America's Digital Schools reports.

The Project RED team also includes Leslie Wilson, CEO of the One-to-One Institute, and Michael Gielniak, Director of Programs and Development for the One-to-One Institute. To join the Project RED online community of practice, click here.

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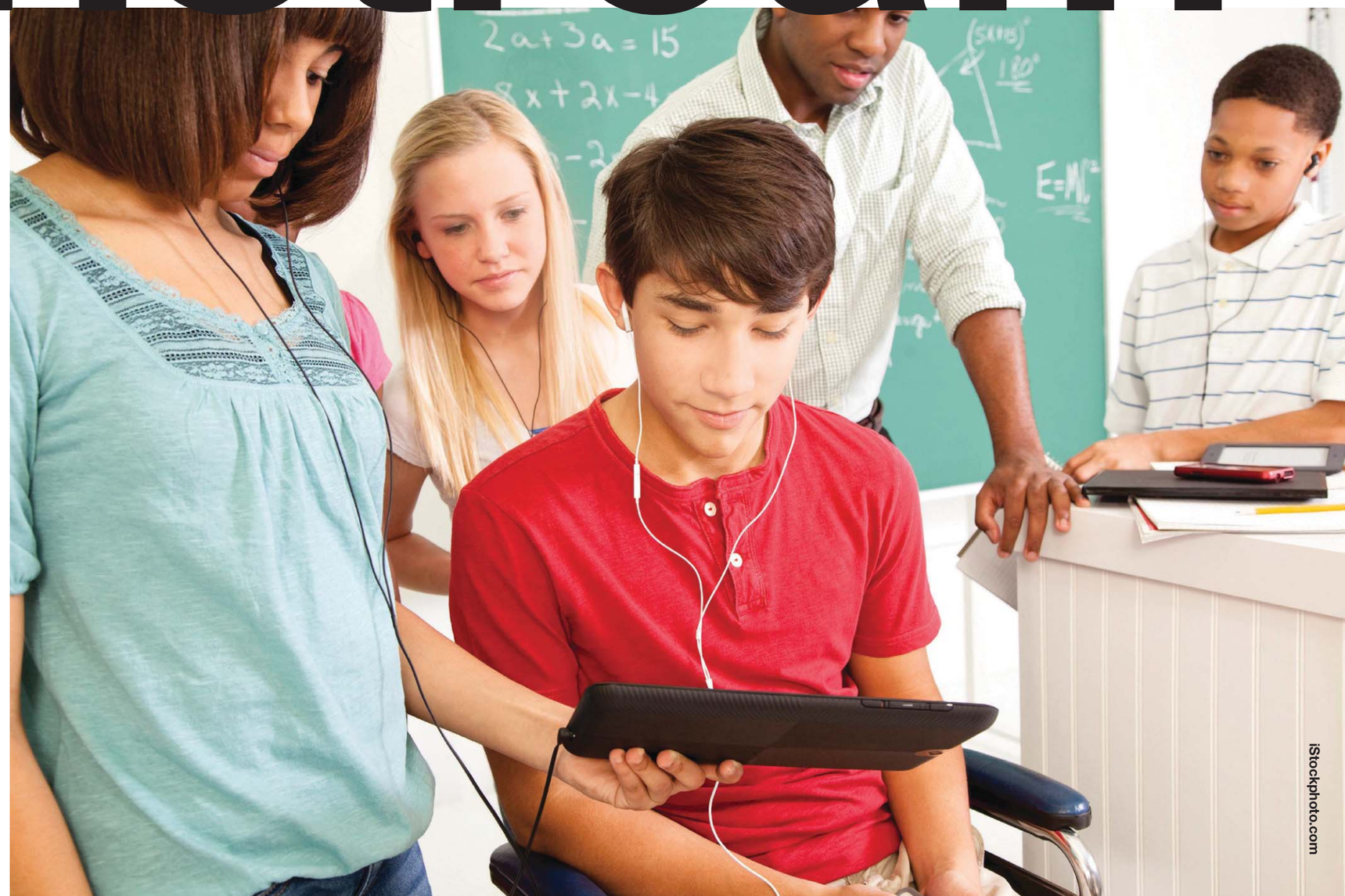
Assistive Tech Goes Mainstream

As schools shift to mobile device usage and new forms of technology-inspired pedagogy—like the flipped classroom—special ed is adopting mainstream approaches for its assistive technologies. By Dian Schaffhauser



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THE LATEST compilation from the US Department of Education (from 2010-2011) reports that about 13 percent of public school enrollment consists of students served by special education programs. That count has pretty much stayed the same for the last 13 years. What's different now is that, as technology pervades all aspects of the classroom, special education teachers need to make a decision about whether they're going to stay on track with specialized assistive technologies or adopt some of the mainstream ones that general education students are using.

The latter approach appears to be winning right now. In many situations the mobile devices, apps, cloud-based computing, and flipped classroom approaches that are finding wide acceptance in general education are also finding a home among the tools used by special ed experts to help their students succeed.

Whereas assistive technologies used to be considered a highly specialized field, "Now assistive technology is blurring with educational technology," says Andrea Prupas, who heads up inov8 Educational Consulting, a firm that does consulting in special education and technology.

As special education adopts and adapts mainstream products, it's the students that win — now and in the future. Prupas says, "We're thrilled, because we see our students succeed. These are tools that adults are using, that our students will be using for the rest of their lives."

Here are ways that special ed experts are leveraging mainstream ed tech initiatives to benefit special needs students.

Bring Your Own

When **Forsyth County Schools** started its bring-your-own-technology program across the district, Chris Swaim, assistive technology facilitator for the Georgia district, considered BYOT a "tremendously positive thing" for her special ed students. The reasons are similar to what any teacher at the district might say.

For one, ownership makes students take the devices more seriously. "Anytime a student owns something, there's a little bit more responsibility," she explains. For another, she's seeing students more "engaged" in their schoolwork.

Plus, since the devices don't always have to be specialized now, special ed learners don't stand out as using something *different*. On the contrary, outfitted with the latest version of hardware, they could even

ADVICE TO I.T. FROM SPECIAL ED

Push instructors to learn a single app. Rather than overwhelming teachers with the number of apps that are potentially useful, inov8's Andrea Prupas recommends that each teacher in the school or teaching team become expert in a single app. "Essentially, have three or four teachers become very, very qualified to use three or four different tools. Then you have your set. You're good to go. Those teachers can teach others in the school and they'll feel very competent in the classroom."

Don't go for the most expensive tool or a site-wide rollout. "Some of the best tools we use are free," says Prupas. Before adopting a new app broadly, recommend that teachers try it in a test run in a couple of classrooms.

Visit the classrooms. Teachers should not be the technical experts, Prupas insists. "They need to be the pedagogical experts. IT really needs to support the pedagogy." She suggests that a member of the IT team should go into the classroom to "see how the teacher is working with students with the tool."

Consider special applications for mainstream technologies. According to assistive technology facilitator Chris Swaim, the prevalence of smartphones with video capabilities at **Forsyth County Schools** allows instructors to record evidence of learning as it happens by taking "right-there-in-the-moment videos to send home to parents."

Don't forget the basics. Swaim believes the most important aspect of running a successful bring-your-own program for special ed students is maintaining a safe network. That includes putting web filters in place "so your students can be protected when they're on the network at school."

experience the novel sensation of being envied by their peers. "When a student is using something really cool, the other kids go, 'Wow!'" notes Swaim.

While Swaim is "thrilled" to support students' decisions to bring their own devices to school, there's still a potential disconnect between what's been recommended by her individualized education plan or program (IEP) team and what the parents have chosen. "They might buy an iPad or a tablet and put a specific communication app on it that they've heard about, that the hype is about. Sometimes it's not the best selection for the student."

When that happens, she says, "We make a good faith effort to support what our parents want students to use; but we feel the responsibility of identifying what is the best thing for the student."

When there's a fundamental disagreement over which device to choose, Swaim lets the data talk. "We go through a consideration process and determine what tools are the best for that child," she explains. "We'll show them, 'This is what we determine. This is the data that shows your child's ability to perform the task using the tools we have recommended.' Sometimes when we show this to the parent, the lightbulb comes on. The main thing we all want is for that child to improve his skills."

Software in the Cloud

BYOT plays well into what Swaim identifies as the biggest push in assistive technologies right now: the move to cloud-based and web-based software. The earliest special ed software was usually installed on a single computer. "Then the student was stuck on that one computer," she notes. From there, the move was to networked software. "We would install it on a school network, and it would be available on the network system — but not at home. Then we had to figure out how to provide software that they needed at home."

Special educators embrace the flipped classroom model because their students can watch the recorded content over and over, which is particularly helpful to students with special needs.

Moving to cloud- or web-based software, she says, "is going to be a huge improvement for our students. They can access it anywhere, at any time — home, out in the community, at the library, at school, in any classroom in the building — as long as they have a computer or some sort of device to access the software. I think that's going to have a huge positive impact on our students."

The wrinkle here is that as schools adopt cloud-based software across the student population, they need to consider how it works for special needs students too. "Google is becoming huge, especially in schools," notes Mary Allard, vice president of marketing operations for the literacy company Texthelp. "But one of the biggest issues right now is accessibility. You can have Google Docs all you want, but if you have kids who can't read the Google Docs, then you have a real problem."

To cater to special ed students in schools that have adopted Google Apps for Education, the company recently released Read&Write for Google Docs, which becomes part of the Google Chrome browser for the PC or Mac. This free tool reads documents aloud with dual-color highlight, provides access to a text or picture dictionary, and allows students to highlight, then place highlighted text into a separate document to build vocabulary lists.

A future paid version will add the ability to read any kind of document that might be stored on Google Drive.

Mobile Learning and 1-to-1

Valeska Gioia, an assistive technology specialist and autism consultant for the South Carolina Department of Education, says that using students' mobile devices and the free applications that they run can save school districts "thousands" of dollars in equipment costs. "The vision programs and equipment that was so expensive can be changed in a way that's more accessible for a child just using an iPad or an Android tablet," she explains.

Generic devices can quickly be customized for special needs through the use of built-in apps and features such as text-to-speech, magnification, and high-contrast functions. Starting with the release of iOS 6, for example, Apple added "guided access" to its mobile operating system. This feature allows a special ed teacher to restrict what applications work on a given device. These new controls can be useful for keeping students with disabilities such as autism or ADHD on task.

Educators can also switch out specialized equipment for commodity mobile devices. For example, students with autism or speech disorders have traditionally used communication boards: The student would point to a picture and the board would "speak" it. Now special ed teachers can outfit students with a

THE CHALLENGE OF COMMON CORE ASSESSMENTS

AS SCHOOLS INTEGRATE COMMON CORE learning standards in their curriculum, the burden could be particularly heavy for special needs learners, warns Ruth Ziolkowski, president of Don Johnston, a developer and reseller of assistive technologies and special needs in the area of literacy. "I see huge benefits to the Common Core in the way the standards build on each other. These are really nice and tightly aligned. The students touch them year after year." And "right from the start, they were thinking about a wide range of students." Those are the positives, she notes.

"At the same time, the stakes have been raised. Our students are still struggling to read the text they have in front of them. As the text becomes more complex, it becomes a challenge. There's a lot more inferential comprehension, a lot more vocabulary required. Those are all things that hang up our students." Spelling is another obstacle, she adds. Students might have "great words in their head, but they can't 'get access' to them."

For that situation, programs and apps can come to the rescue. For example, the company's Snap&Read toolbar provides an intervention that helps students keep pace in reading. The utility floats over applications on the screen and reads any text that appears there and is selected. It can decipher HTML, Word docs, PDFs, e-mail, web-based tests, images, dialog boxes, and Flash websites. Because it's so simple to use, says Ziolkowski, teachers don't have to get involved and "students can truly be independent."

However, even a plethora of useful apps won't solve every problem. As a special ed teacher in New York City, Vicki Windman works with the lowest functioning students, including those with autism, Down syndrome, and neurological impairments. Although her students may be in the same age range as high school students, their learning is closer to preschool level. What would progress look like over the course of the school year? "Let's say, going from five sight words to 10 sight words; I would be elated by that. Or being able to identify the difference between a penny, nickel, dime, and quarter."

Although Windman tries to stay on top of Common Core discussions that may have repercussions for her students, she has yet to hear anything that applies to their situation. And she says that frightens her. Why? "Because now they're testing teachers. So if my kids can't [work at grade level], how am I going to be judged?"

Windman would prefer to assess learning among special ed students by using digital portfolios. Since she has enough iPads in her classroom for all of her students, she can keep and share reports about what each child has done. "Then when an annual review comes around, I could say, 'Look at Johnny. At the beginning of the year, he was doing x, y, and z, and this is what he could do at the middle of the year and at the end of the year.'" The advantage of using iPads in that process, she adds, is that the apps she's running "do data tracking. That saves me a ton of work, because that works with my IEP goals."

tablet computer running any one of many voice output or communication board apps.

The impact of 1-to-1 in the special ed setting can be dramatic. For students who are dyslexic or who have trouble "decoding" text, digital books or text-to-speech programs can read text to them while highlighting each word as it's read — in essence acting as a virtual special education aide. As Gioia explains, students with trouble decoding text might take "hours to read even just a paragraph or chapter. Using these types of tools, they can just listen and comprehend as much as possible," she notes. "It's been a game changer for many students."

For students who can't write, speech recognition programs from Microsoft, Nuance, and others allow them to transcribe anything with their words. "If they never could write a word down and [now] they can transcribe, it changes everything," marvels Gioia. "They feel success; and, of course, success breeds success. They can go on to college and do other things. We're talking about children who would have dropped out otherwise."

To help educators and parents decide which mobile device might best suit a child with a special need, the state's Assistive Technology Program runs a Resource, Demonstration, Equipment Loan Center where people can borrow a specific piece of equipment for two to four weeks.

When it comes to the 1-to-1 promise of student-centered, personalized learning, special education instructors are ahead of the game, according to Forsyth County's Swaim. "We're so individualized anyway in our instruction, I don't think for special ed it's been such a shift. That's what we're all about: individualizing the instruction."

Flipping the Classroom

The kinds of activities that go on in the "flipped" classroom—in which students watch instructional videos at home and come prepared for more hands-on work in the classroom — can benefit students with special needs too, according to Prupas.

Special educators have told her that the flipped model is "great" because their students can watch the recorded content "over and over," which is particularly helpful to students with special needs who "might need a lot of extra time to learn the concepts." But Prupas sees benefits in flipping instruction that go far beyond reteaching.

"We argue that the benefit is really for the collaborative and active learning aspects in the classroom," Prupas says. "The teacher is more of a facilitator." For example, if a student with autism needs to work on social skills specifically, a flipped model allows the teacher to focus on those skills in the classroom by setting up activities that are team-oriented and collaborative. In that case, the instructional videos might show social skills such as taking a phone call or performing a transaction in a store. Then, in class the students would work on the skills together.

The most effective approach for flipping the classroom for special ed students isn't, in fact, all that

FLIP THE SCRIPT

VIDEO: Andrea Prupas shares technologies that are effective for special ed in flipped classrooms.
Click here for the captioned version.

different from doing it for general ed students. Instead of "doing things differently," Prupas points out, "we really have to do different things."

A truly flipped approach, she says, always starts by looking at student needs. "It's very personalized. I think most educators today would agree that's the way things should be done," she notes. Any specific approach needs to grow out of pedagogical intent, she says: "Is the teacher using understanding by design, differentiated instruction, or using a specific math or reading program?" Within that framework, the instructor can settle on the best way to present content to special ed students through the flipped model.

As an example, Prupas offers screencasting — a recording that includes some combination of audio, slides, and video. "When you look at it from the perspective of a student in a regular classroom, you'd say, 'Okay. I'm going to use that for content delivery.'" The instructor might use it to create her own instructional videos for the students to watch before coming into class. But for students with special needs, "You really have to go one step further," she says. "Screencasting can be a great tool for language development. As students do their [own] screencasts, they're also speaking at the same time. It can also be a great tool for visual concepts and ideas."

If this approach to assistive technologies seems like great pedagogy for mainstream education as well, that's not a coincidence. As Gioia says: "Every child learns differently. Every classroom is going to have a struggling student. Every classroom can benefit from assistive technologies." Even — especially — when those technologies are mainstream. the

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Jenny House

3 Fiscal Cliff Myths, Debunked

How will sequestration really affect education?

Are you suffering from Fiscal Cliff fatigue yet? And, even if you are, do you really understand its implications for education? There are many myths circulating about the dire consequences in store as a result of budget battles in Washington, so if you're anything like me, you want to know the truth.

Let's begin with a definition of budget sequestration. In the face of annual budget deficits, sequestration means automatic, across-the-board spending cuts to all federal agencies. This drastic step allows Congress to limit the size of the budget and gives it the right to make mandatory cuts if the cost of running the government exceeds the cap.

On March 1, we all watched as Congress was unable to come to an agreement on how to reduce the $16.5 trillion national debt. This triggered the mandatory sequestration procedures: 5 percent across-the-board cuts to federal programs and activities except for those that Congress identified as exempt (such as Social Security and certain parts of the defense budget). Federal funding for education will be cut by $2.5 billion in fiscal year 2013, and the cuts are currently scheduled to continue through the 2021 fiscal year.

Based on what we know now, here are some of the major myths — and the corresponding truths — about how education budgets will be impacted by sequestration.

MYTH No. 1: No cuts will take place in education until the 2013-2014 school year.

TRUTH: Actually, some cuts have already taken effect. The first districts hit were those who get Impact Aid, which is federal funding that makes up for the shortage in property taxes in districts that are located on or near Native American reservations or military bases. Head Start programs have already had to slash 5 percent from their budgets, totaling about $401 million. Some

Chi Birmingham

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programs are shutting down earlier in the day. Some may have to shut down for the summer, posing a big problem for poor, working parents.

MYTH No. 2: The only cuts impacting education are the $3 billion in cuts to programs funded by the Department of Education.

TRUTH: Many other agencies provide funding to education. One example is the money rural schools get from the US Forest Service, $15.6 million of which comes from the Secure Rural Schools Act, which provides funds for 4,400 schools located near national forests.

The US Department of Agriculture distributed $323 million to 41 states in January. Now they must return $17.9 million under the sequestration requirements or it will be cut from future allotments. Many rural schools have come to depend on these funds for their basic operations.

MYTH No. 3: All programs will be cut so much that districts will have no money for products, including technology.

TRUTH: Here are some of the predicted budget cuts, as reported recently by the Committee for Education Funding:

Title I: Sequestration will reduce the $14.7 billion program by nearly $727 million, potentially eliminating support to an estimated 2,700 schools serving 1.2 million disadvantaged students, while also putting at risk the jobs of approximately 10,000 teachers and aides serving these students.

IDEA (Special Education): This program will be cut by nearly $620 million. States and districts will have to cover the cost of approximately 7,200 teachers, aides, and other staff needed to implement a program that serves roughly 6.5 million special needs students.

But that's not the end of the story. The National Education Association also reported the following additional cuts:

Teacher Quality grants to states will be cut by $124 million, which could result in as many as 1,630 layoffs. It also could mean that as many as 2,630 teachers who were hired to reduce class size will be "unhired."

Some 95 percent of school districts receive Teacher Quality funds.

Career and Technical Education will be cut by $87 million. CTE, also known as Perkins Career and Technical Education Basic State Grants, provides knowledge and skills to students to prepare them for careers. The cuts will impact 1.4 million students.

21st Century Community Learning Centers will be cut by nearly $59 million. That means that 86,000 students will not have access to before- or after-school programs. It also could mean that 1,200 teachers and nonteaching staff could lose their jobs.

Putting It Into Perspective

So what's the bottom line? It is true that there will be cuts to many of the programs that you use to purchase

PRESS PLAY

Find the Funds

Jenny House shares five sources of technology funding that are immune to sequestration.

Click here for the captioned version.

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SHARE

technology, but remember: The federal funds that your district receives comprise at most 10 percent of your total operating budget. The majority of funding comes from state and local sources.

So let's do some simple math: If you take the 10 percent of your budget provided by the federal government (the funds most impacted by sequestration), and divide that 10 percent by 5 percent, the equation would be 0.1 × 0.05 = 0.005 or 0.5 percent. For most districts, that is the maximum amount by which the budget will be reduced.

It will hurt for sure, but if you look at the big picture, it is a very small part of your total operating budget. And it could have been much worse if the cuts were the 9 percent originally proposed by Congress.

It is true that there will be cuts to many of the programs that you use to purchase technology, but remember: Federal funds your district receives comprise at most 10 percent of your total operating budget.

Speaking of which, as of this writing Congress has not finished executing the details of sequestration. Many bills are being proposed to exempt different federal programs from across-the-board cuts, and meetings are taking place to negotiate alternative ways to reduce the national debt. So stay tuned. the

Jenny House, founder and president of RedRock Reports, provides strategic vision on funding for both education and business.

Product Roundup

Editor Picks

The latest releases, services, and new product versions

rollout

Collaborative Classroom

Eleventh-grade physics students at **Riverside Secondary School** in Port Coquitlam, British Columbia, Canada, will be the first to use Samsung Electronics Canada's Samsung School, which consists of 31 Samsung Galaxy Note 10.1 tablets, a 65-inch digital e-board, and Samsung software. The package offers a screen-sharing feature that allows course material to be distributed to each student's tablet. Students and teachers can then interact and share content with each other via a digital e-board. *Read the full story online.*

Tapping the Desert Sun

As part of a 20-year agreement with solar provider Constellation, Arizona's **Somerton School District** recently installed 6,600 photovoltaic panels at 10 carports and eight shade structures across its five campuses to help create up to 2.3 million kilowatt hours of electricity annually. The district will also participate in the Arizona Public Service utility's Renewable Energy Incentive Program, which provides rebates to homes, businesses, schools, and other organizations that install renewable energy systems. *Read the full story online.*

Identifying Best Practices

Metropolitan Nashville Public Schools (TN) has deployed an online service that will help community partners gain access to relevant data and identify which intervention activities are having the most impact. MNPS is using Social Solutions' Efforts-to-Outcomes Extended Integration (ETO-Xi) tools and resources with Nashville Promise Neighborhood. The latter is an umbrella network of 27 organizations in Nashville that provide numerous services to "improve schools and communities." *Read the full story online.*

newreleases

AV & Presentation

- BenQ M7-Series Projectors Target Large Venues with High Light Output
- Epson To Roll Out Ultra-Short-Throw Interactive Projector Next Month
- Gadget Turns an iPad into a Document Camera
- Epson To Ship Portable, Interactive Short-Throw Projector This Month

Enterprise Systems

- BitTorrent Sync Takes on Dropbox, Google Drive with Free, Unlimited File Sync Without the Cloud
- Windows Azure (Finally) Takes Infrastructure into Cloud

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- Red Hat Opens Early Adopter Program for E[illegible] OpenStack Distribution

Mobile Computing

- Impulse Point Intros Identity Based BYOD Registration Solution
- Dell Unveils Sub-$500 K-12 Laptop
- SOTI Unveils MobiControl Mobile Device Management for Education
- Advanced Academics Takes ROADS System Mobile with iOS App

Security

- Omnilert Adds One-Click Emergency Response
- ContentKeeper Launches Secure Internet Gateway at FETC

Teaching & Learning

- eInstruction Rolls Out Entry-Level Clicker
- Blackboard Learn 9.1 SP12 Adds Retention Center, Inline Assignment Grading
- WizIQ Boosts Streaming Performance

the JOURNAL

thejournal.com May 2013 : vol. 40 : no.5

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T.H.E. Journal (ISSN 1553-7544) is published monthly by 1105 Media, Inc., 9201 Oakdale Avenue, Ste. 101, Chatsworth, CA 91311. Complimentary subscriptions are sent to qualifying subscribers. Subscription inquiries, print back issue requests, and address changes: Mail to: *T.H.E. Journal*, P.O. Box 2166, Skokie, IL 60076-7866; e-mail T.H.E.Journal@1105service.com or call 866-293-3194 for US & Canada, 847-763-9560 for International; fax 847-763-9564.

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