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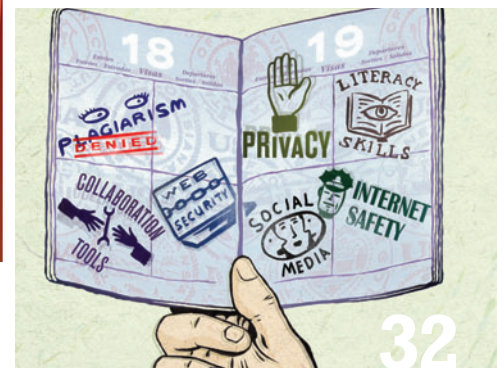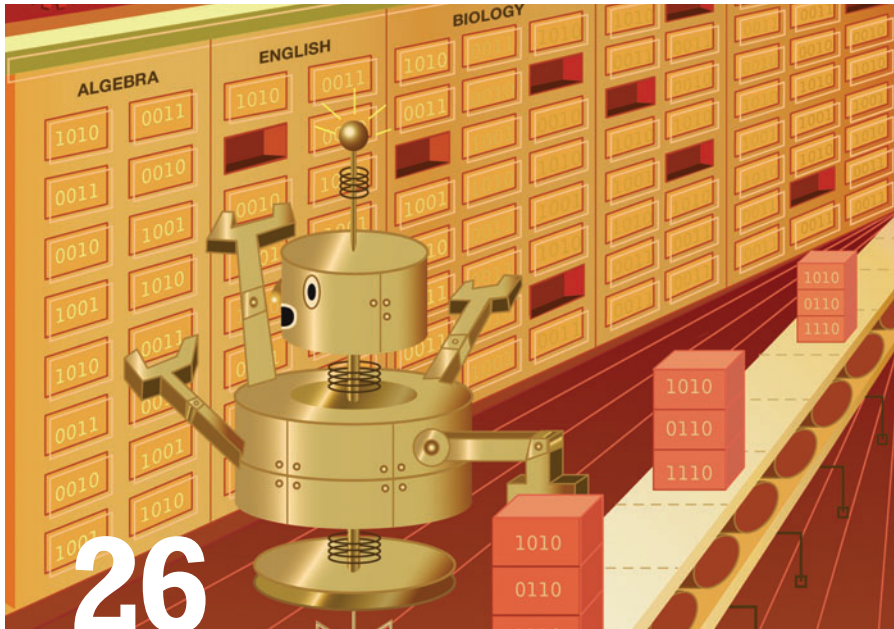
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SPECIAL ISSUE: DIGITAL SCHOOLS

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Michael Hart, Executive Editor

The Expanding School Day

TURN TO PAGE 18 and you'll find **Byron High School** math teacher Troy Faulkner noting that he starts hearing from his students almost instantly if he doesn't meet his 5 p.m. deadline to load a video demonstration of the following day's lesson onto YouTube. They're that anxious to log onto Moodle and watch him solve quadratic equations.

When she writes about Faulkner and the math classes in Byron, MN, education consultant Kathleen Fulton is talking about a specific program in a specific school, but the term "flipped classroom" is becoming more familiar all the time. The idea is that teachers deliver the traditional lecture or presentation via video the night before, reserving class time to help students with their own work. In other words, the teacher-directed instruction is the homework and problem solving with the teacher is class time.

It's not just happening in Byron, and it's not just taking place via YouTube either. Learning no longer need take place just between 8 a.m. and 3 p.m. or within the walls of the old-school classroom. I probably heard the term "flipped classroom" a dozen times during the Consortium for School Networking conference in Washington, DC, last month.

But in educational technology, some things can change quickly. The chances are good that by the time I go to the annual CoSN meeting next year, the "flipped classroom" will be yesterday's news and people will be talking about something else. Look how quickly the focus of discussion has evolved on the BYOD trend.

A year or so ago, many district administrators and technology directors were wondering whether and how they could take advantage of the ubiquitous devices students were willing to bring to school. They wondered if they really could ask parents to buy their children the smart-phones, netbooks, and tablets that could be used for their schoolwork.

I met very few administrators at CoSN asking those questions this year. Instead, they're worrying about how to get all the bandwidth they know they're going to need for students who show up for school with, not one, but sometimes two or three devices that they move back and forth between all day long. Certainly, there are still schools that forbid students from bringing even a single smartphone to school, but their numbers are diminishing.

Instead, those teachers and administrators in the vanguard appear to me to be racing to find ways to take advantage of the fact their students are eager and willing to expand their classrooms. In a standing-room-only session at CoSN, Bailey Mitchell, chief technology and information officer for **Forsyth County Schools** in Georgia, pointed out that "visits" to the district's learning management system remain consistent throughout the day but rise steadily after 3 p.m. and peak with an average of 450,000 visits between 8 and 9 p.m.

Mitchell acknowledged that many of those visits are made via family desktop computers but, nearly as often, they're made by students who are working with desktops, smartphones, and tablets, all at the same time.

Before very long, the challenge will be to shift from the need to get a device—any device—into the hands of every student to giving students enough to do that is educationally valuable with the devices they're more than willing to take advantage of.

Michael Hart

Continue the conversation. E-mail me at mhart@1105media.com.

[news]

Online Safety Information Available to Parents

● **TO HELP SCHOOL DISTRICTS** comply with local or statewide requirements that they make safety resources available to parents, **PublicSchoolWORKS** has developed the Parent InfoCenter, a district-hosted online information portal featuring training, awareness information, and reporting tools for students and parents.

The service allows districts to offer parents the same training given to school personnel on the prevention and identification of child abuse and bullying prevention. Among the InfoCenter offerings:

■ Student and parent reporting information, with online and telephone reporting options

■ A printable poster for students with information on how to report safety concerns

■ A repository for additional safety information that districts or schools wish to include.

"Unfortunately, student safety concerns that include child abuse, bullying, and more are growing concerns for many school officials," says PublicSchoolWORKS Vice President Tom Strasburger. "It's our responsibility as adults to provide a safe place for students to get their education and provide tools to help them when inappropriate behavior is taking place."

According to Strasburger, the company will update information on the portal and "provide resources for districts to meet existing and new regulations" as state and federal legislation changes. For more information, visit *publicschoolworks.com*.

Report Finds Video Key Component of Teacher Evaluator Training

● **A NEW REPORT** highlighting best practices for training principals to conduct high-stakes teacher evaluations emphasizes the importance of authentic practice, the availability of exemplar evaluation video, and the distinction between bias, interpretation, and evidence.

Researchers developed the recommendations in collaboration with the online professional development company **Teachscape**, which helped record and score some 23,000 lessons across more than 3,000 classrooms. The team then trained evaluators and recorded the most effective training methods.

Findings indicate that quality evaluator training or certification programs need to give participants the opportunity to score real lessons and get immediate feedback. In addition, evaluator training should focus on accuracy and consistency in scoring, and training on both high-end and low-end teacher performance. Providing evaluators with access to prescored video of classroom sessions should also be a priority.

"As a result of state and federal policy initiatives that emphasize performance-based teacher evaluation systems, observers who serve as evaluators are central to the entire process," says Catherine McClellan, lead author of the report. "If principals are not trained to accurately assess teachers, they cannot provide useful feedback and succeed in their primary job of instructional management. Without proper evaluator training, teacher effectiveness programs cannot work."

The report, titled *Teacher Evaluator Training and Certification: Lessons Learned from the Measures of Effective Teaching Project*, is part of the Bill & Melinda Gates Foundation's Mea-

[industry update]

Vernier has launched the newest version of its data-collection tool, LabQuest 2, a stand-alone interface used to collect sensory data. Used as a stand-alone device, or as a data-collection interface for computers with Logger Pro software, the device features a high-resolution touchscreen, analysis tools, and on-board curriculum. It is compatible with all Vernier probes, which include more than 70 different sensors to collect data on temperature, light, and sound, for use in experiments related to various STEM topics. Built-in WiFi allows students to share data to any device with a web browser, like tablets or laptops.

E2020 is searching for middle and high school teachers interested in delivering video lessons to supplement its existing instructional materials, used in schools for credit recovery, advanced placement, and career education programs. Interested teachers should create a video of themselves giving a brief lesson on an academic subject in their area. For full details, visit *education2020.com*.

The **Software & Information Industry Association** has opened its Vision K-20 survey for responses. The survey gives educators and administrators the opportunity to evaluate their technology use in a short survey, which focuses on five technology-related categories: 21st century tools, accessibility, differentiated learning, assessment tools, and enterprise support. The survey records both educators' current technology use and their ideal use. To take the survey online, visit *siia.net/visionk20*.

PBS and the **Corporation for Public Broadcasting** are donating free iPad apps for early learners to Head Start centers and other organizations in under-served communities as part of the Ready to Learn Initiative. Through September, PBS and CPB will distribute the apps, designed to help young children develop math skills, to Head Start centers, local PBS stations, and Title I schools.

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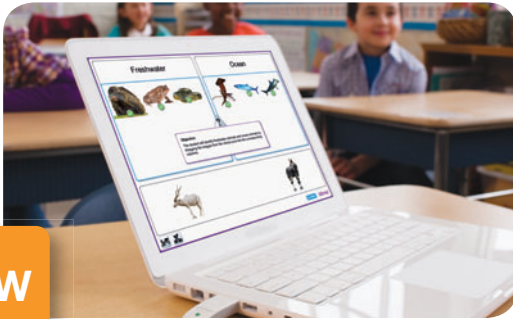
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Chromebooks for Education: Classroom Technology That Scales

● Chromebooks have landed in K-12. As districts consider Chromebooks for Education for their 1-to-1 computing initiatives, take a look at what these devices promise for today's students and teachers.
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Getting Your District Ready for BYOD or 1-to-1

● Experts reveal best practices for implementing a mobile learning plan. Hear how to prepare your constituents for this change and what you need to know as you move your district in this direction.
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Desktop Virtualization for Schools and Cost-Conscious Organizations

● Learn how Georgia's **Morgan County Schools** has leveraged desktop virtualization to better serve its students' learning needs and improve operations for its IT staff.
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K-12 Facilities Planning: Policies, Opportunities, and Challenges

● Experts look at the K-12 infrastructure from a national perspective and see how recent federal policy initiatives to increase funding for K-12 facilities are faring.
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How to Select a Tablet

● Learn 10 essential criteria that organizations should consider when choosing a tablet computer.
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[green spot]

USGBC Refines Green Classroom Concept

● INTENT ON increasing the number of green classrooms in California's K-12 schools, the Orange County chapter of the U.S. Green Building Council is retrofitting a Costa Mesa classroom that it hopes will serve as a model for a more widespread, national efforts of a similar kind.

The **Davis Magnet School** classroom will be gutted, insulated, and equipped with high-performance lighting that "harvests" daylight, environmentally friendly flooring and furnishings, wireless submeters (for monitoring utility usage), and a new ventilation system. All paints and finishes used during the process will have high recyclable contents and low levels of volatile organic compounds. The retrofit will be funded through in-kind donations.

Positioned next to a conventional classroom, the retrofitted space will be used in an experiment that compares energy usage between the two rooms. Construction is expected to start in June and wrap up by the start of the 2012-13 school year.

{win big!}

Futuristic Technology Contest Selects Regional Winners

Toshiba and the National Science Teachers Association announced 24 regional winners for their ExploraVision Program 2012, a competition that challenges teams of up to four students to design technologies that could exist in 20 years. Winning entries included a system to filter radium from water, a cavity prevention selector, and a tread-transforming smart car.

To celebrate the program's 20th anniversary, the teachers who submitted the most student projects in each grade category received a Toshiba Thrive tablet. The regional winners will now move on to the national phase of the competition, where eight teams will win the top prize, a $10,000 US savings bond. For more information, visit *exploravision.org*.

Edge Challenge Seeks New Educational Apps

Desire2Learn is looking for the next big educational app via its Edge Challenge 2012, which will award $25,000 and the opportunity for two team members and a mentor to attend Fusion 2012, Desire2Learn's annual user conference in San Diego.

The competition, titled "Create and Collaborate," calls for teams of up to five to create a working software solution that illustrates an innovative approach to creating or collaborating while learning. Submissions, which must be created using a mobile web platform and entered by April 30, should include the app itself along with a short video that demonstrates the app in use. For more information, visit *desire2learn.com/edgechallenge*.

Netop Increases Funding for Software Grants

Netop is increasing the size of its GAP grant program by more than 50 percent with the goal of putting more classroom management software into schools.

The grants, which range in size from $150 to $1,100, can be used to offset purchase or upgrade costs for the company's software. The grants support Netop School, Netop Vision, and Netop Vision Pro. The software gives teachers and administrators control over student computer use and allows them to guide learning through controlled web browsing and on-screen demonstrations.

Last year, the company awarded more than 200 GAP grants totaling more than $100,000. Grants are available until all the funding has been awarded. Details at *netop.com/ngage*.

[stem]

New Early College STEM Programs

● **CHICAGO STUDENTS** will soon have the opportunity to attend one of five Early College STEM Schools (ECSS) offering instruction in grades 9 through 14. **Chicago Public Schools** (CPS) and City Colleges of Chicago (CCC) will participate in the ECSS program with IBM, Cisco, Microsoft, Motorola Solutions, and Verizon Wireless.

Each of the five participating technology companies will partner with one of the participating ECSS schools, and each company will work with CPS and CCC to develop a unique curriculum at its partner school. The companies will also provide mentorship and internship opportunities for the students and professional develop-ment opportunities for the teachers.

After high school graduation, students will be granted industry certifications and college credit in STEM-related fields, or be given the opportunity to work toward their associate's degrees. The programs being offered include web development and software programming, database and cloud data management, and network engineering and security.

[gaming]

## Video Game Pilot Combines Physical Activity and Learning

● **TEACHERS IN** seven school districts across the United States—including some of the largest in the country, like the **Los Angeles Unified School District**—are combining physical education and subjects like math, language arts, and science through a pilot program using Microsoft's controller-free video game platform, Kinect for Xbox 360.

Students in the pilot play through a library of 200 ready-to-use classroom activities that align with Common Core State Standards. The educational activities, designed by pedagogy experts, are paired with existing video games for the Kinect, like bowling and darts, which require physical activity. Teachers browse through the activity library online to identify activities by subject area, age range, and associated games.

"As educators, we are always looking for the best ways to help our students learn and retain the knowledge and skills they need in life," says Adina Popa, technology resource teacher in **Loudoun County Public Schools** (VA), which is participating in the pilot to help teach math concepts such as patterns versus randomness, probability, and angles. "We know student engagement is a key factor in that and, with a tool like Kinect, we are able to strengthen our curriculum while engaging our students, making learning more effective and more fun."

More information about the pilot is available at *microsoft.com/education*.
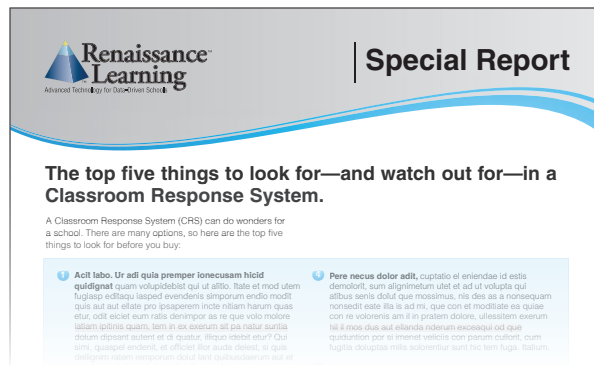
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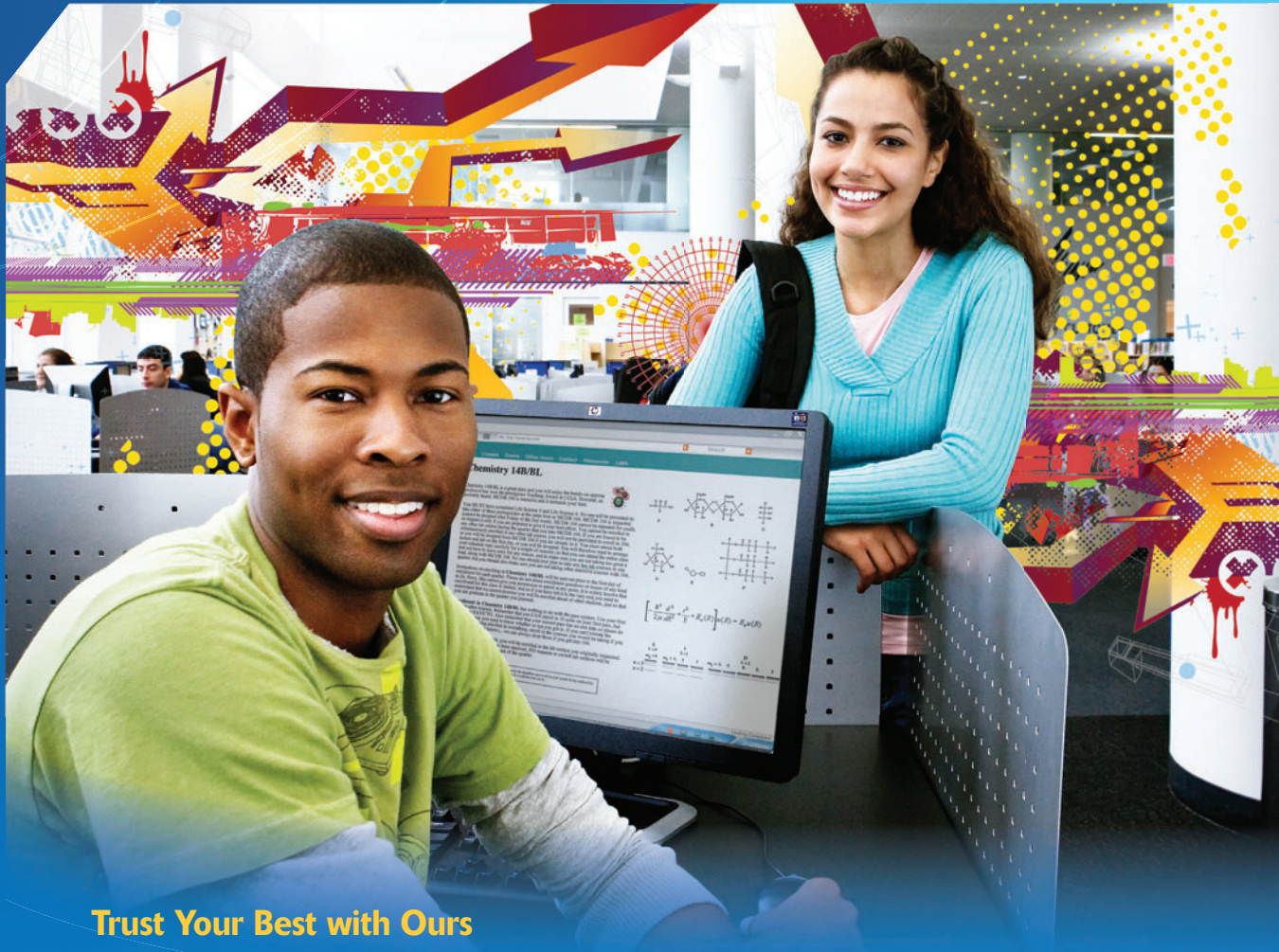
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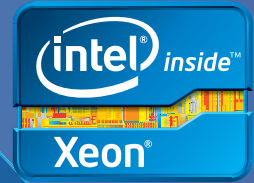- Up to 20:1 server consolidation ratio
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Data Driven

In the midst of moving to the Common Core, one district education director shares how a technology-supported math program is getting students and teachers alike to think critically about data.

THE IMPENDING SWITCH to Common Core State Standards will require a transformation of teaching and learning in K-12 classrooms across the United States. Many current teaching practices simply will not provide students with the necessary skills to be productive 21st century citizens, and most educators recognize that fact. However, changing a teacher's practice and a school's culture can certainly be daunting tasks.

At **Charlotte-Mecklenburg Schools** (NC), where I work, a number of students and teachers are ushering in sweeping change as they move toward full implementation of the Common Core's Standards for Mathematical Practice. They are reimagining the way math teachers are trained and students are taught, using an approach that makes use of technology and focuses on professional development.

Specifically, more than two years ago the district began employing a Texas Instruments initiative called MathForward that combines the use of technologies like graphing calculators and a navigator system (which allows teachers to collect instant feedback from students), a heavy focus on professional development, and differentiated learning. The program can be used in conjunction with any textbook, because it's not a curriculum—it's a way to change the teacher's pedagogy and work in the classroom. Today, the district's Title

Students at Eastway Middle School in Charlotte, NC, use graphing calculators to send data to their teacher as part of a Texas Instruments algebra-readiness program known as MathForward.

I middle schools (150 classrooms) and high school Algebra 1 classes (100 classrooms) are enrolled in the program.

As part of its overall Common Core implementation strategy, the Charlotte-Mecklenburg district's principal focus now is on the core's W-1 standards, which, while not math-specific, focus on evidence-supported argumentative writing, a skill that applies to all content standards. A central part of the MathForward program incorporates using math-based data to support a student's hypotheses.

Teaching Teachers First

The program consists of multiple parts, but it all starts with the teachers, who begin with five days of face-to-face training on using the technology and research-based pedagogy for math instruction. Then, four days each month a program coach observes teachers' classrooms and works with them to create lessons that take advantage of the data teachers collected from students (i.e., test scores and homework answers). Four to five times a year, all participating teachers are pulled out to learn more content and work as a professional learning community.

The program is in use every day in the classroom. When students come in, teachers ask randomly selected homework questions, and students answer them using buttons on their graphing calculators. The questions could be multiple choice, fill in the blank, or even open response. The data is then transmitted to the teacher's navigator system, where teachers can display the answers for the entire class anonymously. Teachers can then say, for instance, "We need to go over No. 7, a lot of you missed that." The great thing is that it gives the teacher immediate buy-in. They see instantly that this is something that can make their lives easier and benefit their students.

The students have taken to it too. If they have 15 homework problems and everyone in the class got 14 of them right, they know they won't have to spend 30 minutes in class going over it. The teachers can focus instruc-

tion on the areas in which the students need the most help.

In these MathForward classes, students also spend about 20 minutes of each class solving what we call "real-world problems." Texas Instruments has a team that scours the news and develops topical situations that students can think critically about.

For instance, last year, when oil was spilling into the Gulf of Mexico, students spent about eight weeks looking at data coming in from the region. They used Google Earth, their math skills, and various technologies to digest the just-in-time data the experts were generating. Kids then learned to ask questions to try and solve these problems. Each day, after they spent some time on the Gulf oil spill problem, they moved on to a regular math lesson, and then returned to the problem with teachers asking if what they just learned would help them solve—or think differently—about the problem.

Obviously, we did not expect students to solve many of the complex, theoretical questions that were posed—the experts do that—but students learned that you need to use math to solve these types of problems and, in doing so, they used every one of the eight Standards for Mathematical Practice in the Common Core, from reasoning abstractly to attending to precision.

In addition to making sure students employed the standards, we also felt it was important to make them aware of what they were doing. Each math classroom has posters on the walls demonstrating the eight math-related standards with an aligned graphic. Students are expected to write a "ticket out the door" each day explaining what they learned in class, and which mathematical practice they employed. The practice also reinforces our focus on W-1 argumentation—using data to form an opinion and then being able to back up that opinion—since what we are really asking kids to do is to take information, analyze it, and communicate about it.

Differentiating Data

For the teachers, the professional development part of the program is the real hook, because the ultimate goal is to change their practice so they can be better teachers for all kids. But they couldn't do it without the technology they have available.

In MathForward classrooms, teachers typically collect 15 to 20 points of data about students every day. Instead of teachers having to spend time grading these problems, they now spend time reflecting on who is struggling with what and how they can best meet their needs. The technology, coupled with the face-to-face coaching, is enabling them to differentiate. The teacher, who in the past could only provide two to three different assignments to differentiate, can now provide as many as 30 different assignments.

From the first implementation of MathForward more than two years ago, we have seen significant improvements. In particular, 23 eighth-grade classrooms produced two years' worth of growth in student achievement in one school year, and several schools are moving student mastery on state tests from 40 percent to nearly 90 percent. Special education and limited English-proficiency students have shown four to five years of growth in these classes because of the engaging technology and teachers' instructional practices.

In the schools that have been using MathForward the longest, the culture of math has been transformed to one where *all* students know they can master difficult math concepts. The rigor of the Common Core standards requires students to begin using graphing calculators in the sixth grade and, with MathForward, our teachers feel empowered to do that successfully. the

Cindy H. Moss is director of PreK-12 STEM education at Charlotte-Mecklenburg Schools in North Carolina.

A COMMON CORE TOOLKIT

The move to the Common Core State Standards presented **Charlotte-Mecklenburg Schools** (NC) with a number of challenges. Among them was the dearth of freely available collected resources that teachers could turn to in making sense of the new standards.

To counter this deficiency, district leaders created a comprehensive internal resource that compiles webinars, video clips, and samples of student work, all revolving around the new concepts and standards. Called the Common Core toolkit, the resource serves as a compendium of everything schools will need to begin preparing themselves for the shift.

"It's the district place where we put high-quality resources," explains Cindy Moss, the district's director of PreK-12 STEM education. "We've already juried what's out there, so you can trust that it's high quality."

Ultimately, Moss says, teachers will be able to take as much as 80 percent of their lesson plans directly from the toolkit, enabling them to train their focus on changing their practice, not creating lessons.

To develop the toolkit, the district created a Common Core steering team with curriculum and assessment specialists, special education experts, ELL teachers, and other stakeholders who will be affected by the switch, including parents, who were represented by leaders of the district's Parent University, which offers free skill-building courses. The team then wrote grade-level-specific lessons in subjects like language arts, math, and science. Afterward, stakeholders were allowed to examine it with their own specific populations in mind.

As Moss explains, "The ELL rep might take it and make some modifications that might be needed for a kid who is an English language learner, the special ed rep might make some recommendations for a kid with a certain IEP, and the Parent University representative would look at it and say, 'Here's a paragraph we need to send home to parents when students are learning these units.'"

The best part is that Charlotte-Mecklenburg is sharing its toolkit with other districts. Currently, Moss says, the toolkit is not accessible online; however, she hopes that will change next year. For now, interested districts can gain access to the toolkit upon request. Information on how to contact Charlotte-Mecklenburg Schools is available at *thejournal. com/cctoolkit*. —**Stephen Noonoo**

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The Flipped Classroom: Transforming Education at Byron High School

A Minnesota high school with severe budget constraints enlisted YouTube in its successful effort to boost math competency scores.

BY 5:01 P.M. on a Tuesday afternoon, **Byron High School** (MN) math teacher Troy Faulkner has already received five e-mails from his students: "Where's tomorrow's video lesson?" With their laptops, tablets, or smartphones—whatever is convenient—Faulkner's students are waiting to log on to Moodle and watch a YouTube video of him solving quadratic equations. In the classroom the next day, Faulkner will work with students as they demonstrate how well they understand the concepts laid out in the lecture the night before.

Welcome to a "flipped classroom" at Byron High School—where the lectures are homework, and problem solving with the teacher is class time.

A Cinderella Story

According to Superintendent Wendy Shannon, nobody in the **Byron Public Schools** district set out to flip their classrooms, but necessity became the mother of invention. The district, in suburban Rochester, was due for a math textbook revision. Teachers already knew the old math texts were poor matches for the state's new math standards, and that a curriculum update was needed. But they faced a huge problem.

"With two failed operating levy referendum issues and a bad economy, we'd already had to cut $1.2 million from Byron's school budget," Shannon says. "We literally had no money for new textbooks."

The teachers came up with a radical idea: They'd create their own math curriculum. Byron High Principal Michael Duffy questioned each teacher privately to make sure they really were up for such an ambitious task. Satisfied that they were, he gave them his blessing.

All Byron High School teachers have participated in professional learning communities since 2008, with each department meeting for at least an hour each week, so the math department already was comfortable working as a team. So, starting in January 2010, the math team got together every Monday at 6:45 a.m., tearing apart the math curriculum and rebuilding it from scratch.

Middle school math teacher Jeremy Baumbach, who taught an advanced math class to eighth graders, joined the team to assure that his students would have a seamless transition into their high school coursework. The pressure was on: They'd committed to a textbook-free high school math curriculum by the time school started in fall 2010.

DIY Curriculum Formation

Initially, the teachers thought they could simply pull material from the web, linking to online lessons they found from other math teachers around the country. But it soon became clear that this wasn't going to give them what they needed.

According to Faulkner, "We looked at the state standards and areas where there were cracks in our kids' mathematical foundations. Take rational equations. Students should have them down pat by the time they are juniors, but this was something that lots of kids stumbled on in tests. Why not introduce the concept earlier, starting in
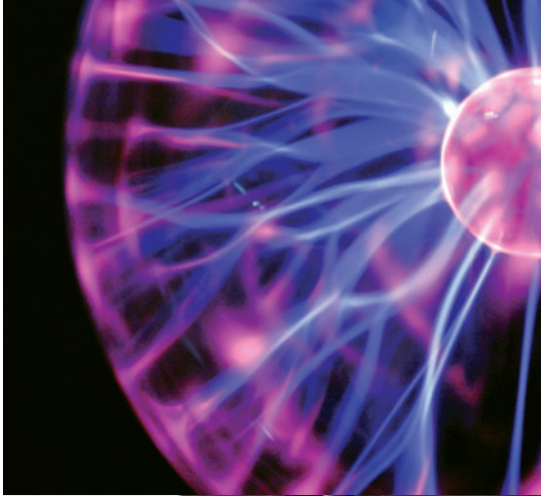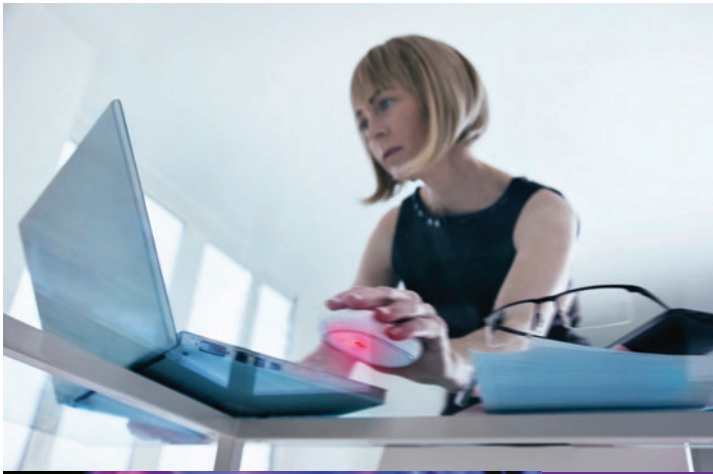
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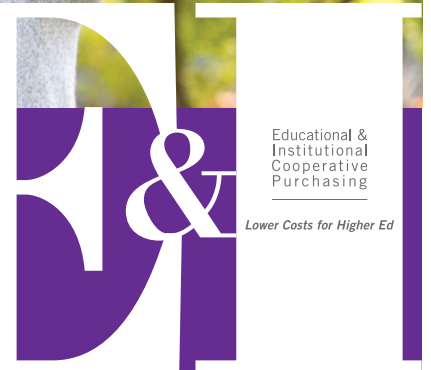
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algebra, again in more depth in geometry, and on through upper-level math classes? It just made sense."

Shannon gave the teachers her full support. In the spring of 2010, the team applied for and won a $5,000 grant from the local Byron Fund for Excellence in Education. It provided small stipends for teachers to continue to work together in the summer and paid for the purchase of Kuta, a software program that supports a common framework for generating worksheets.

Unable to afford an expensive course management system, they turned to Moodle, a free online learning management system. The district's director of information and learning technology, Jennifer Hegna, helped the teachers create a Moodle course for each class, embedding lessons, homework, quizzes, and answer sheets in each course site.

They soon realized they would need to record videos of their individual lectures so that parents and students would have a resource to use when they were at home. At that point, however, they weren't sure of how to do it.

Unblocking YouTube

Hegna describes an important breakthrough the group had: "Formerly, the district blocked YouTube from student use. Once we got permission to unblock it, this made all the difference. We could store recorded videos for free. YouTube is available on almost all student personal learning devices. Teachers create their own YouTube channels and embed—not link—the videos into Moodle. This eliminates distractions and helps kids stay focused on the content."

When the 2010 school year started up, the math team was ready—but just barely. Throughout the first year they kept trying new things, struggling to stay a few lessons ahead of the students. As the teachers get more comfortable with the technology and their new approach, the tinkering continues.

Darren Nelson, who teaches Basic Algebra, Algebra II/Trig, and Senior Math, describes some of the benefits he's seen: "This saves an amazing amount of time. We can demonstrate a math concept in a 10-minute video that normally we'd spend a whole period on in class. Students work at their own pace and, if they finish the problems in class, they move on to the next lesson."

In class, Nelson is always on the move, watching as students do the problems, working with those who have trouble, encouraging students to help each other, offering praise. He believes this approach gives him greater insight into how each student is learning, and more flexibility in his teaching.

Do teachers find it awkward to "perform" on video? Some found it unnerving at first, but most soon became comfortable with using an interactive whiteboard just as they would in class. Faulkner laughs, "It's okay because students see just our hands [working problems on the whiteboard] and hear our voices on the videos."

So far, students like the change. At the most basic level, they appreciate having one less textbook to lug around in their backpacks. They like that the videos are short—10 or 15 minutes at most. One notes, "If I'm out sick or have to miss a class for some reason, I don't fall behind. I really like that." Students also have to take more responsibility for their own learning. Although almost all of Byron's students have high-speed internet access at home, they still have to be creative in organizing their time to watch the videos.

Teachers see greater parental involvement as well. Although initially teachers got some calls from parents asking, "Where are the homework problems?" most parents are now happy with the new methods and curriculum.

National Recognition

Byron educators describe the flipped classroom as just one example of the continuous improvement process guiding the high school. Five teachers have been given small stipends to serve as data coaches, leading the efforts to collect, analyze, and interpret test data. "We won't let a student fail," says Principal Duffy. If students fall below 70-percent proficiency in a course, they are "invited" to a mandatory support study hall at lunchtime.

Math mastery at Byron High has jumped from 29.9 percent in 2006 to 73.8 percent in 2011, according to the Minnesota Comprehensive Assessments. ACT scores have risen from an average composite score of 21.2 (on a scale of 36) in 2006 to 24.5 in 2011. This school year, 86.6 percent of Byron's seniors will have completed four or more credits of math.

In 2010, Byron was selected as a National Blue Ribbon School by the US Department of Education. In September 2011, Byron was honored as Intel's "School of Distinction" for high school mathematics.

Success and innovation are contagious. Other Byron teachers are watching the math department, and are eager to adopt the flipped classroom model in their courses. The Byron community seems to be listening too. In November, by a 61-percent margin, citizens gave the school district a vote of confidence that translates into a $546,294 operating levy per year for the next six years. It's a Cinderella story that bears repeating in other schools and districts. the

Kathleen Fulton is an education consultant who recently retired as the National Commission on Teaching and America's Future's director for Reinventing Schools for the 21st Century. Prior to that, she was project director for the Office of Technology Assessment for the US Congress.

LINKS

Intel Schools of Distinction
intel.com

Moodle
moodle.com

National Blue Ribbon Schools Program
ed.gov/programs/nclbbrs

YouTube
youtube.com

Logistics and Distribution

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Typing in the Age of Tablets

Efforts to make "typing" on handheld devices functional are inspiring new ideas for modifying or replacing the typewriter-inspired keyboard format.

DO A GOOGLE search on the question, "Does anybody teach keyboarding anymore?" and you'll find out that—at least in the blogosphere—it's as dead a subject as Latin, and only slightly more relevant than cursive writing. Today, it's not uncommon for teachers to be expected to fit keyboarding instruction into an already crowded curriculum.

But in the age of touchscreens and smartphones, typing drills on a traditional QWERTY keyboard may not be the best use of anybody's time. Instead, new technologies are helping overcome the vexing issues of speed, accuracy, and screen space that are the consequence of importing standard typing techniques to mobile technologies.

QWERTY Gets an Upgrade

Today's tablet computers and some touchscreen smartphones hide the keypad until it's needed, freeing up space on the smaller screen. Some phones, including Android, utilize Swype—a standard-looking keyboard that allows a user to drag a single finger or stylus from one letter to the next as a way to more quickly input letters. Want to spell the word "quick"? Start on Q, drag your finger to U, then slide to I, onto C, and stop on K.
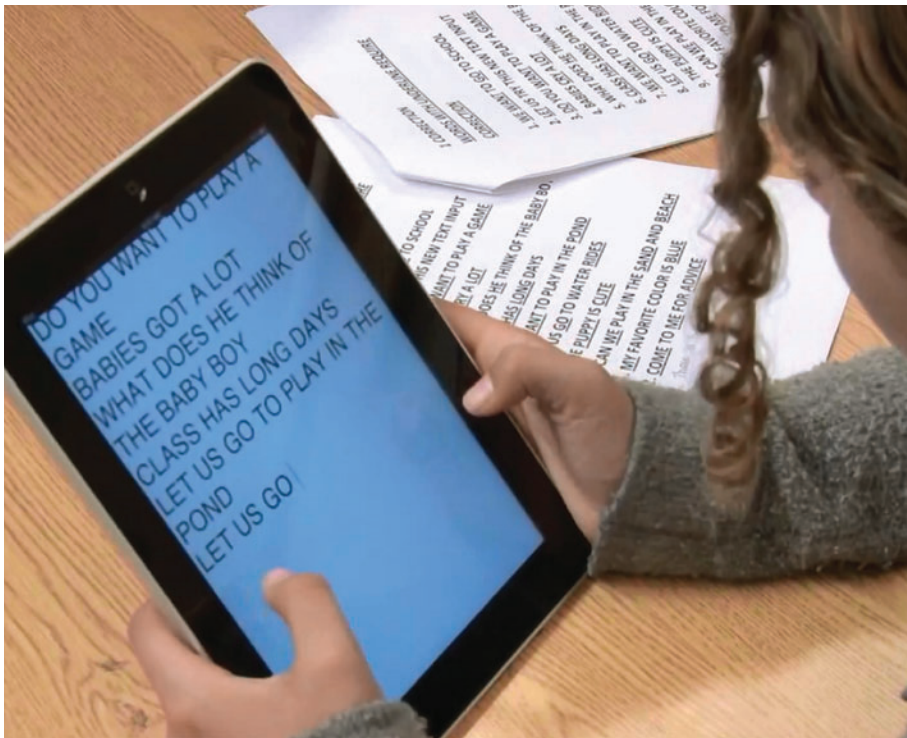
This and other similar software programs use algorithms to follow the path and predict the text. The combination of small letters and built-in shortcuts (for instance, drawing a loop over a letter to indicate it is to be used twice for words such as "apple") makes full-sized letter keys unnecessary. This approach would seem to be easier for smaller fingers. But it doesn't completely address the issue of "screen real estate," according to Steven Lindauer, a former fifth-grade teacher at **Lovell Elementary School** in Apopka, FL, who now teaches at nearby **Wekiva High School**.

"The screens are small to begin with and now on my iPad, if I need the keyboard, it'll take up half the screen," Lindauer says.

Making the keyboard smaller or moving it out of the way when you need to see a larger image on the screen could address that issue. The Android 4.0 operating system, code-named Ice Cream Sandwich, includes a keyboard that does just that. Originally called BlindType by its developers, the QWERTY keyboard layout is positioned at the bottom of the touchscreen. However, if the user begins typing off to the upper right of the keyboard's original position—or anywhere else on the screen, for that matter—the entire keyboard moves to that position, even at an angle. And you don't even have to hit all the letters precisely. Just tapping near the needed letters will prompt the predictive software to present the most likely word.

These solutions still don't address another problem with typing on handhelds that Lindauer points out: being able to hold your device and type quickly. Some phones can be held in one hand to more easily accommodate typing, but this increases the risk of dropping the device. And with tablets, to achieve any kind of typing speed, it becomes necessary to put the device on a flat surface and to use both hands. These solutions can seem jury-rigged in an effort to accommodate the QWERTY format, which is beginning to feel increasingly out of sync with current technologies.
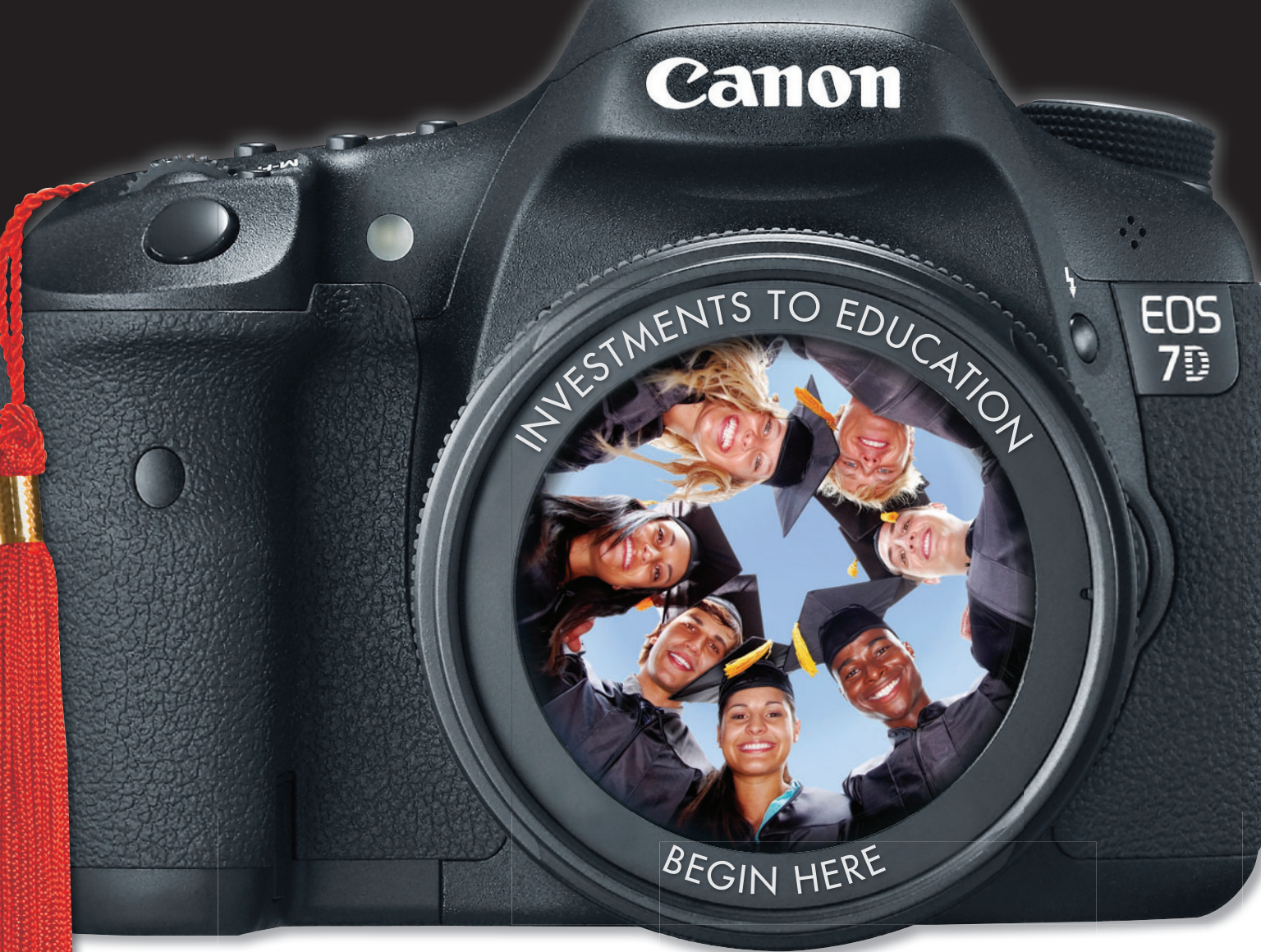
Yellow Key Letters that stand on one point.	**Green Key** Letters that stand on two points.
Blue Key Letters that have a wide base.	**Purple Key** Letters with a complete circle.

Snapkeys uses letter design to group all 16 letters into four large, color-coded keys—yellow, blue, green, and purple.

Keyboarding Shapes Up

Benjamin Ghassabian, inventor of keyboarding software Snapkeys and CEO of the company with the same name, decided that accommodating a century-old technological format was not good enough. He says he wanted to come up with a way to type that matched the functionality of a modern handheld device.

"The keyboard wasn't meant to be a touchscreen," he says. "We decided if you want a solution that can make it easy for end users to know where the letters are, we should go back to the way children learn. If you use the shape of the letters, then it is easier, because that is how they learn letters from the beginning."

Using the design of letters as a guide, they can be grouped into four categories: those with bases that "sit on" two points (M, H, K), one point (I, F, V), a wide base (E, U, Z), or those whose shapes include a complete circle (D, P, O). Snapkeys utilizes the letter design to group all 26 letters into four large, color-coded keys—yellow, blue, green, and purple. Punctuation and numbers are also associated with specific keys (see the picture above). When learning the new letter groupings, the colored keys sit on top of the image on screen and take up less space than a conventional keyboard does.

The keys are positioned at the bottom right and left of a screen so that the device can be held in both hands and only thumbs are used to type. Again, predictive software follows the order in which the keys are tapped and the most likely word is provided. Ghassabian said the software is currently 99 percent accurate at predicting the correct word the typist intends to use.

Snapkeys touts the ease with which anyone can learn the system, but to prove it the company staged a sponsored pilot last year with a group of 20 fifth-graders at Lovell Elementary, to see if students could learn the program in less than five hours. After installing the program on 20 iPads, the Snapkeys staff met individually with the students for two 15-minute training sessions over the course of two days. The kids then practiced for 20 minutes three days a week for a month with Lindauer, who taught at the school and led the practice sessions.

"The kids caught onto it pretty quickly," reports Lindauer, who says that the English proficiency of the participating students varied. "Some of them really took off and they were typing like crazy. Others were a little bit slower, but everybody caught on. I was really surprised by how quickly some of them could type.

"We would play race games when we were practicing to see who could type a sentence the fastest. I would time them, so they had a great time trying to beat each other. I'd be right along with them too. Sometimes I was faster, but not always."

An Invisible Keyboard

According to Ghassabian, users can input any character on the standard QWERTY spectrum, from dollar signs to brackets, and he notes that the application can be used for both formal essay writing and for more informal uses, like web searches and firing off instant messages.

Once the user becomes familiar with the placement of the letters, the keys can be hidden. Following a simple prompt, the four colored boxes with the letter groups are replaced by four simple graphics—one dot, two dots, a smile-like line, and a circle—making the entire screen accessible. The graphics sit on top of whatever the user happens to be viewing, but the letters themselves are invisible.

For example, if a student does a Google search for a science project about volcanoes, all she has to do is place the cursor in the search box and then thumb-tap the quadrants at the bottom of the screen where the graphics are located. Since everything but the shapes is invisible, the entire screen is made available to view the search results.

The Lovell students demonstrated just how easy the program is to use at the 2011 CTIA—The Wireless Association annual conference in Orlando, FL. (In exchange for participating in the pilot and the demonstration, the school kept the iPads.) Since then, Snapkeys has undergone some refinements and will release a finished product later this year. The company is currently in negotiations with companies it did not yet want to identify to preload the software onto phones and other devices. However, a demo app for Android and iOS is currently available.

As many kids already display remarkable proficiency with thumbs-only typing, thanks to their comfort with cell phones, Ghassabian believes this invisible-keys, thumbs-only method of typing just makes sense if students are going to get the most out of technology in the classroom.

"Children are growing up not with the PC anymore, but the tablet," he says. "Many, many schools are using tablets. Fingers do not have to be all over the screen. There are only two positions—up or down, right or left." the

Margo Pierce is a Cincinnati-based freelance writer.

LINKS

Android
android.com

Snapkeys
snapkeys.com

Swype
swype.com

A textbook follows an arduous process to get approval for use in the classroom. So who vets the curriculum when a teacher can simply pluck a learning object off a virtual shelf? **By Dian Schaffhauser**
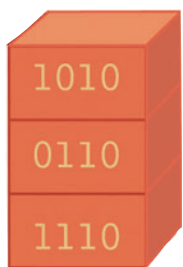
QUALITY CONTROL

Maintaining Standards in a Digital World

EVEN THOUGH non-print-based learning objects have been in the classroom for years, the shift to digital content has gotten more attention lately. One development that's made the difference is the Apple initiative to introduce its iBooks textbooks for iPads, generating a notable amount of buzz. That and President Obama's announcement that he believes every student in every state should have an all-digital curriculum by 2017. Florida already has committed to going all digital by 2015, while San Diego has distributed 78,000 digital textbooks to its students.

That's why it should surprise nobody who's looking for signs of the arrival of a digital revolution that the **Vail School District** (AZ)—a tiny rural district southeast of Tucson with 10,000 residents, two grocery stores, and not a single bookstore–is part of an advance charge to stop buying textbooks for its students. Vail's grand vision, called Beyond Textbooks (BT), began nearly five years ago with a goal of shifting to the use of open educational resources— digital content—in all of its classrooms. But it's grown into far more than that.

Today, nearly 50 other districts in the state have teamed up with BT as paid partners to gain professional development and access its wiki-based repository, which includes lesson plans, quizzes, interactive web links, ideas, presentations, and other digital matter. (In fact, the work won the Vail district the 2011 Sylvia Charp Award from the International Society for Technology in Education and *T.H.E. Journal*.)

Once the Common Core State Standards are in place, will Vail's work spread beyond Arizona's borders and become the rebel alliance that single-handedly overturns the rigorous textbook adoption process and takes down the textbook publishing empire composed of Pearson, Cengage Learning, McGraw-Hill, and Houghton Mifflin Harcourt?

ed—this former teacher and middle school principal remembers faculty meetings where somebody would hold up a textbook and say, "Hey, we'd like you to review these." Representatives would be chosen by grade level or subject area and told to provide feedback within a given time frame. Nonexperts would also be asked to weigh in as well. It wasn't an onerous duty.

Another problem is that major "adoption states" dominate the conversation for most publishers. These are the states where a central body is in charge of selecting textbooks that schools can buy—and because those states have so many K-12 students, the books are written to cater to those states' needs. Says Collins, "Texas, California, Florida, and, to some extent, Indiana domi-

> **"Some committee members know the subjects; others don't. Some are trained for the task; others are not. Some are given adequate time to really study the books; most are not."** —Christopher Stream, associate professor, University of Nevada, Las Vegas

Not likely. But Vail's efforts do raise an important question for any district that is developing its own digital curricula outside of the professional publishing world: How do you ensure the quality of your materials?

Arizona uses a local textbook adoption model. Each district is empowered to select its own curriculum rather than have a central textbook committee or state department of education recommend a short list.

In the course of making the transition to digital content, Vail has had to sort out how to revise its legacy review steps for choosing textbooks with something that works with digital content—and not commercially published content either, but materials that are provided by teachers.

The question isn't simply how to reconfigure an existing practice. Textbook selection allows state and local governments and school communities to wield influence over what their students will learn.

Teachers have typically built their lessons around what's in the textbooks. But in an environment where the individual instructor can get onto a website and download a learning object to teach a concept, what happens to that vetting process? Who ticks off the checklist of standards that are met? Who defines and makes sure that quality is adequately maintained?

According to BT Director Kevin Carney, in the old days—pre-2008, when BT start-

But that approach had its limitations. For example, while the textbook might work for a major adoption state, Arizona isn't part of the club. "So you might indeed be teaching some standards out of that textbook that are terrific things, but they don't match the Arizona state standards," says Carney.

For states where textbook adoption is done at the state level, quality control might seem like a nonissue. After all, isn't that what the state curriculum review committees are supposed to do? In theory, yes; but not necessarily in practice.

As Nobel Prize winner Richard Feynman famously recounted in his 1985 reminiscences, *Surely You're Joking, Mr. Feynman!*, the physicist joined the California state curriculum commission and discovered that he was the only member of the committee evaluating math books who actually bothered to read them: "It turned out that the other members of the committee had done a lot of work in giving out the books and collecting reports, and had gone to sessions in which the publishers would explain the books before they read them."

Don Collins, a math textbook author, professor at the University of Texas at El Paso, and a former managing editor for a major textbook publishing company who has sat in on many publisher presentations to state textbook committees, says reviews can still be that way: "Even if you got a book, that's no guarantee anybody looked at it," Collins says.

nate, because the markets are so big."

Their influence gives other states less leverage over the texts they want to put in front of their students. In 2010, for instance, Christian evangelists and social conservatives who controlled the Texas state education board proposed changes to Texas curriculum—such as minimizing explanation of the rationale for separation of church and state in history books.

Also, though they're loath to admit it, textbook committee members are not adequately prepared or necessarily qualified to evaluate books. As Christopher Stream, an associate professor at the University of Nevada Las Vegas, who has researched textbook adoption, reports, "Some committee members know the subjects; others don't. Some are trained for the task; others are not. Some are given adequate time to really study the books; most are not."

Seeking Success

Although the Vail district's process for approving digital content isn't a committee process at all, it has its own simple methodology that's free of the broader problems that pervade some of the more formal book adoptions. First, says Carney, the teacher who's posting a resource has to try it out in the classroom. "It's not only something you had to have used, but used with success."

Once somebody uploads the resource, it's live and available for other teachers

to access. There's a crew of three at BT who—even as people may be downloading and trying out the digital object—examine potential copyright issues; formatting problems, such as converting a document file to a PDF; congruency to standards; and level of rigor. If there's ever a question about a given upload, Carney himself weighs in. When it's a specialty area, such as physics, BT calls on experts in the given field within its membership.

Each resource has a name, school, and school district attached to it. That allows another teacher to follow up, but it also encourages people "to be more careful about what they post because they know their name is behind it."

Teachers from subscribing schools also can weigh in with opinions. Often the issue is that the particular resource isn't at grade level. "But, as we all know, we have kids who are below grade level," he continues, "so this would be a resource for [them]."

"We've found great success," Carney reports. The numbers prove it: Of 5,000 learning objects on track to be uploaded in the current academic year, "we've had less than 10 resources that have come back to me."

Crowdsourcing Content

Another approach for vetting content is crowdsourcing, a practice in use at schools

added an online service that allows teachers to rate the resources they've used, "so the cream rises," explains Program Manager Wendy Grey. "We want it to be teacher-approved." The approach is "Amazon style," allowing instructors to write reviews and give ratings to the digital content they've tried.

Henrico County Public Schools in Virginia follows a similar strategy. The district uses a number of commercially published sources for digital content, but it also encourages development of lesson plans and digital content by its own teachers.

The district hosts an annual competition in which it solicits submissions to "Henrico 21," a public repository. The submission needs to include a lesson plan, a rubric, student handouts, links to essential resources, and a student work sample or "artifact" created through the lesson. Lessons have to be vetted first at the school level through a site-based team review. That same team also provides feedback to teachers and makes recommendations for moving lessons onto the district level.

The content added to Henrico 21 is licensed under a Creative Commons license, which allows it to be used by other teachers, schools, and districts inside and outside the state. The site hosts between 200 and 300

who is involved in the process."

The Pursuit of Quality

As sensitive as it is to the feelings of the teachers who contribute to BT's riches, being kind doesn't necessarily translate to being effective in the classroom. Publishers probably would consider themselves to be in a better position to stay on top of the pursuit of quality than the typical educator.

Quality of curriculum has several aspects, and they're irrespective of format, says Pearson School CEO Peter Cohen. First, there's the content. "Is the content appropriate? Is it authentic? Does it do what the author is trying to do in terms of teaching?"

Then there's the quality control within the editing and production processes. "We have teams of people," Cohen notes, "whose sole job it is to go through and make sure there's a period at the end of a sentence, and the words are spelled properly, and the English grammar is proper. That doesn't mean it's perfect 100 percent of the time, but that they're pretty good overall."

Also, there's production quality. In that arena, Cohen believes digital wins hands down. Referring to Pearson books converted for the iPad, he declares, "It's sort of infinitely superior to the quality you can put on a printed page. One of the comments that the Apple folks keep making is how simply beautiful the pages are. The graphics are just stunning. In a printed page, you're limited by the dots per inch, and there are fewer dots per inch than you can get on pixels on a screen. From that perspective, the quality is much better."

A final quality issue is ensuring that the curriculum addresses the full scope and sequence of the subject area. Could a team of enthusiastic high school biology teachers, for example, truly re-create the depth and scope of *Modern Biology* from Holt Rinehart Winston? Probably not, especially if you count in all of the extra materials being made available by publishers.

Major open education resource advocate David Wiley recently blogged about this topic, calling for funding for a "next gen"

> ## "Is the content appropriate? Is it authentic? Does it do what the author is trying to do in terms of teaching?"
> —Peter Cohen, CEO, Pearson School

in a number of states, including among them Georgia and Virginia.

The **Georgia Virtual School**, which has offered middle and high school-level courses to schools and parents statewide since 2005, uses an amalgam of commercially produced materials that it purchases along with open education resources. All of it adheres to the state's Georgia Performance Standards.

To simplify the process of helping educators find the resources they need for a particular lesson, the state has recently

lessons. They can be searched and individual entries can be star rated and commented on.

Vail's BT has avoided the crowdsourcing approach because, says Carney, he fears it might send the wrong message. "When we start rating those resources, we run the risk of a fellow educator being another voice [saying], 'You're not doing a good job.'

"I want to be sensitive to the fact that these teachers are working hard, willing to share their resources. To rate them just really opens up a can of worms for everybody

of OER: "You have to admit that some of the things the publishers are working on are both cooler and better than almost everything that currently exists in the OER space. Can you name a single OER project that does assessment at all (and I don't mean PDFs of quizzes)? Can you name one that does diagnostic assessment or handles mastery in any meaningful way?"

Likewise, there are other areas where entrenched publishers retain a decided advantage over a crowdsourced option or a staff review of submitted open educational resources: They've been on the front line for decades addressing content bias.

"When people are looking at programs, they want to make sure that all diverse groups are appropriately represented," Cohen explains. A teacher building and sharing a lesson plan may represent only the kinds of students she has in her own classroom. Others may not necessarily find themselves reflected in the lesson.

"The person who was producing it never thought about that because it's beyond the purpose they originally created it for," he adds. "So they don't go through that vetting process that we who are selling programs go through to assure they are appropriate for the audiences buying them."

Furthermore, the big companies are able to provide functionality to their client schools that can help them more efficiently correlate the content their teachers are using in the classroom with the standards being mandated by the state. In situations where administrators keep a very close tab on what instructors are teaching, those publisher-supplied tools are useful for reporting. Replicating that on the fly would be much trickier.

All of this isn't to suggest that Cohen doesn't see a place for digital content developed and sourced by teachers. Pearson, in fact, sells an online learning exchange that provides a repository and functions for doing searches and ratings. "Eventually, the best content will get well enough vetted that you can feel relatively confident," he acknowledges.

But even then, he doesn't view the hunting and gathering efforts required in the open educational resource realm to be a good use of teacher time. "One of the questions that a school or a teacher or district needs to ask itself is, 'What is the best use of my resources in order to improve education achievement? Is it going out and curating content...or am I better off having my teachers spend their time engaging with students?'"

Time-Consuming Revolutions

The Common Core State Standards could introduce a tectonic shift in how content is created and reviewed. Since most states will be adhering to the same academic standards in math and English language arts, suddenly the need for individual states to have materials created to match their unique standards "pretty well goes away," points out Geoffrey Fletcher, deputy executive director of the State Educational Technology Directors Association and former editorial director of *T.H.E. Journal*.

Fletcher says some states have already talked about sharing the work of creating open education resources that match with the Common Core standards. Then each would distribute the content they'd developed under a Creative Commons "CC BY" license that enabled the others to share it.

Fletcher says, "States, districts, and individual teachers would have the right and responsibility to actually modify those materials, add to them, subtract from, and change those materials to match the needs of their students." States are beginning to realize, he adds, that they need to provide school districts "with a lot more flexibility."

Since the standards aren't expected to be fully in place until 2014, the development of that open content is still in the future. In the meantime, energetic instructors will continue cobbling together digital content.

But it may be that during this time of upheaval, as the shift to digital content expands in the classroom, that teachers will begin to feel like Lucy did with her best friend Ethel in the famous chocolate factory episode. They can keep up with the

> **Teachers may feel like Lucy did with her friend Ethel in the famous chocolate factory episode. They can keep up as long as the bonbons—those digital objects—arrive slowly and steadily.**

job as long as the bonbons—those digital objects—arrive slowly and steadily. But once the conveyer belt speeds up and teachers are left to sort through content coming at them fast and furious from so many sources, they may decide, as Lucy realizes, "We're fighting a losing game."

If that turns out to be the case, the easiest approach could well be to continue having big publishers go through the review gauntlet, whether with printed textbooks or digital content. **the**

Dian Schaffhauser is a senior contributing editor based in Nevada City, CA.

LINKS

- **Beyond Textbooks**
  beyondtextbooks.org
- **Digital Textbook Playbook**
  fcc.gov/encyclopedia/digital-textbook-playbook
- **Georgia Virtual School**
  gavirtuallearning.org/Home.aspx
- **Henrico County Public Schools**
  henrico.k12.va.us
- **Henrico 21**
  blogs.henrico.k12.va.us/21
- **Pearson Education**
  pearsoned.com
- **Vail School District**
  vail.k12.az.us

the focus

Massachusetts School District Harnesses the Power of Virtualization

In January 2011, one of the largest school districts in Massachusetts began searching for a new wireless solution. Plymouth Public Schools (PPS), just 40 miles south of Boston in the historic town of Plymouth, has more than 8,000 students across 12 campuses and a growing number of mobile devices on each one of them. The district was on its way to outgrowing its existing wireless infrastructure—a mishmash of individually secured (and, in some cases, unsecured) wireless access points.

Access was only provided to specific traveling administrators who had to look up access codes via a spreadsheet. The district needed a scalable, more efficient network that would deliver secure, high-density coverage to its growing base of users.

According to Alan McLane, technology systems engineer, the district had four items on its wish list when it went looking for a new solution:

- The capability for wireless access for teacher-issued laptops, iPad carts, and, potentially, 1-to-1 computing or bring-your-own-device (BYOD) options for students;
- The ability for teachers to access a wireless network without having to look up passwords;
- The option to provide internet access to guests but still be able to restrict it by role; and
- Centralized access point management across the district.

Working through the district's reseller, McLane went with ADTRAN's Bluesocket vWLAN (virtual wireless LAN) and access points. It was deployed in August of last year.

Bluesocket vWLAN for VMware is a free, downloadable virtual control software on a hypervisor that eliminates the need for hardware-based controllers.

Learning that ADTRAN offers a VMware-ready app was a huge benefit for PPS. The district already was in the process of installing VMware to virtualize some of its servers when it came across ADTRAN's solution.

"ADTRAN was the perfect fit with our ability to deploy a virtual controller, instead of a controller appliance required by many other wireless solution providers," explained McLane. "When the feature set of the Adtran solution was compared to other vendors' wireless solutions, it was clear that ADTRAN gave us the most features along with very aggressive pricing. This was very important to us."

Now, the district uses role-based access to setup VLANs for faculty, students, and guests. This capability lets students and employees use the same login everywhere in the district, carrying similar privileges with them to any campus. For example, a student at one school might be granted guest access with specific privileges, such as internet access, at another school, but denied access to internal servers. Teachers and administrators, on the other hand, would be granted their own individual access to specific server areas they would need access to. In addition, either wired or wireless access is available for users visiting campuses.

Plymouth now has a network with near limitless scalability. A single instance of vWLAN on VMware allows for 1,500 access points and 48,000 users. This is especially important since Plymouth schools are increasingly using laptops and mobile devices, such as tablets and smartphones, ramping up their use of the internet.

The Plymouth school district has 16 buildings that need access: an administration building, facility services building, technology center, preschool, two high schools, two middle schools, and eight elementary schools. It now has 149 access points provided by ADTRAN, and all it would need to expand coverage would be to install additional access points and a vWLAN software license.

vWLAN enforces network security at the edge. Since its implementation, teachers have been able to access and sign in to the same wireless network anywhere they go in the district, thanks to centralized management of SSIDs. In addition, McLane noted, auto-configuration of access points has saved technicians significant time. Today, a technician can run a new access point to any location and plug it in. Within a matter of minutes, the AP is self-registered and the technician knows its configuration and can confirm it is up and running.

Also of importance for his district, said McLane, is the ability to view statistics about the wireless network. "We are now able to track users and AP usage, detect rogue APs, as well as run reports and perform other various tasks," he said. "ADTRAN's wireless solution has been a solid addition to the restructuring of our technology infrastructure."
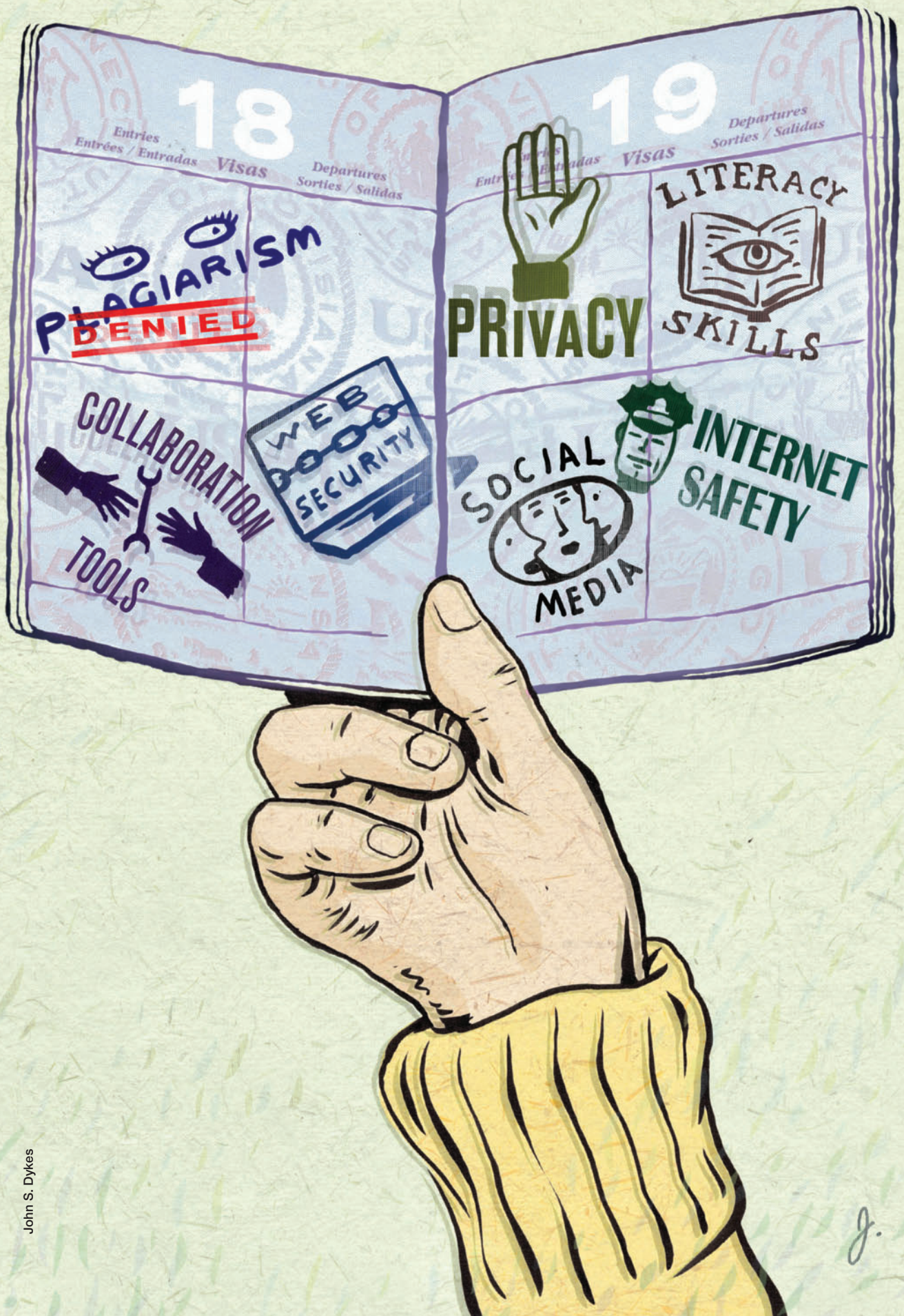
ADTRAN®

Almost since the moment the notion of the modern classroom first arose, schools have been charged with the task of producing good citizens—human beings with the necessary skills and knowledge to participate effectively as responsible members of society. But how has our definition of a "good citizen" changed over the ages? **By John K. Waters**

i pledge allegiance...

becoming a 'good citizen' in the digital age

IN TODAY'S WORLD of near-ubiquitous connectivity, in which ordinary people have almost instantaneous access to unlimited stores of information and the ability to interact with anyone, anywhere, anytime, what does it mean to be an effective citizen? What skills and knowledge do our students need to participate fully in a world transformed by technology? What role should our schools play in developing effective digital citizens?

Ask a K-12 educator these questions and chances are the answers will have something to do with teaching proper behavior, displaying what they consider good manners, and setting appropriate prohibitions. Good digital citizens don't engage in cyberbullying, they might tell you. They don't give out too much personal information about themselves, and they don't post crazy videos on YouTube that will come back to haunt them in future job interviews.

But some educators, particularly those who think about this issue in higher education, will say that digital citizenship has less to do with safety and civility than participation in the worldwide online conversation—participation that requires a set of relatively sophisticated skills. But who's to say those questions, and those skills, must wait until our prospective citizens are college freshmen?

"One of the challenges and important priorities for K-12 today has to be broaden-ing our understanding of what it means to be a digital citizen," says Joseph Kahne, Davidson professor of education at Mills College in Oakland, CA, and chairman of the MacArthur Network on Youth and Participatory Politics, "so that we're talking about young people as producers and managers of information and perspectives, and not simply as people we need to keep safe and civil."

'A Day-to-Day Skill Set'

In his work, Kahne focuses on the connection between students' participation with digital media and their levels of civic engagement. He does not suggest that schools shouldn't make every effort to keep their students safe and civil. He does, however, argue that when they merely focus on this "thin vision" of what it means to be a citizen, they are not necessarily preparing students to become fully engaged digital citizens.

Not surprisingly, Kahne maintains there is little consensus among K-12 educators and their administrators on exactly which skills should be developed in an increasingly digital society. While they may be getting closer to an accord, he says, technology is evolving so quickly that a standard set of skills is hard to set in stone.

What it meant to be literate and write well may have changed little between the beginning and the end of the 20th century, but the digital revolution that has taken place in recent years indicates there are new forms students will need to master if they're going to be considered truly literate in the 21st century. The five-paragraph essay students have had to master for decades isn't going away, but digital forms of communication have different rules and limitations.

"We do have a sense of what [digital communication] skills should be," Kahne says. "The ability to find information, for example, has always been on the list. Also, the ability to judge the credibility of information. But now we're seeing things like the ability to present

SOCIAL MEDIA 101

PLAGIARISM, PERSONAL CONDUCT, PRIVACY. These are just a few of the complex issues related to responsible digital citizenship and ethics that students wade through every day on social media sites. But what exactly are these social media ethics, and how should kids learn what they need to know about them?

To help answer these questions, one Harvard research group has looked at the skill set required for effective digital citizenship from the perspective of ethics, and its lead researcher is working on a new curriculum designed to link ethical thinking skills with new media literacies.

Carrie James, a research director and principal investigator on Project Zero at the Harvard Graduate School of Education, heads up the research group, which has been working with other organizations, including Common Sense Media and Project New Media Literacies, to establish a concept of digital citizenship that encompasses what James describes as "the skills, knowledge, and ethical sensibilities that we feel young people need to participate successfully in new media environments."

James also co-directs the GoodPlay Project, a John D. and Catherine T. MacArthur Foundation-funded study of the ethical character of young people's activities in the new digital media, which includes online games, social networking sites, blogs, and other virtual communities. The project has conducted qualitative research with young people between the ages of 10 and 25 on the extent to which they think about the moral and ethical dimensions of their media use.

As a result of that research, the GoodPlay Project has collaborated with Project New Media Literacies to develop a curriculum titled "Our Space: Being a Responsible Citizen of the Digital World," a set of classroom materials designed to link ethical thinking skills with new media literacies.

James says ethical thinking skills include complex perspective-taking; reflection on roles and responsibilities; and consideration of community benefits and harms that may be associated with actions taken online.

The ethical issues the curriculum focuses on are divided into five thematic areas:

- Self-expression and identity
- Privacy
- Ownership and authorship
- Personal and information credibility
- Participation or conduct in online spaces

As an example of how the curriculum works, in the lesson "Should You Be in MySpace," students examine a fictionalized social network profile of a college student named Jeff and are asked to consider the extent to which his online conduct (and that of his online friends) is socially responsible. The "Authorship and Ownership" portion of the curriculum features a lesson that asks students to reflect on the line between inspiration and plagiarism by comparing original source materials with contemporary remixes and other forms of appropriation.

information online in compelling ways emerging as another basic skill of the digital citizen."

One simple way K-12 educators can help their students, Kahne advises, is by creating assignments that require them to build 21st century skills. In a survey conducted between 2005 and 2009, researchers in the Civic Engagement Research Group at Mills College queried 967 juniors and

classroom content—the students became more likely to do those things during their discretionary time," Kahne explains. "The kids who had been given assignments that required them to find different points of view online were more likely to be exposed to different points of view outside of schoo. If you teach someone how to do something well, or highlight the need to do it, they're more likely to do it."

are not geographically connected to them, Livingston says.

With the need to manage relationships in this geographically untethered digital community, what could be called a set of survival skills emerges, Livingston says. Among that set is a sense of what he likes to call information discernment.

"We learn on the playground to evaluate this person I'm speaking to who is

> ## "Our lives are so incredibly enmeshed with the digital. If you're going to be a good citizen, period, you have to be a good digital citizen."
>
> —Michael Wesch, associate professor of cultural anthropology, Kansas State University

seniors from 28 high schools in California about what Kahne calls "sort of a day-to-day skill set." The students, who came from urban, rural, and suburban districts, were asked how often they were asked in class to assess the trustworthiness of information; how often they were required to use the internet to get information about political or social issues; how often they were required to find different points of view about those issues; and how often they were asked to create something and publish it on the web.

"We found that, when young people are required to do those things—when they're part of the school assignments or the

The survey findings confirm—for Kahne, at least—the importance of encouraging K-12 educators to integrate into the curriculum the skills students will need later when they are in college and the workplace.

"Of course, there are some kids who would have done those kinds of things no matter what, and some kids you won't motivate very much no matter what," he says. "But if we leave these activities to the so-called self-motivated student, we're abdicating a big responsibility."

Social Responsibility

Just as any list of standard literacy skills may be in flux, so too a concept of social responsibility is evolving. According to Jeff Livingston, senior vice president of McGraw-Hill Education's College and Career Readiness Center, technology is changing the very definition of "community." In an analog world, he argues, good citizens are engaged productively with—and feel a responsibility to—their local communities: the neighborhoods, districts, regions, and states in which they physically reside.

The internet, on the other hand, transcends physical borders. Consequently, digital citizens engage both locally and with groups that are not necessarily connected with their geographic reality. A true digital citizen is simultaneously engaged with both local groups that are near where they live and with those that

standing in front of me physically," he says. "But who is this person I'm communicating with online without physical clues and cues? How do I develop a sense of discernment, and how do I keep private certain things about myself until I'm certain that this is someone who should be a part of my life? Just deciding where someone fits in your life is a cornerstone skill of the effective digital citizen, and something that teachers and parents are beginning to talk with students about in the first place."

Beyond Basic Skills

To some observers, all this talk of required skills is not that complicated. Mark Frydenberg is a senior lecturer on computer information systems at Bentley University, a technology-focused business school in Waltham, MA. He defines a digital citizen as someone who uses web-based communication and collaboration tools as part of his or her daily routine to share ideas, plan activities, and stay in touch with others. His version of digital citizens blog, comment, like, chat, tweet, connect, and follow.

Given that definition, Frydenberg's list of skills every student needs to engage effectively in the ongoing online conversation is fairly straightforward. It includes basic computer literacy skills: how to use databases and spreadsheets, for instance, and how to maintain a computer. It would include some basic web literacy skills:

Digital Defined

Watch culutral anthropologist Michael Wesch discuss the tools today's students need to be good digital citizens at *thejournal.com/citizenship*.

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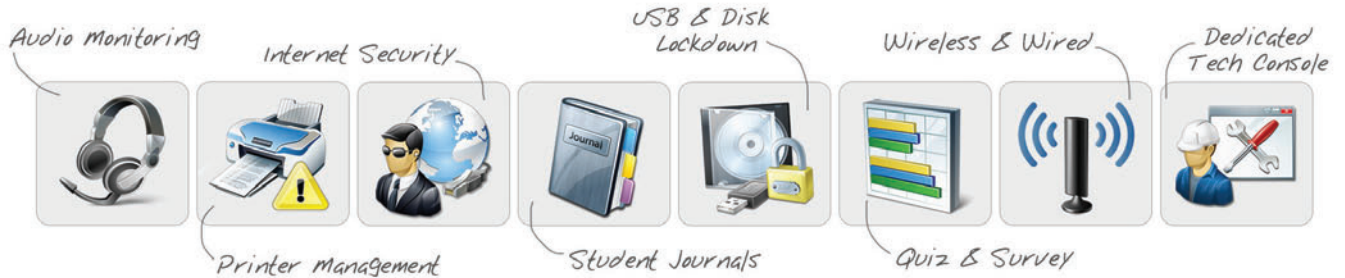
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how to distinguish between information that is credible and deceptive; how to manage information (and how to determine, for instance, if it is private and secure); and how to understand the difference between synchronous communication (chat, Skype, instant messaging) and asynchronous communication (e-mail, VoiceThread).

Frydenberg also believes those basic web skills should include how to create a web presence beyond Facebook (blogs, wikis, Twitter, websites, etc.); how to tell the difference between personal and professional presence online (Facebook vs. LinkedIn); and how to use online collaboration tools.

Finally, he would add two skills he feels are essential before one can be granted full digital citizenship: first, the ability to make the leap from the consumer use of the web to using communication and collaboration tools as enterprise tools and, second, how to use search engine optimization (SEO) in the workplace.

But not everybody believes the path to digital citizenship is simply a list of skills that can be checked off once mastered. Helen L. Chen, a research scientist at Stanford University's Center for Innovations in Learning, agrees that K-12 schools need to give students technical skills that will serve them after they have left the classroom. But to Frydenberg's list she would add more foundational disciplines that go beyond the ability to use technology skillfully—and yet hark back to the kinds of skills and values parents and teachers have always worked to teach and instill in students.

"Knowledge about technology and the ability to navigate the web and social media are no replacement for the very basic foundational skills of critical thinking, written and oral communication, and, increasingly, flexibility, teamwork, and the ability to adapt to new working environments and collaborate with people from a wide range of backgrounds," Chen says. "In my opinion, developing those skills is

a process that requires some degree of rigor, self-reflection, and self-understanding."

Susan E. Metros, deputy CIO for technology-enhanced learning and a professor of visual design and clinical education at the University of Southern California in Los Angeles, agrees that being a discriminating consumer of online content is not enough. "We teach them to read, we teach them to speak, so why don't we also teach them to see?" Metros asks. "We have a responsibility to give them, not only the skills, but the theory and the context to understand the ethical implications of media."

Kahne agrees, adding schools need to take more responsibility for providing that context. "Many kids know a lot about producing content and being creative online, but it isn't always clear how much the schools have done to develop and nurture those skills," he says. "Many students have simply done it on their own—which, of course, is also one of the exciting things about online spaces: the possibility of doing it on your own. But some youth take advantage of those opportunities, while many don't. The key role of the schools is to make sure that everybody develops these skills and that they all have access to them."

Encoding and Decoding

Michael Wesch, an associate professor of cultural anthropology at Kansas State University, goes a bit further and suggests that fully prepared digital citizens have the ability to see "see behind the curtain" and to create, not just their own digital content, but their own digital *tools*.

"This notion of digital citizenship is no longer about the old questions about the quality of sources," Wesch says. "We've been asking those questions forever." Nor is it merely about computer literacy—what he calls "netiquette." It doesn't stop at critical thinking either.

"The newer, more interesting questions that are, I think, unique to the digital world revolve around things like algorithms," Wesch says. "When my students are freshmen, I try to get them familiar with the digital space in a new way, to begin to give them a sense that what they're seeing on the screen is *encoded*. By the time they're seniors, my hope is that they not only see those structures, but start to manipulate them and put things together in new ways."

Wesch is a researcher, but he is also an active developer of innovative teaching techniques, including the World Simulation Project, which is the centerpiece of KSU's Introduction to Cultural Anthropology course. He describes the project as "a radical experiment in learning, created in a fit of frustration with the large lecture hall format which seems inevitable in a gigantic classroom of as many as 200 to 400 students."

Understanding that what a person sees on a screen is a construct created by somebody is part of "building a scaffold toward digital citizenship," Wesch says, and the next step to take.

"Our lives are so entwined with the digital—so incredibly enmeshed in the digital," he concludes, "that, if you're going to be a good citizen, period, you have to be a good digital citizen." the

John K. Waters is a freelance journalist and author based in Silicon Valley.

LINKS /////////////////////

- **KSU World Simulation Project**
  mediatedcultures.net/worldsim.htm

- **Project Zero**
  pzweb.harvard.edu

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PROFILE

LINDA M. CLAUTTI CHIEF EXECUTIVE OFFICER, URBAN PATHWAYS CHARTER SCHOOLS, PITTSBURGH

>> MAKING COLLEGE A REALITY

We have operated a school for grades 6 to 12 since 1998, and last year we opened a K-to-5 school. About 90 percent of our student population comes from homes that live in poverty. We take these students who are from at-risk environments and get them into college. When I arrived here in 2003, no one was even talking about college. Since then we have had a complete change of culture, and technology has been a big part of that.

With the past two graduating classes, 100 percent of our students have been accepted to colleges. This year, all of our seniors have applied, with 90 percent of those applications going to four-year schools.

There was no technology here in 2003. Now we have a full-time technology director, we are wireless in both buildings, computers and whiteboards are in every classroom, and we have teachers and students who are engaged.

>> INVESTING IN THEIR FUTURE

We give laptops to all of our high school students, which are theirs to keep upon graduation. It's both an incentive for them to graduate, as well as a tool they're going to need when they get to college. These are kids who wouldn't be able to afford a laptop on their own, and yet we know that everything at the college level is electronic.

Buying these laptops every year is a lot of money, but we strongly believe that if we want to promote college and have these students be college-ready, they need to have college tools—and that to do that we need to start early, because their home environments don't always support technology.

>> LET ME COUNT THE WAYS...

We've made technology a priority in our budget. We're part of the E-Rate program, which allows us to have a good infrastructure for the technology, and we take advantage of grant opportunities. We just received three Heinz Endowment empowerment grants for technology-based initiatives.
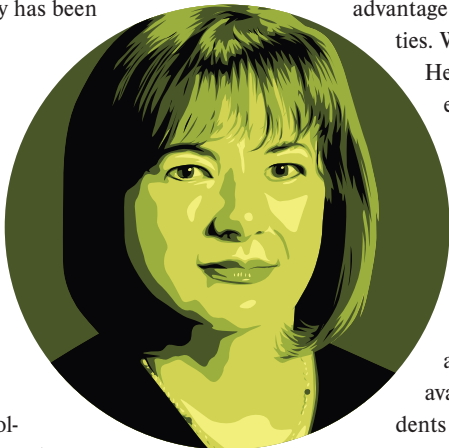
We're partnering with Carnegie Mellon University in the lower school on a project in which they are creating interactive avatars to help our students with behavior modification and language issues. Our high school teachers put their assignments on EDU 2.0, which is a free service, and we're using it to have teachers collect survey information from the students.

We have a media literacy class where students collect data using Flip cameras and then put together their own productions in which they're creating music through technology and creating their own logos. With her Heinz grant, one teacher is using iPads to improve writing and reading.

>> INCENTIVES FOR TEACHERS

Technology is part of our pay-for-performance for teachers. We expect our teachers to stay on top of the technology and to use it as an instructional tool. By doing so, they

show students how it's used in their daily lives. But it's not just a question of whether teachers are using technology themselves; it's also whether their students are. When the principal and other administrators go in to evaluate these teachers, they are looking for evidence that the technology is used not only by the teachers, but that it is also used by the students.

>> FACING THE FUTURE

As an administrator for many years, I had avoided technology, but in 1994 I found myself president of a high-achieving, all-girls academy and realized they had no technology and that was a problem. So I surrounded myself with people who knew it.

>> CLOSING THE GAP

Technology is most important for students who come from impoverished backgrounds, because they don't have access to the things kids from the wealthier neighborhoods have. We've tried to create an environment that will allow our students to be on an equal footing with their counterparts so that when it comes time for them to go to college, they're not intimidated. Technology really helps to close the gap. the

Daniel Hertzberg

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