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March 2016 | Volume 43, No. 2

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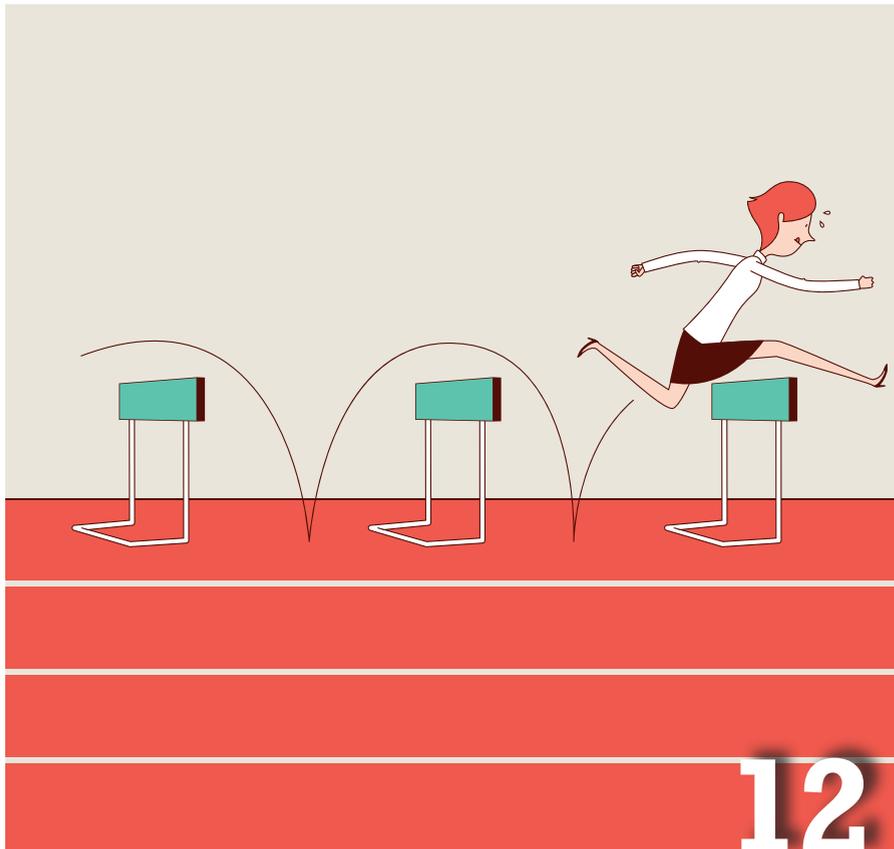
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It's Time to Plug the School-to-Prison Pipeline

THE SCHOOL-TO-PRISON

pipeline is far and away to most tragic unintended consequence of what is otherwise one of our nation's most noble public enterprises — free education for all.

By the most recent national data available, some 300,000 students are referred to law enforcement by their teachers or school administrators annually. That's 300,000 American children whose futures are being stunted by the institutions established for the express purpose of nurturing their futures and fostering their growth.

The causes, costs and consequences are, of course, complex. The causes can be as subtle as misunderstandings resulting from personal bias — the poor, students of color, the disabled and LGBTQ students are disproportionately affected — or as obvious as the predictably disastrous results of ill-conceived zero tolerance policies.

In some states, the problem of law enforcement referrals became so bad in recent years that the United States Department of Justice intervened; DOJ has also issued guidance to all schools aimed at cutting down such referrals.

The American Bar Association (ABA) too has taken notice — and the implication of that development should be obvious to every school administrator.

In 2014, the ABA formed its Joint Task Force on Reversing the School-to-Prison Pipeline, which just released its preliminary findings last month, confirming that schools do indeed dole out discipline disproportionately to some groups.

“The causes of the school-to-prison

pipeline are many, complex, and inter-related. These include criminalization of school discipline and the increased presence of law enforcement officers in schools. Throughout these causes runs evidence of

implicitly biased discretionary decisions, which, unintentionally, bring about these results,” the ABA report noted.

Further, none of these policies has led to any improvement in school safety or reductions in school violence, ABA noted.

So what's to be done?

Zero tolerance has to go, for one. It has achieved nothing, and it has hobbled the potential of too many of America's youth.

The ABA task force agrees with that statement. In its report, the elimination of zero tolerance was among its specific policy agenda items. Other task force recommendations included:

- Providing legal representation and training more lawyers to represent youth “at the point of exclusion from school”;
- Pushing for more detailed reporting requirements for school disciplinary actions; and
- Pushing for legislation to ease back on heavy discipline for low-level offenses.

The task force also recommended working with educators and police to train them on appropriate uses of discipline.

Regardless of where you stand on the issue of discipline or zero tolerance, change is coming, and you'd better be prepared. You can find the newly released preliminary report at jjie.org. 

To continue the conversation, e-mail me at dnagel@1105media.com.



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Many of the students in Owens's class have learning disabilities or other special needs such as autism that create challenges with communication and socialization, so they often use pictures and other visuals instead of spoken or written language.

5 Ways Teachers Are Opening Up the World to Special Education Through Technology

Teachers who work with special needs students are finding that technology can not only broaden their students' experiences but engage them in learning, help them retain information, improve their socialization and boost their self-esteem.

O**N WORLD** Global Collaboration Day Sept. 17, 2015, students with special needs from Finland, Sweden, Germany, South Africa and the United States shared videos with each other introducing themselves and their school. The event kicked off an extended online global collaboration between the students, called the SMARTee Project. The students use SMART Amp technology to collaborate online and teach each other about their local cultural traditions and events.

The six special education teachers from around the world first met and formed the idea for the collaboration at SMART Technologies' Exemplary Educators conference last summer. While attending the conference, they found they had more in common with each other than with the general education teachers in attendance.

"We were talking about some of the challenges that we have compared to a general education teacher," said Brianna Owens, a special education teacher at Petroglyph Elementary School in Albuquerque, NM. "We do things so differently, but special ed really does look very similar on the global scale, be it South Africa or Germany or Finland,

and so we talked about how we could meet some of the challenges by having our kids work together."

Other teachers around the United States and the world have also discovered the power of online global collaboration projects for students with all types of special needs. Students who have severe or multiple disabilities, those in inclusive classrooms, and those who struggle with verbal communication and face-to-face socialization are using technology to connect with all types of kids around the world and are feeling more engaged in the learning process through this inclusive online environment.

Connecting Across Cultures

Students in the SMARTee Project are using SMART Amp software to share their work with the other classes, create workspaces for each other to use and collaborate within a shared workspace. Owens's students taught the other classes about the Albuquerque International Balloon Fiesta, an annual event featuring hundreds of hot air and gas balloons. "This is a project I would teach my kids every year, but this year it really took it to that next level because they had to understand it at a level to be able to go back and teach other

students,” said Owens.

Many of the students in Owens’s class have learning disabilities or other special needs such as autism that create challenges with communication and socialization, so they often use pictures and other visuals instead of spoken or written language. Owens said those communication differences can create barriers to interaction with the general education students in the school, but they actually facilitated communication with students in non-English-speaking countries because all of the students could understand picture communication, regardless of their language. Owens quoted Jörgen Holmberg, one of her SMARTee Project colleagues, who said, “Many of the students have problems collaborating with a student sitting next to them or even talking to the kid next to them. That’s a huge barrier. But with our kids it’s easier for them to collaborate with a kid sitting in another country.”

The goal of the SMARTee project is to help the students “understand their own differences but also understand that our similarities make us more alike than different,” said Owens. “My students understand on a daily basis that they’re different, and not always in a positive way. This project gives them a chance to understand and embrace those differences and understand that, wow, I might be American and this student is German, but this kid looks like me or writes like me or this kid has the same disability that I have, and so they have that connecting element.”

Learning by Helping Others

Michael Soskil is a science teacher at Walenpaupack South Elementary School in Newfoundland, PA, and in the two previous years he worked as a curriculum coach for his district, collaborating with special and general education teachers to come up with exceptional learning experiences for the students. Many of those experiences were online global collaboration projects.

One of the inclusive classes with both special and general education students participated in a musical exchange project

with a group of children in the Kibera slum of Nairobi, Kenya, where about 250,000 people live in extreme poverty in an area approximately 1.5 square miles in size. Soskil’s students took a personal interest in the students in Kibera and began a video exchange project, where the Kenyan students would record videos to teach the American students some Swahili, and the American students would record videos to teach the Kenyan students some math concepts. Soskil’s students with lower-level math abilities participated by teaching simpler math concepts to the younger Kenyan students. “We know that when kids teach they retain 90 percent of what they learned, rather than when they consume, they only retain 20 percent,” said Soskil. “And so for them to create videos on their own to teach was pretty powerful.”

Through their involvement with the online collaboration projects, Soskil’s students became concerned about the living conditions of their friends in Kibera. They learned about the water crisis facing all of Kenya and then organized a campaign in collaboration with students in Kansas and Greece to help get clean drinking water for the Kenyan students. “What we know about learners, whether they’re special ed or regular ed, is that in order to transfer information from short term to long term memory, they have to have an emotional connection with what they’re learning,” said Soskil. “And especially children that have different learning disabilities that are in special ed classrooms, need that emotional connection to really make learning gains. And what global collaboration does, especially when it’s on a meaningful topic, where kids are doing good in the world, is it really creates those emotional connections that allow kids to hold onto information.”

Cross-Cultural Collaboration

The Global Virtual Classroom is a source of free online educational resources. Every year it runs a Web design contest, where three classes from around the world have to collaborate to develop a site on a common theme while incorporating unique elements from each of the three schools. Janet Barn-

stable, a retired grade 7 and 8 technology teacher from Percy Julian Middle School in Oak Park, IL, participated in the contest for many years and won first or second prize on numerous occasions.

While Barnstable was not a special education teacher, many students with special needs took part in her elective technology class, and she said it helped them feel good about themselves because they could use technology to take advantage of their strengths or overcome their areas of weakness. “For example, those who were good at drawing had [Adobe] Photoshop Elements to be able to express themselves in art. Those who were terrible at spelling could use the text-to-speech features of the [Apple] Mac,” said Barnstable.

By collaborating with the students in other countries, Barnstable said, those students improved their social skills and gained confidence. Because they were developing a public site, they double-checked their work to make sure things were correct. And because some of the other students weren’t native English speakers, Barnstable’s students became the language experts and learned to gently correct English errors of their peers.

“So they, who had been taught negative things almost all of their life about themselves, were here learning how to speak positively and reinforce other students’ skills,” she said.

Developing Leadership Skills

At Park Avenue School in Orange, NJ, students with special needs in grades 6 and 7 led a school-wide recycling project after connecting with Community Recycling through Microsoft Skype. The multiply disabled students learned about what kinds of materials can be recycled and how the recycling process works. They also learned about the organization’s Shoebox Recycling program, which collects gently used shoes for shipment to third-world countries. The students decided to contribute by collecting used shoes from the school and community, for which Community Recycling pays the school a small amount of money per pound of shoes collected.

To advertise the program to their schoolmates, the students created a rap video and performed a skit. They placed shoe collection boxes throughout the school and were responsible for tracking the number of shoes they collected, the condition of the shoes, how much they weighed and how much money they received as a result. “It gives them some degree of responsibility, and so we thought it would be good, and they seem to enjoy it,” said Robert Coles, the special ed teacher who leads the project.

The students have also become the liaisons for the school’s recycling program and are responsible for weekly monitoring of the recycling bins in each classroom. It’s their job to ensure that only recyclables are placed in the bins, and they notify the teachers if the bin in their classroom

contains non-recyclables. “It builds responsibility; it builds teamwork; and it builds a sense of pride in each of the students,” said Coles. “They have these shirts that they’re wearing, which lets the school know that they’re part of that recycling team, and I think that that pays great dividends for each of the students as individuals in terms of building their self esteem.”

Reducing Communication Barriers for Nonverbal Students

Sharon Alterman teaches middle school-aged students with severe and multiple disabilities at the Charms Collaborative, a special school for students with low-incidence disabilities in Stoughton, MA. Her students have significant intellectual impairments

combined with physical impairments, neurological impairments or visual impairments.

Alterman has non-verbal students who use augmentative and alternative communication (AAC) as their primary means of communication. “AAC is a very slow means of communication; even for fluent communicators, it’s still much slower than spoken communication. And people won’t necessarily wait,” she said. The iPad AAC app her students use, AssistiveWare Proloquo2Go, interfaces directly with Twitter. Alterman has found that by involving her students in online global collaboration projects through Twitter and other online tools, “they can communicate using their primary means of communication and not have any barriers. Everyone’s communicating the same way. Unless somebody says that they’re communicating with AAC, nobody would know, nobody has to know, and that’s extremely powerful.”

Last year, Alterman and her students started using Twitter and other online tools to participate in several global collaboration projects, including the Summer Math Photo Challenge, where students post photos to illustrate weekly math concepts; the Global Read Aloud, where students around the world read the same book and connect online; the Not Perfect Hat Club Global Blogging Challenge, where students read The Not Perfect Hat Club and blog about the book; and the Global Math Task Twitter Challenge, where students complete math tasks and post their results.

Alterman said her students loved making peer connections through the online collaborations and were very motivated to participate. “We hear a lot in special ed about, ‘You should walk into the classroom and not be able to tell the special education students from the typical students.’ Well, I’m sorry; you see my students, and you’re always going to be able to tell because it’s the way they present and the way they communicate. You’re always going to know, but this is the one universe in which nobody has to know, and that’s extremely powerful.” 

Leila Meyer is a technology writer based in British Columbia.



Above Left: Visual tools used in Owens’s SMARTee program
 Above Right: One of Alterman’s students at the Charms Collaborative
 Owens said this year her students had to take their project to the next level because they had to understand the project well enough to be able to go back and teach other students.

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Allowing Technology to Amplify Quality Teaching

IN 1913 THOMAS Edison declared that motion pictures were going to revolutionize education, estimating that individuals only absorb 2 percent of the material they read but 100 percent of what they see on film. When television came along in the 1950s many thought it was going to revolutionize education. President Kennedy was so sure about television's power he convinced Congress to authorize \$32 million for classroom television programs.

Today school districts are looking to mobile devices and laptops to revolutionize education. Without question these devices have the potential to be effective tools. However, without quality adult supervision they are merely cognitive candy, warns Kentaro Toyama, W.K. Kellogg Associate Professor of Community Information at the University Of Michigan's School Of Information. Toyama spent a decade designing technologies for education and witnessed technology implementation strategies that worked and ones that failed. Over the years he's developed the Law of Amplification, which districts and teachers can follow to ensure their technology workers harder and smarter.

Toyama's Law of Amplification states that teachers who are motivated and committed to education and have sufficient time to learn about technology and integrate it into their lessons will positively exploit technology. The technology amplifies their positive pedagogical qualities. On the other hand, teachers who are unmotivated or those who are motivated but are not trained on the integration of technology or not supported by their administration will have little success using technology in their classrooms. "The defining factor about whether technology is used well in the classroom or not is the

degree to which the teachers are committed and prepared to use the technology," said Toyama, who details his law in *Geek Heresy: Rescuing Social Change from the Cult of Technology* (PublicAffairs).

Beware Those Blingy Rewards

Providing mobile devices to students without quality adult supervision is like giving dessert to children before they have had their dinner, said Toyama. The cognitive candy effectively kills the students' appetite for truly nutritious education. To prevent this from happening school districts must be careful and vigilant with their spectra and use of technology in the classroom.

As technology advances, students expect just the blingy rewards without putting forth the cognitive work, said Toyama. This is exactly the opposite of what districts and their educators should be doing. Instead teachers should be offering the blingy rewards sparingly to develop an intrinsic motivation to learn rather than motivating students extrinsically.

Toyama is not the only technology

Keep Schools Secure to Keep Learning

A robust IT security system can prevent cyberattacks, meet federal and state regulations, and protect student and faculty information.

Security experts estimate 15 percent of all data breaches happen at educational institutions. “Today’s constant cyberthreats have devastating, crippling effects on our school systems,” says Keith Krueger, CEO of the Consortium for School Networking (CoSN). “Only a robust, current IT security system can help safeguard against cyberthreats to a school’s technology infrastructure and data assets.”

A data breach is defined as when sensitive, protected, or confidential data is lost, stolen, or put at risk. A weak IT security system can leave the door open for malware and viruses, distributed denial of services (DDoS) attacks, criminal and “recreational” hacking and more. “It’s not a matter of if you’re going to get breached. It’s a matter of when,” says Peter Streips, president of Network Security Group.

Since 2005, The Privacy Rights Clearing House’s Chronology of Data Breaches has tracked more than 10 million education records that have been compromised, either through “unintended disclosure” (sensitive information posted publicly on a website or sent to the wrong party) or “hacking or malware” (electronic entry by an outside party, malware and spyware). Yet this is just “the tip of the iceberg” when it comes to data breaches, says Beth Givens, Executive Director of Privacy Rights Clearinghouse.

Here are several recent examples of data breaches in K-12:

■ **May 2015:** Unauthorized individuals gained access to the



student information system at San Dimas High School, San Dimas, CA, and changed the grades of several students. The suspects also downloaded personal student information, including social security numbers, birthdates, and medical information.

■ **July 2014:** The Park Hill School District in Kansas City, MO, notified parents and faculty a data breach had potentially compromised personal information of more than 10,000 students and district employees, including social security numbers, student records and employee evaluations.

■ **November 2015:** The Salt Lake City School district experienced a DDoS attack. These are designed to disrupt or disable the district’s information network (as opposed to actually accessing information about students or employees). A similar cyberattack on the Kentucky Department of Education’s Infinite Campus information network in

August 2013 tricked hundreds of thousands of computers around the world into sending signals to the Infinite Campus portal, jamming up the firewalls.

Such attacks on school district networks aren’t unusual. Jeremy Cox, an information security officer with the Washington County School District in Utah, the only district in the state with full-time cyber security personnel, says their district’s systems are being attacked “all the time.”

THE TRUE COST OF A DATA BREACH: ECONOMIC, MORAL, AND LEGAL

The cost for school districts to fully recover from a data breach can run into tens of thousands of dollars, not to mention the cost of network downtime. Those costs include working with experts to remove viruses or malware, as well as the cost of notifying students and parents about the breach. According to a 2014 study, the education sector

(including higher education) has the second highest per capita cost of cleaning up from a data breach, estimated at \$294.

At colleges and universities, the costs of a data breach can reach astronomical proportions. The Maricopa County Community College District in Maricopa County, Arizona, is one of the largest community college districts in the United States, serving more than 128,000 students. A 2013 breach there ended up costing a whopping \$18 million dollars for repair of the security system and notifying 2.3 million current and former students, staff and vendors that their social security numbers and other sensitive data may have been exposed.

THE LEGAL SIDE

Given those statistics, data security in education is clearly an economic necessity. However, it's also a moral and legal responsibility. "These days, schools across the country are being held to a rigorous legal standard for

Family Educational Rights and Privacy Act (FERPA) that protects the privacy of student education records from unauthorized disclosure and the Children's Online Privacy Protection Act (COPPA). That requires operators of online sites and services directed at children under the age of 13 to provide notice and obtain permission from a child's parents before collecting personal information from that child.

Perhaps chief among the federal regulations, however, is the Children's Internet Protection Act (CIPA). This was enacted by Congress in 2000 to "address concerns about children's access to obscene or harmful content over the Internet."

Part of that legislation, which was updated in 2011, specifically precludes schools and libraries from receiving discounts offered by the E-rate program unless they certify they have Internet safety measures in place that block or filter obscene or harmful content over the Internet. Internet safety policies must also

exposure of plaintiff's private information." This is regardless of whether that information was ever used for nefarious purposes. While this case pertained to medical records (not school records) that were "inadvertently made accessible to the public," it foretells the potential for similar education-related lawsuits in the future.

As more student data is collected and stored, parents are becoming more concerned and questioning the necessity of collecting such student data, especially when only an estimated half of K-12 schools use encryption to scramble sensitive and private data. A data breach at a school in Nashville, for example, exposed the Social Security numbers of more than 18,000 students. As one parent noted at the time, "If schools want that information, there should be some sort of penalty paid if they don't guard it with their lives."

Amelia Vance, director of education data and technology for the National Association of State

"Parents want to know data schools have can be protected, but when you're dealing with data, there's always a level of danger."

—Amelia Vance, director of education data and technology, NASBE

data security—one that leaves little room for error, but substantial room for legal liability," according to a published report in THE Journal.

Over the last twenty years, the federal government has enacted several laws in an effort to protect student privacy and information. That's understandable given the fact that some security experts say educational institutions, including higher ed and K-12, present "the most attractive targets for data privacy crimes." In fact, one estimate suggests more than 140,000 children are victims of identity theft each year.

Federal regulations include the

include the monitoring minors' online activities.

It's not just federal laws that present Internet security challenges to school districts. School officials must also be aware of their own state laws regarding data security and breach reporting requirements. As of January 2015, only three states—Alabama, New Mexico, and South Dakota—have no laws related to security breach notification.

Why are these state laws so important? A recent Massachusetts Superior Court decision stated a plaintiff could sue for financial damages based on "the mere

Boards of Education, agrees with that sentiment, yet also takes a realistic view. "Parents want to know the data that schools have can be protected," she says, "but when you're dealing with data, there's always a level of danger."

To help educational institutions understand the complexities of data privacy, confidentiality, and security practices, the U.S. department of Education created the Privacy Technical Assistance Center (PTAC). This is a "one-stop" resource for education stakeholders to learn about data privacy, confidentiality, and network security. Among its other services,

the PTAC recently released a security checklist designed to help school districts develop privacy programs.

CYBERSECURITY: A TOP PRIORITY

Given the growing threat to school district networks, the potential costs of cleaning up cyberattacks, federal and state privacy regulations, and the potential legal liability a district might face in a data breach, it's no wonder that cybersecurity has become a top priority in K-12 education. IT professionals and other district officials are demanding network security tools to mitigate risks, including appliances that can support deep visibility into network activity, integrate security policies for multiple outside devices, and maintain detailed recording-keeping.

Next-generation firewalls (NGFWs) and unified management solutions provide the best defense for protecting a district's network. "Next generation firewalls are very efficient at monitoring and properly protecting an organization's network," says

a critical function for CIPA compliance, not only in school but at home when students use school-issued device to connect to the Internet.

■ **Application control:** This allows, for example, YouTube for Schools, but blocks its recreational use. At a public school outside of Boston, for example, IT officials discovered the second most used app by students was a streaming music service. Next-generation firewall technology eliminated student access to the streaming music service.

■ **Bandwidth management:** This controls ingress and egress traffic, helps prioritize traffic, and can ensure key services don't suffer from slowdowns.

■ **Central management:** This helps you manage multiple network security devices and applications. Centralized management not only simplifies the process, but also controls costs.

After deploying NGFWs, IT officials and other education stakeholders can feel confident their infrastructure

provide threat prevention for both wired and wireless network, filtering of objectionable content and Web sites, and easy management.

The first step in achieving that goal, says CoSN's CEO Krueger, is to analyze the security systems a district currently has in place and assess how those systems can be improved to mitigate dangers. For many school districts, their network infrastructure has developed over time—almost haphazardly—creating a heterogeneous mix of non-standardized systems. At the same time, school districts have had their firewalls in place for a long time, even though state-of-the-art in firewall protection has developed substantially over the last few years.

Next generation firewalls can help school districts strengthen and secure their network, meet requirements for CIPA and other regulations, and ultimately help expand and enhance teaching and learning. But schools can only achieve those goals when all

“Security in an organization is not specifically an IT responsibility. It's everyone's responsibility.”

—Ed Kelty, CIO, Maricopa County Community College District

Dr. Eric Cole, a faculty member at the SANS institute, a research and education organization.

NGFWs offer advanced capabilities for catching threats and combining multiple functions into a single device, including:

■ **Deep packet inspection:** This targets traffic irregularities or encrypted malware.

■ **Integrated intrusion detection and prevention capabilities:** These ensure that traffic doesn't have to pass through separate security layers and performance doesn't suffer.

■ **Content filtering:** This distinguishes good traffic from bad,

will provide a safe and secure digital learning environment for all students. At schools throughout the country, educators are striving to meet the demands of providing students with 21st century learning and skills through technology, whether for collaborative and/or personalized learning, Web-based applications, Internet research, or online testing and assessments.

The primary challenge here is to harness the technology while staying ahead of the ever-present, ever-evolving threat of a data breach or cyberattack. To accomplish that objective, K-12 IT administrators are looking for scalable solutions that

education stakeholders take an active role in helping schools secure their networks.

As Ed Kelty, chief information officer at the Maricopa County Community College District, puts it, "Security in an organization is not specifically an IT responsibility. It's everyone's responsibility."



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“heretic” out there. In fact, while many poor school districts are doing everything possible to get more technology into their schools, wealthy, well educated parents are asking the districts that educate their children to pare down the technology and provide more adult guidance. Lakeside School, a private high school in Seattle whose students are the scions of the Pacific Northwest elite and that boasts Bill Gates among its alumni, has no dearth of technology. But what the parents of Lakeside students are really paying for is the extra adult guidance that is so important in a student’s education. Lakeside has a 9-to-1 student to teacher ratio.

Similarly, many tech company executives in Silicon Valley send their children to Waldorf Schools, where technology is banned up to the eighth grade.

“What this tells you is that the people who are at the center of the technology industry and who have had incredible educations themselves and have high hopes for their children and have the wealth to afford whatever educational system they prefer are asking for less technology in their children’s lives,” said Toyama.

Toyama and his ilk are not railing against technology, and they’re certainly not encouraging districts to ban it. What they’re saying is that the success of a district’s technology implementation plan is heavily dependent on the adults in charge, not the amount of devices in the district. It’s quality versus quantity.

Deploying Technology with Positive Results

To assist districts in successfully deploying technology, Toyama has identified three forces that must be present for technology to positively affect education: intention, judgment and self-control. When teachers use technology properly, it amplifies these qualities, allowing both the qualities and the technology to shine at their brightest, said Toyama. If any of these elements is missing technology is misused and becomes a distraction rather than a positive tool.

Good intention, which is typically ap-

parent in an educational context, provides that both the teacher and the student are focused on learning specifically for the child’s benefit. Good judgment, however, is a quality that is far more difficult to measure or break down.

“It often means that in the case of teachers they are making both short-term, moment-by-moment decisions and longer-term decisions about how to structure a curriculum that is in the best interest of the students they are teaching,” said Toyama. Sometimes good judgment means not using technology even when the lesson is about technology. “In many circumstances in which I have taught computer literacy skills to very young children, I found that having them close the laptops at their desk is an essential part of teaching them about the laptops themselves,” said Toyama.

Self-control, the third force, is the ability for a teacher to follow through on intentions. Teachers may place a limit on computer time in the classroom, for example, but drift over that limit for any number of reasons. Technology will only be effective in the classroom if the teacher has the discipline and self-control to make a concerted effort to shut down the mobile device. “All three of these components are necessary not just at the [teacher level] but at the school level,” said Toyama.

The 3 Habits of Highly Effective Technology

The best use of technology solutions in education is selective and targeted, according to Toyama. To ensure districts get the most out of their technology dollars, he created three rules that guarantee that a district’s technology amplifies the positive qualities of the teacher using the technology.

The first rule states that since technology amplifies underlying human forces, it is important that the stakeholders identify those positive human forces. These forces include the schools that are excelling and the teachers within those schools who are the best at what they do. Once identified these star teachers should be supplied with an abundance of the latest technology. “These

are the candidates where the addition of technology is likely to help,” said Toyama. Money spent on technology for ineffective teachers is merely wasted.

The second rule states that teachers should use technology solutions to amplify positive human forces. For example, providing a mobile device to an outstanding history teacher who is not technologically savvy won’t automatically enrich his students’ learning experience. But if administration works closely with this teacher to identify his teaching style and trains him on how to use the mobile device so that it amplifies his pedagogical intentions, his students will immediately reap the benefit of the newly deployed technology.

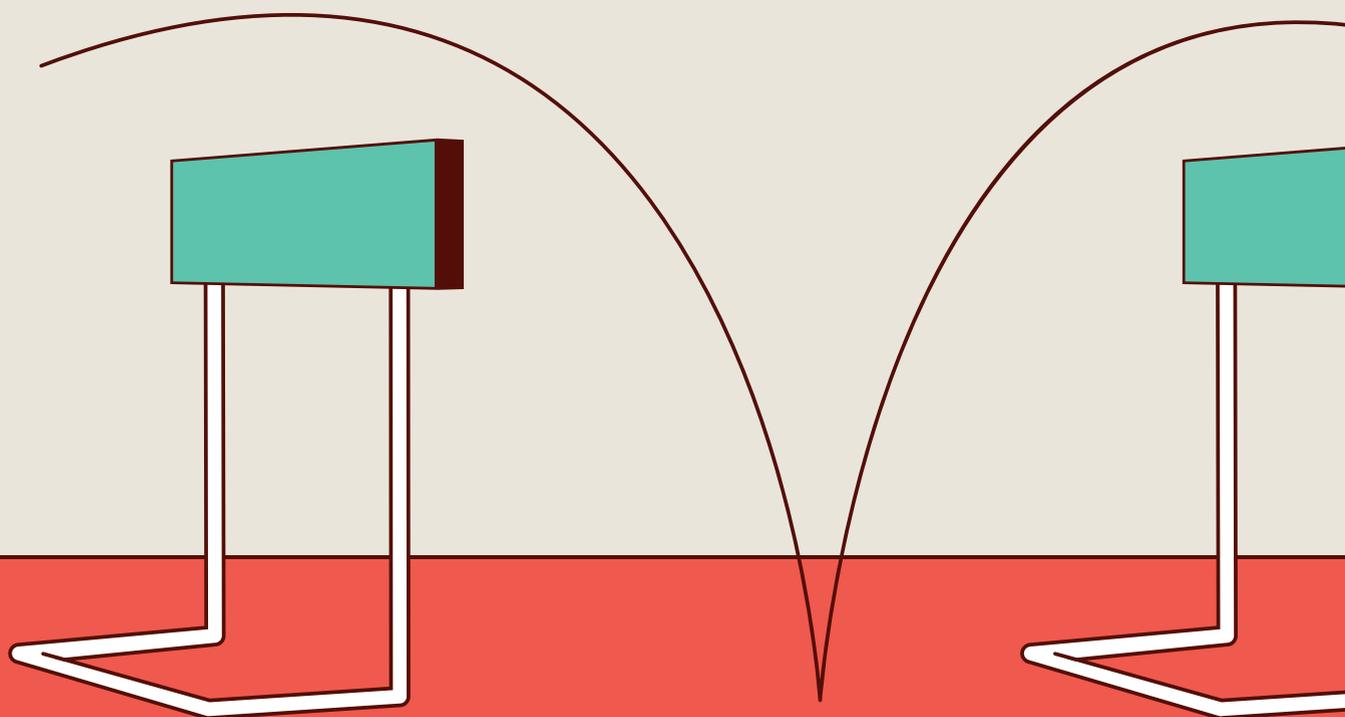
Toyama’s third rule states that schools should avoid indiscriminate dissemination of technology. “It’s kind of pointless to run these projects in which the goal is to distribute as many computers as possible to as many children as possible. Without understanding whether the students are in an educational context that is already working for them you don’t know if the technology is actually going [to be effective or not],” said Toyama. It was the indiscriminate dissemination of technology that caused Nicholas Negroponte’s One Laptop Per Child initiative to fail, in Toyama’s view.

As a rule Toyama bristles at technology initiatives that allocate mobile devices and laptops without considering the educational aspect of their use and determining whether the devices will amplify the positive qualities of the human resources using them. “Any project involving computing technology in education is always going to run up against one fundamental challenge: What children most want to do with technology is some form of entertainment. Unless there is a very deliberate attempt to ensure that children are using the technology in an educational productive way, more technology in the hands of children simply distracts them from their education,” said Toyama. 

Frank DiMaria is a middle school computer teacher and freelance writer living in Fort Mill, SC.

**FUNDING
TECHNOLOGY:**

E-RATE REBOOT REMOVES BROADBAND HURDLES

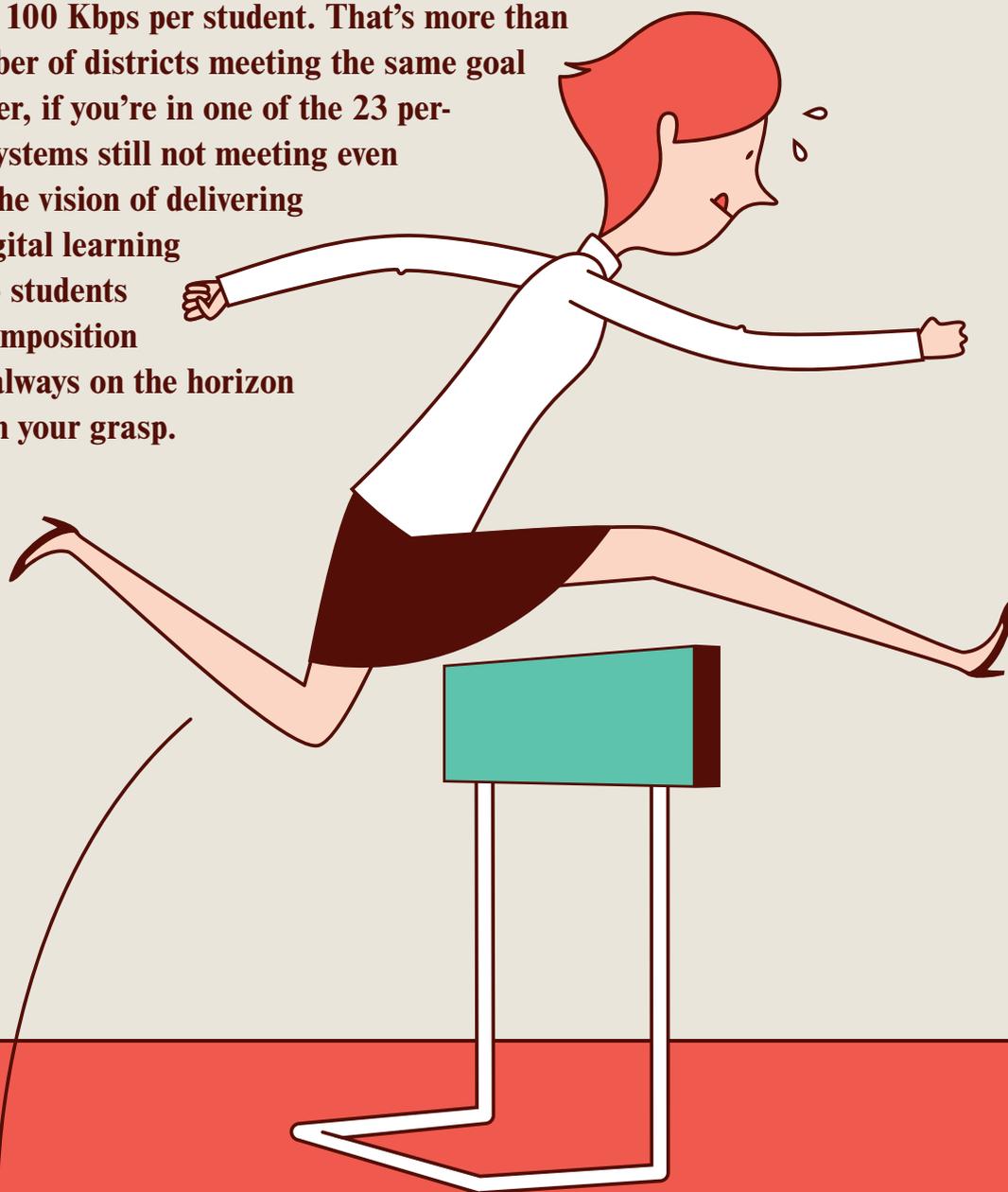


It has been more than a year since the FCC modernized E-rate. Here's how the latest developments are affecting schools.

BY DIAN SCHAFFHAUSER

According to the latest “State of the States” report from Education Superhighway, 77 percent of districts are meeting the FCC’s minimum Internet goal of 100 Kbps per student. That’s more than double the number of districts meeting the same goal in 2013. However, if you’re in one of the 23 percent of school systems still not meeting even the minimum, the vision of delivering personalized digital learning opportunities to students may have the composition of a mirage — always on the horizon and never within your grasp.

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However, when the Federal Communications Commission (FCC) increased E-rate's annual funding by \$1.5 billion at the end of 2014, a major hurdle — lack of funding — was removed that had prevented many schools from having adequate broadband and WiFi access. It was time to see if the mirage would take physical form.

More than a year after that E-rate “modernization,” the results are real, and they have dazzled.

“This isn't a typical Washington, D.C. ‘enact something,’ and then five years later you start to see it play out,” observed Funds For Learning CEO John Harrington. “This is literally being felt today in classrooms and in libraries across the country, which is a really good success story.” Harrington's company serves as an advisor to E-rate applicants.

Extra Money Makes a Difference

First, there were more funds committed to applicants in 2015 than there have ever been, at least since 2012: \$3.9 billion. (In 2012 a total of \$4 billion was committed, exceeded in 2010 with a \$4.3 billion level of commitment.)

But more important, said Harrington, was the turnaround time and the type of services being funded. The Universal Service Administrative Company (USAC), which handles management of E-rate for the FCC, has “never gotten this much money committed this quickly,” he noted. On top of that, the funding commitments cover both off-campus Internet access and telecommunications services (the “category 1” services) and the on-campus piece, the internal connections, which falls onto the list of “category 2” services.

“That is what has been missing since

2012,” he emphasized. By the time category 1 funding was doled out, there was nothing left for category 2. “For most schools and libraries that was almost a deal breaker. It's great if you can bring fast connections to the school building. But if there's no way to access that, if there's no WiFi signal to connect to, then what good is it?”

In other words, that extra money offered up by the FCC has come in handy. Of the \$3.9 billion locked up in 2015, \$1.517 billion was committed to the components of high-speed broadband connectivity and broadband internal connections, just like the agency promised.

Analysis by Funds For Learning shows that applications for 2016 are dominated by the need to purchase switches (referenced in 2,336 category two requests as of Jan. 8, 2016), wireless access points (2,015), cabling (1,695), wireless controllers (1,059) and fire-wall services and components (1,037).

As a spending category, switches and routers are the biggest need. For 2015, the pre-discount demand for those totaled \$888 million. “That makes sense. Those are more expensive than WiFi boxes,” Harrington noted. Compare that to 2013 and 2014, when funding on either category was zero. “So we went from zero to a billion dollars,” he added. And already 84 percent of applicants have begun their implementation work.

More Deliberate Planning

Another change introduced for 2015 was the “rolling funding cycle,” which granted every school district that applied \$150 per student multiplied by its discount rate, to be spent on infrastructure needs over the course of five years. (For the tiniest schools the change set minimum funding

of \$9,200.) Suddenly, there was no need to rush to cover every possible upgrade required now or in the near future. What that change brought was better planning on the part of the district.

As Harrington explained, the average district discount was 76 percent in 2015, which meant on average a school system would have \$114 to spend over five years per student on bolstering its internal broadband set-up.

“One of the challenges in the past with the E-rate program is [that] because no one knew if they'd get funding for internal connections or not, on the years they thought they could, well, then they would put in everything. It drove the requests up higher,” he said. By providing assurance that the funding would be available whenever it was needed, it took “some of the pressure off.” Schools were freed up to only apply for what they really needed. The result: “It helps them plan and smooth out the workflow.”

For the first funding year of that change, which ended in March 2015, only about 15 percent of the schools really jumped in and maxed out their budgets at sites, Harrington said. The rest “held back.” In a survey conducted last spring of applicants, Funds For Learning found that the majority were planning to do their “major hardware refreshes” this year and next.

Faster Approval in Spite of System Problems

While the extra E-rate funding has proven to be a “shining success,” as Harrington put it, the FCC's pledge to the streamline its application processes and move to self-service hasn't quite come to full fruition. Yes, the approval process has sped up considerably. But USAC's E-rate Productivity Center (EPC), an account and application management portal, has been a “challenge.” “Applicants can get into it, but it's very buggy [and] inconsistent.” For example, he recounted how some applicants would enter their data, hit save, and come back later to find the form gone.

The delays caused by those system problems are playing havoc with the 2016 funding year, Harrington observed. As

HOW E-RATE WORKS

E-rate, which is funded out of the “federal universal service fee” tagged onto phone and Internet bills, provides a discount program for public and non-profit schools (as well as libraries) to obtain high-speed Internet access and telecommunications at affordable rates. The amount of discount a district is allowed is based on two factors: the percentage of low-income students served in the district and whether it serves a rural or urban area. Once the district has figured out what eligible services it needs, it fills out a Form 470 and submits it to USAC to apply for the funding. If USAC issues a funding commitment, the school system can start receiving discounts on the services approved. Reimbursement is done by USAC to cover the discounted amount. The non-discounted portion is covered by the school system itself.

Over 250,000 student records
exposed in breach

Parents demand answers
after school network hack

District breach remained
undetected for “nearly a year”

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of mid-January, USAC still wasn't sure when its filing window would close. "As we approach the 2016 funding year, we are balancing the benefits of setting specific dates with the desire to deliver the best possible experience for applicants in the new EPC environment," said Mel Blackwell, vice president of schools and libraries for USAC, in a public statement. USAC expected to announce firm dates in early January "based on our progress in development and testing during the next few weeks."

The Next Area for E-rate Reform

Harrington predicts that the 2016 funding year could see "upwards" of \$2 billion committed for internal connection projects. Under the modernization of E-rate, the system will be able to accommodate those requests without a hitch. In fact, it could handle every one of the nearly 100,000 public schools in the country applying for these funds. Yet it won't.

Whether it's a lack of faith that they'll qualify at any discount level or that they've been burned in the past, some districts just won't bother even setting up a mandatory account, which starts the application process. As of last October, Harrington had estimated, only two thirds of potential applicants (64 percent) had done so.

"I still talk to schools that don't understand that there are funds available for internal connections. If they have needs for on-campus computer networks, they should seek those funds," Harrington insisted. "They have a responsibility, I believe, to submit those applications."

Reform of E-rate isn't complete, Harrington added. "All the pieces are there — the technology and the money." Now, more regulations need adjusting. In particular, his organization would like to see bureaucratic hurdles removed to address the "homework gap," making sure students have access to connectivity when they head home by allowing districts to partner with others in setting up WiFi everywhere their students live.

"Your normal textbook works when it gets home. But without [access to WiFi], that digital resource almost becomes a liability," Harrington said. "If we're really

HOW TO OPTIMIZE E-RATE

David Schofield and Wayne Weber, partners in Atlanta-based Network Sourcing Advisors, said they believe that a lot of E-rate spending is wasted because schools aren't going about their planning in the best way. "If everybody got the best rates they could, there would probably be additional funds and more people would get money," said Schofield.

The stories they share point out the problems. First, there's the district with 10 gigabit internal networks between schools and only 100 megabit connections going up to the Internet. "And they wonder why everything is so slow," he mused.

Then there's the district that spent \$20,000 a month for a broadband hookup that was only "in the hundreds of megabits." NSA's research found that the cable company with the franchise for that area had a "social contract" that promised to wire all schools at no charge. "When we were done with them, they had 10 gigabit for less than a third of what they [had been] paying a carrier for years," Schofield asserted.

And in plenty of other scenarios the district simply forgot what it was paying for — including services no longer used but still being billed for and paid by accounting month after month with no real oversight.

Weber offers some basic advice that will help any school system maximize its outlay for telecommunications, including its high-speed broadband.

Take Inventory

First, understand what you have. That means taking stock of baseline of voice and wireline connectivity, including plain old telephone service (POTS), Internet services, private line services and long distance. "Build that in detail in a spreadsheet and then really examine it," advised Weber. "Focus on what you have, then on what you need."

Plan with E-rate in Mind

While the E-rate modernization addresses a great need for districts — internal connectivity — ultimately, E-rate will reflect what the carriers themselves want to sell, Weber said, who called it "a big stimulus package for the carriers in a way." So as you're planning, he suggested, keep in mind not just what's going on in the marketplace, but also what the E-rate regulations are pushing. These days, it's IP services for everything.

Get Creative

"You have to really believe that you don't have to accept status quo," Weber insisted. It may be time to give up that service provider that has been delivering services to your district for the last decade. Consider other options: teaming up with your city, county or state to get onto their contract and take advantage of lower pricing; seeking a new aggregator that can deliver local phone, Internet services and long distance in a single package; or joining a regional service provider that can get better pricing for its members by virtue of its size.

Get Professional Help with Negotiation

The best discounting comes at contract signing time, Weber observed. "But due to tariffs, it inches its way back up. Before you know it, by the end of your contract, you'll be paying more." It's not unusual, he added, to see services increase by 17 percent to 23 percent a year. That's where competitive benchmarking will come in handy — to understand what others are paying for comparable services.

Sign on for the Short-term

Weber encouraged districts to keep contracts to no longer than three years and to include technology refresh and competitive review clauses that require the service provider to re-evaluate what the customer is getting for its money. "What you want is to have a contract where you get some leverage," Weber said.

talking about anytime/anywhere learning, then it's actually anytime/anywhere connectivity. And we have to step up to that challenge and not do a disservice to the students by giving them these devices that only work a few hours out of the day."

Although it'll be a while before the impact of E-rate modernization can be fully measured, Harrington expects good news. "Almost every school in America is counting on the E-rate program for their Internet access. You've got to have that piece in

place before you can really come in with some of the ed tech initiatives, the personalized learning. So they got the timing right. The FCC had to do what it did last year and get this billion out in infrastructure in order for some of that reform and those new initiatives to have the oxygen they need to move forward." 

Dian Schaffhauser is a writer who covers technology and business for a number of publications.



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The Perfect Storm: The Conditions are Right for a Revolution in Curriculum Development

WE ARE NOT speaking out of class in observing that the computer technology use in K-12 has not had a particularly significant, positive impact on increasing student achievement. By and large computers have been and are being used as supplements to existing curriculum — as nice-to-haves, as add-ons when time permits. But research data indicates that only when computing technology is an integral, essential, used-on-an-everyday-basis component of curriculum are increases in student achievement observed.

As we argue below, it hasn't made good economic and pedagogical sense for curriculum developers and publishers to include computer-based learning activities in the core curricula — to create curricular materials where computing technologies are an integral, essential, component of those materials. But, as we also argue below, four enabling conditions are coming together relatively fortuitously to create that “perfect storm” — to create the opportunity for curriculum developers and publishers to produce new curricular materials where computing-based learning activities are inextricably interwoven in those materials.

Like a tide that raises all the boats, good curriculum enables all teachers to be more effective. And good curriculum does not typically come from individual teachers trying to integrate technology into their existing curriculum. No, good curriculum comes from professional curriculum developers creating materials where computers are integrated from the get-go.

Enabling Condition 1: Hardware (1-to-1)

There *has been* a very good reason, from a curriculum developer and publisher's point of view, for excluding computer-based learning activities from textbooks and core curricula: The technology in classrooms had been so *unpredictable* that curriculum developers and publishers couldn't guarantee that the activities they would include in the core could be enacted in all — or even most — classrooms.

By *unpredictable* we mean:

- Since the earliest days of computing, school budgets were challenged to provide adequate computing and networking support. And, if there were computers in the classroom, there was no way for curriculum developers and publishers, writing their materials in an office far, far removed from schools, to know what computers those classrooms had: Apple Macs, Microsoft Windows-based PCs, outdated OSes, etc.

- And, still further, the hardware technologies themselves have changed rapidly. Over the last 20 years K-12 has been exposed to *multiple* generations of desktops and laptops, several generations of interactive whiteboards, several generations iPads and other tablets (Google Android, Windows) and now

Chromebooks and other laptops.

The impact of such unpredictability was most consequential:

- While a textbook might well be around for seven years, textbook writers couldn't feel confident that the learning activities they wrote would actually be enactable over those seven years.

- To handle the Windows and Mac issue, multiple versions of the same app needed to be developed — which is a development and maintenance nightmare

- And there were times when it was virtually impossible to make a computer-based activity run across multiple devices, e.g., the Flash-based math and science simulations that educators and students came to love that ran on desktops couldn't run on iPads since Flash simply wasn't supported in iOS.

Bottom line: It hasn't made pedagogical sense or economic sense for curriculum developers and publishers to create *in their core curricular materials* computer-based learning activities for such unpredictable hardware and software environments.

With respect to hardware unpredictability, then, what's different now?

A prediction we made in 2001 is actually coming true: The cost of a computing device is virtually the same as the cost of a pair of gym shoes — about \$100. Chromebooks and low-end, Windows-based devices, \$99 laptops, in fact, are just around the corner. And well appointed, 4G/WiFi, 5.5-inch Android smartphones — phablets — can be had for \$129. One-to-one — every student having her or his own personal computing device — is about to be the new normal; device access is no longer a roadblock.

While networks remain the Achilles heel still of school computing environments, that too is changing, e.g., the new generation of remotely controlled WiFi access points is helping schools to decrease the cost of providing connectivity while also helping to increase the reliability/robustness of their networks.

Most importantly, while the diversity of devices in classrooms is now exacerbated, as we describe in the next section, a very recent innovation in software development —

one of those four “perfect storm”-enabling conditions — will ameliorate the diversity issue and render it moot!

Enabling Condition 2: Software

The ubiquitous availability of computing devices is a necessary condition— but not a sufficient condition — for curriculum developers and publishers to create materials where computer-based learning activities are woven inextricably. Indeed, it is another innovation — a very recent one — that will unlock the opportunity that ubiquitous computing availability affords. And that innovation is spelled: HTML5.

HTML5 (HyperText Markup Language) “is a core technology markup language of the Internet used for structuring and presenting content for the World Wide Web. As of October 2014, this is the final and complete fifth revision of the HTML standard of the World Wide Web Consortium (W3C).” (wikipedia.org/wiki/HTML5)

The above definition notwithstanding, what is HTML5 and why is it potentially a educationally disruptive tool for curriculum developers and publishers? Take a deep breath ... let it out ... here we go!

A browser is a core application in a modern computer (desktop, laptop, tablet, smartphone, etc.) that enables a user to explore the World Wide Web. Virtually every computing device can run a browser. And, while browsers — Microsoft's Internet Explorer and now Edge, Apple's Safari, Google's Chrome, Mozilla's Firefox, Opera's Opera — differ with respect to interface design, ease-of-use, computing resource demands, etc., all the browsers support the standards set forth by the W3C. Thus, viewing a Web site in Apple's Safari browser running on an Apple iPad or viewing that same Web site in Google's Chrome running on a HP Chromebook — or an Asus Chromebook — is virtually the same.

Okay, there are differences owing to screen size, computing power, etc. Viewing a site in Safari on an iPhone is not exactly the same as viewing that site on an iPad in Safari. Picky, picky, picky; but

for all intents and purposes, the viewing experience is the same.

Now, here is where the story gets exciting: While HTML4 only supported a limited range of interactive elements, e.g., dialogue boxes, HTML5 finally provides software developers with the tools to create interactive “Web pages” that have the same sorts of interactivity that computer programs have had.

And, since HTML5 is a W3C, international standard, then apps written in HTML5 will run on all standards-supporting browsers, and thus there is no need to write a version of the app for Mac and a version for Windows. HTML5 apps are device-agnostic.

So, for example, a developer can now write one concept mapping application in HTML5 that provides essentially the same functionality as, for example, Inspiration, but that runs on all computing devices that support a W3C-standard browser.

So, if curriculum materials are written in HTML5, then curriculum developers and publishers can now, finally, have confidence that their core curricular resources are universally enactable: HTML5's write once, run everywhere finally gives — or should give — curriculum developers and publishers the confidence that what is included in their core materials can be enacted in virtually all classrooms for the lifetime — and beyond — of their textbooks.

In fact, HTML5-based applications make BYOD actually a quite workable strategy. In a typical BYOD classroom, a teacher might well be faced with students bringing in laptops, tablets and smartphones, and many of them are of the hand-me-down variety — i.e., old, first-generation devices! With apps written in HTML5, a teacher can feel confident that all the devices in the classroom will be able to run those apps.

Besides device neutrality, writing applications in HTML5 confers yet another educational benefit. It's subtle, so perhaps the best way to see this added benefit is via an example.

Assume a sixth-grade teacher has assigned her class the task of answering the following: What are the processes in

the water cycle, and how does each one work? Toward answering those questions, we show a screen from one student's Safari browser with five tabs in operation — a text editor written in HTML5 that hosts the questions and the student's responses, a search engine opened by the student to find resources about the water cycle, the Wikipedia page describing the water cycle, and an animation depicting the water cycle.

Apps written in HTML5, like the text editor, are just "Web pages" — and thus are just tabs in a browser, just like a tabs that display text (e.g., Wikipedia) or animations. In other words, all resources are just Web pages; all students need is a Web browser on their computing device.

Thus, curriculum developers can now create **complete digital lessons** using all of the resources available on the Web — some resources are computer applications written in HTML5, and some resources tap into the amazing Web sites that scientists, companies, countries, foundations, individuals, non-profits and even kids have created, published and are available for free on the World Wide Web.

Now curriculum developers and publishers *can* create curricular materials where technology is inextricably interwoven into those materials and feel confident that those materials will be enactable *everywhere*.

But just why should they develop such materials?

Enabling Condition 3: Call to Curricular Change

While hardware and software technology is finally in place, it is the third enabling condition that will push curriculum developers and publishers actually to use HTML5 for development.

The vast majority of states have already adopted the Common Core State Standards and ordered that their schools use curriculum that are aligned with the CCSS. At least in those states, new curriculum is needed.

Now, while some districts are developing the CCSS-aligned curriculum

themselves, most districts don't have the resources for such development and will need to purchase CCSS-aligned curriculum from publishers.

Complementing CCSS are new science standards, the Next-Generation Science Standards (NGSS). Like CCSS, NGSS are standards — and not curriculum; NGSS, like CCSS, specifies what needs to be learned, not how it is to be taught or learned. Fifteen states have so far adopted NGSS.

Who is going to develop these new curricular resources?

Enabling Condition 4: Funds to Support Change

While K-12 has come to expect that educational apps are free, schools are still accustomed to paying for curriculum materials. Teachers need *curriculum*, not just apps, since curriculum provides them with guidance on how to use those apps effectively.

Fortunately, investment support (i.e., money) is pouring into K-12 at an unprecedented rate to fuel the development of new educational resources:

■ "Funding to education-technology companies is booming. Financing grew from \$944 million in 2013 to \$1.6 billion in 2014, a 71 percent increase. In the last four quarters, including Q2 '15, ed tech startups attracted \$2.3 billion, a jump of 96 percent compared to the previous four quarters. Meanwhile, deal flow ticked down in 2014 compared to the previous year. There were 217 deals in 2014, down from 223 in 2013. Note: This data only includes funding to VC-backed companies in the ed tech space." (CB Insights report, July 2015)

■ Non-profits, such as Gates Foundation, the Lucas Education Foundation and the Spencer Foundation are making considerable investments in education. For example, LEF is focusing its attention, in part, on promoting project-based learning.

The Four Enabling Conditions for the Perfect Storm in K-12

Yes, the conditions for the perfect storm are at hand. Yes, the opportunity is here to final-

ly create curriculum materials, aligned with the standards, that incorporate computing-based learning activities from the get-go — learning activities that research suggests *will* result in increased student achievement.

But:

■ You can lead a horse to water,... but there is no guarantee that the resulting products will in fact be "good" curriculum. While there is research that can be used to guide the development of "good" curriculum, there is no guarantee that those research guidelines will be followed. Just because good curriculum *can* finally be built, doesn't mean that it *will* be built.

■ And, even if the materials are good, materials alone are not enough to ensure that increases in student achievement are observed: Teachers must be afforded significant professional development opportunities in order to learn to use the new materials effectively.

■ And materials and PD are still not enough. Curriculum and PD are just two of a dozen critical factors we have identified that need to be addressed in moving a school to using a modern pedagogy where computers are used as essential tools, not just as supplements.

■ And it takes time. We have worked at a primary school in Singapore for six years; and while it is different today, and while technology is infused in the curriculum, the processes of change continue to grind ... and grind slowly.

Public education is arguably the greatest achievement of a democratic country. Does America have the political will — and the economic resources — to create the next generation of curriculum — curriculum where the computer is inextricably interwoven in the everyday activities of learners? Will the perfect storm occur? **THE**

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**Cathie Norris** is a Regents Professor in the Department of Learning Technologies, School of Information at the University of North Texas.

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## 4 Ways Teachers Are Learning to Use Technology to Benefit Students with Special Needs

**A**SSISTIVE AND accessible technology can help students with special needs overcome a wide variety of challenges. Nonverbal students can communicate using augmentative and alternative communication (AAC) technology; students with physical disabilities can take advantage of special keyboards and monitors; and the accessibility features of Apple iPads and Google Apps for Education can help students with learning disabilities or other challenges.

Although some tech-savvy teachers are confident figuring out these technologies on their own, many others need training on how to implement assistive and accessible technology effectively to benefit their students. In some cases, formal training is available, but for time-strapped teachers and cash-strapped districts, attending a course or conference might not be an option. Fortunately, when it comes to technology-related professional development for teachers of students with special needs, a wide variety of options are available.

### Statewide Initiatives

Teachers in the state of Indiana have access to a one-stop shop for all of their assistive and accessible technology needs. The PATINS Project is a statewide initiative that helps public K-12 schools in the state of Indiana increase accessibility of curriculum for all students. They loan assistive technology and accessible materials and provide universal design for learning (UDL) and professional development services to districts at no charge.

The PATINS Project sometimes hosts traditional training events at schools, where state director Daniel McNulty or one of his staff members gives a presentation on a particular topic to a group of educators and other professionals. However, McNulty said they are trying to get away from that lecture style of training and are putting more emphasis on individualized training in the classroom, where a member of the PATINS Project visits a classroom in person and provides suggestions based on their observa-



## TO 3D OR NOT TO 3D

AFTER BORROWING A 3D PRINTER AND REALIZING ITS POTENTIAL, THIS FIFTH-GRADE TEACHER WON ONE FOR HIS CLASS.

After borrowing a 3D printer for three weeks for his fifth-grade classroom last year, Vincenzo La Ruina knew he needed to have one available all the time. While something as sophisticated as a 3D printer might seem like overkill for kids as young as fifth-graders, La Ruina had them doing some impressively creative projects.

At first, the kids at Gardiner Manor School in Bay Shore, Brooklyn, NY spent some time getting used to the technology. They experimented with the technology to print relatively simple things like a 3D rocket, ring or dog tags. La Ruina held contests in his classes to help them select what they would print. After they quickly became comfortable with their 3D printer, the list of possible projects expanded both in number and in scope.

Their design priority list included designing a logo for their school, a car, a spaceship, something you can wear, a house, a bridge, a plane, a unique shape, an animal, a pencil holder, a small monster, a plant, a robot, a boat that will float, a tree, a chair, a bowl, a sculpture, a new tool that can be used for something, and a LEGO person.

They had fully embraced 3D printing technology, and La Ruina was putting it to work and doing innovative projects with his math and art classes. I was inspired by a workshop I went to," says La Ruina. "I like the idea of kids being able to make what they want. They can articulate an idea onto a 3D printer. They can take an idea and make it 3D. I am excited to help these kids solve these problems."

**"I want everyone to have a chance to use this. They can do it on their own. They can come to me for help."**—Vincenzo La Ruina, fifth grade teacher

Gardiner Manor School has third through fifth graders. The older kids use Tinkerbot to create their designs prior to printing. The younger kids use Cubify, which is easier for them to operate. One of La Ruina's students wanted to make soccer ball, so he helped him decide whether they should start with a square and trim the excess material off, or start with a polygon and build it up. It's that kind of abstract conceptual thinking in which La Ruina enjoys engaging his students. "They're learning to make and design things," La Ruina says.



"I want everyone to have a chance to use this," says La Ruina. "They can do it on their own. They can come to me for help. It's not too much effort. If you give them an hour, they can get started."

La Ruina is looking forward to putting this more sophisticated Stratasys Mojo 3D printer to work with his classroom projects. The first 3D printer the school borrowed was indeed brand new, but required frequent maintenance. With his experience,

he is also much more familiar with the 3D design and printing process. "My knowledge has grown since writing the essay," he says. "We will be able to be more precise." *La Ruina won the Stratasys Mojo 3D printer after winning an essay contest sponsored by Stratasys and THE Journal.*

tions and conversations with the teacher. “I want our efforts to be on quality rather than quantity,” said McNulty. “So when we go into the classroom, it tends to be because there may be one or two difficult situations in that classroom where the teacher just can’t figure out a solution and it’s hard to describe over an e-mail.”

In other cases, a teacher might call them up for help because the school just dropped off 15 iPads in the classroom, and the teacher doesn’t have any training on how to use them. McNulty or another staff member can then go into the classroom and show the teacher how to enable the accessibility features of the iPad and add or create content for it, and they can suggest specific apps for particular students with special needs. “So it looks like work-

Alterman, a special education teacher at the Charms Collaborative in Stoughton, MA, turns to Twitter to find out about new technology tools for her classroom. “That’s where I find out about tools and technology,” she said. “Because I hear teachers saying, ‘I’m using X, and I say, ‘Ooh, tell me about that. I’ve never used that. What is it? How are you using it? Tell me how that works.’”

Twitter seems to be the social media tool of choice for many people when it comes to technology-related questions, and teachers can use it for quick, informal one-on-one conversations or for larger, more organized Twitter chat events. Sharon Plante, a teacher and director of technology for Eagle Hill Southport School in Southport, CT, is active on Twitter and occasionally fields

cating,” said Plante. “I’m hoping to really reach a broader audience and get those conversations going so people can realize what is out there.”

## Conferences and Online Training

But Twitter chats are fast and furious online events, so they can be intimidating or overwhelming. For those teachers, more traditional professional development opportunities might still be an option. If they have the time and money to attend courses and conferences, Plante recommends the Assistive Technology Industry Association’s (ATIA) annual conference in Orlando, FL. For those who can’t afford the time or money to attend a large event,

**“Clearly the conversations that are now occurring on Twitter are expanding the reach with which the assistive technology people, the educational technology people, and then general as well as special educators are communicating.”**

— Sharon Plante, teacher and director of technology for Eagle Hill Southport School

ing with the teacher and the students at the same time, or just working with the students sometimes and sort of modeling some things for the teacher,” said McNulty.

In addition to traditional training events and individualized classroom training, the PATINS Project also hosts between two and four big statewide assistive technology conferences each year, as well as online training, webinars and recorded video tutorials. Recently, however, McNulty hired a new staff member for outreach and social media. It’s her job to try to find those teachers who need their help but aren’t necessarily coming to PATINS for help, and she’s also responsible for the project’s various social media outlets, including Twitter, Facebook, Pinterest, YouTube and iTunes, and the team is planning to start hosting monthly Twitter chats in the near future.

## Social Media

Social media has become an important professional development resource for teachers of students with special needs. Sharon

questions from other educators.

“People that I have connected with otherwise who know what I do will just message me and say, ‘Hey, I have this child who is dyslexic or dysgraphic and needs some support. Can you suggest some tools or ideas?’” said Plante. “For a person who has a question and doesn’t have somebody in their district or school to answer, it’s a quick and easy way to get an answer. They can quickly put it out there, and then maybe somebody will know somebody who will pass it along. It’s a quick, great way to get a question answered. And I know if I don’t know the answer, I know people who do.”

Various individuals and organizations also host organized Twitter chats, such as the Assistive Technology Chat (#ATchat) and the new monthly Twitter chats the PATINS Project is planning. “Clearly the conversations that are now occurring on Twitter are expanding the reach with which the assistive technology people, the educational technology people, and then general as well as special educators are communi-

the ATIA also offers webinars, as do other organizations such as Understood.org, Learning Ally and Presence Learning.

Thomas Mokua is a special education teacher at Crispus Attucks Charter School in York, PA, and he has attended multiple webinars from Presence Learning. He said he thinks technology and related professional development are essential to teaching students with special needs. “I watch the webinars and try to use them because I understand that I cannot be effective if I’m not continuously learning,” he said. “I just came out of school less than five years ago, so I’m well versed in a lot of this information and technology, but that doesn’t stop me from making sure that I keep up with what is going on. It’s always changing, and you can be left behind.”

The Indiana Department of Education, in collaboration with Public Consulting Group (PCG), runs another program called Project Success. The program supports teachers who assess their students with special needs using the alternate state

assessment. At Avon Community School Corporation in Avon, IN, a middle school life-skills teacher and a speech therapist for the middle and high schools attended a program through Project Success for an AAC iPad app called LAMP Words for Life from Prentke Romich Co. “They came back, and they were ready to go,” said Amy Roberts, district assistant director of special education. “They started using this program with many of our nonverbal students, and now they are communicating. They are able to tell us their wants and needs. It’s amazing what these kids are able to communicate. They just needed that voice.”

### Informal or Peer Training

Many teachers are learning from their colleagues within their home school or district. Roberts conducts informal training sessions with a group of teachers throughout the year. “When we meet for a half-day session, I’ve just been building in discussion about iPads and iPad apps during this time. It’s really more of

a we-all-learn-from-each-other environment,” she said. “We just learn from each other to find out what everyone else is doing with iPads and what other apps everyone else has found that have been helpful for students.”

Educators at Katherine R. Smith Elementary School in San Jose, CA also use informal approach to technology-related professional development for students with special needs. Sergio Hernandez is a special education teacher at the school, and he also happens to be a member of the school’s tech leadership team, which is in charge of instructional technology. “They’re tasked with leading our school to make sure we’re embedding technology in our instruction and that we’re using it as a tool,” said Aaron Brengard, principal of the school.

Katherine R. Smith Elementary has a 1-to-1 device-to-student ratio with Chromebooks, as well as a mobile cart full of iPads for any classroom to use. Hernandez has discovered various Google Chrome apps or extensions that can help some of his students with

special needs. For example, some students use the Voice Typing tool in Google Docs, which lets them speak to the computer and converts their speech to text. Another one is Texthelp’s Read&Write for Google Chrome, which reads aloud words, passages or whole documents in Google Chrome to assist students with special needs such as dyslexia.

“I’ve got some teachers who figured things out, and then they were leading professional development as staff meetings,” said Brengard. “And then we decided we needed to go a little bit further with it, and so we were able to find a resource at our county office, and they came in and did training with us for one day. From there it kind of went right back to the team, and that team is continually working on implementing it, and then leading other teachers and getting things into their classrooms. So it’s a just-in-time support system.” **THE**

Leila Meyer is a technology writer based in British Columbia.

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## OER for Common Core

**K**arl Nelson is the director of the Digital Learning Department for the Washington State Office of Superintendent of Public Instruction (OSPI). In this Q&A, he talks about how his state is using open educational resources to help support Common Core State Standards.

The OSPI's OER Project was launched in 2012, when the Washington state Legislature passed HB 2337. According to Nelson, the legislature saw OER as a chance to both save districts money and improve instructional material quality, so it directed OSPI to identify a library of openly licensed courseware aligned with the state standards. The Legislature also asked OSPI to provide guidance to school districts using OERs.

**THE Journal:** What strategies have you used to support districts' use of OERs?

**Karl Nelson:** We've reviewed existing open educational resources, and posted the results of the review here. We've held a number of events for teachers to help them understand how OER can be used in schools. These events are nicely integrated with our state's overall efforts to implement the Common Core. In other words, we don't see OER as a distinct effort from our work in helping districts identify high-quality instructional materials that are aligned to our state's standards.

We've run a small grant program to provide funding to Washington school districts who are either creating OER, adapting existing OER or adopting OER.



**THE Journal:** What Common Core standards and grade levels are covered by the materials you have gathered?

**Nelson:** Our OER project is focused on both math and English language arts, K-12. To date, we've reviewed high school resources in math and ELA. We're currently in the process of reviewing middle school math and ELA resources.

**THE Journal:** What types of materials are available?

**Nelson:** We focused on full-course math resources and unit-level ELA resources. For math, we wanted to focus on resources that districts could consider adopting right away, rather than having to piece together a course from lessons and other smaller pieces of content.

In ELA, we focused on unit-level resources, as ELA teachers have a history of picking and choosing from a wider variety of materials. In both cases, we felt like there were a number of useful OER repositories that maintained smaller grain-sized materials, and that we could best help Washington teachers by providing reviews of larger grain-sized materials.

**THE Journal:** In what way, if at all, are the resources specific to the state of Washington?

**Nelson:** The resources really aren't specific to Washington. Instead, they're drawn from national nonprofits, other states and a variety of other sources.

**THE Journal:** How do you vet OERs before placing them on your site?

**Nelson:** This is really the key to our work. To conduct the reviews, we've gathered

teams of teachers from across the state. The reviewers use five different rubrics to evaluate the materials: Achieve’s EQuIP rubric is used to measure the alignment of individual units against the Common Core.

Student Achievement Partners’ Instructional Materials Evaluation Tool (IMET) is used to evaluate full-course materials against the Common Core. We only use this for math resources, as it is only appropriate for full-course materials. We use portions of Achieve’s OER Rubrics that don’t overlap with EQuIP or IMET. A Common Core alignment worksheet is used to ensure that the materials are addressing the standards. Reviewers also include extensive written feedback on the “Reviewer Comments” rubric.

**THE Journal:** Do you rank the materials in any way?

**Nelson:** Although we do publish the scores and comments, we’re not ranking the materials. The goal with this process is not to identify the single best OER, or to create a list of options that districts must choose

from. Washington is a local control state, so each school district can choose instructional materials on its own. Our goal is to provide as much information as we can for teachers and district leaders as they’re working to identify OER that may work in their district. We’re also hoping that the results of our reviews will help the content developers continue to improve their resources.

**THE Journal:** How many educators have used the resources?

**Nelson:** Because we post reviews and link to the developer’s website for the actual resource, we don’t have specific usage information. But a number of districts in Washington have adopted OER resources, including Spokane, Bethel and Evergreen. We’ve seen interest and adoption of OER grow over the almost three years we’ve been working on OER.

**THE Journal:** What is your mechanism for feedback from educators? Have you changed anything you do based on external feedback?

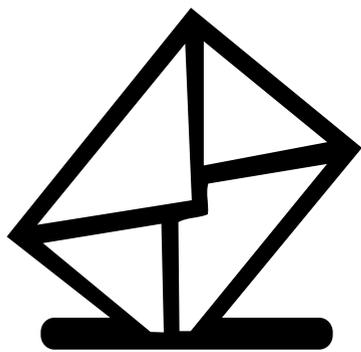
**Nelson:** The primary mechanism is through our OER reviewers, who are either classroom teachers or curriculum specialists/directors.

**THE Journal:** What’s next for the project?

**Nelson:** We’re currently reviewing middle school OER, and looking forward to posting the results of that on our Web site. Beyond that, we’re planning on continuing to support districts around their use of OER.

Finally, I’ll note that I’ve been saying “we” throughout all of these answers. I did that because this has been a team effort: Barbara Soots is our OER Program Manager, and she’s coordinated the reviews and the events I described above. We’ve also had significant help from our Teaching and Learning department, especially our math and ELA directors, Anne Gallagher and Liisa Moilanen Potts. In all, we’ve had a team of more than 10 people working on various aspects of the OER project. 

**Chris Piehler** is the former editor-in-chief of *THE Journal*.



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# 3 WAYS TECHNOLOGY SUPPORTS ELL INSTRUCTION

**THE WESLACO INDEPENDENT** School District is located at the southern tip of Texas, only seven miles from the Mexican border, and 40 percent of its 18,000 students are English language learners.

With so many Weslaco students beginning school without any exposure to English, Superintendent Ruben Alejandro knew he had to do something dramatic to move the needle on achievement. To meet the needs of these students, he has put together a comprehensive plan for ELL instruction — the centerpiece of which is an early literacy program that provides access to an online library of digital books for the entire Weslaco community.

The initiative, called “Zero to Three Weslaco Reads,” is intended to develop early literacy skills among children before they even enter the school system — and to encourage students to continue reading as often as possible through elementary and middle school.

“We needed to do something to build English vocabulary and comprehension skills among our students as quickly as possible,” Alejandro said.

The challenges that Weslaco educators face aren't unique to that district. Nationwide, nearly four and a half million students participate in ELL programs, according to the United States Department of Education, and this number continues to rise.

Here are three key ways that technology is improving instruction for English language learners in Weslaco and many other K-12 districts around the nation.

### Extending Learning

Although basic conversational fluency typically occurs in one to two years, it often takes English language learners at least five years to catch up to native

to download digital books from myON's library of more than 10,000 titles to any device for reading before, during or after school. About 70 percent of these titles are nonfiction, which helps students learn the vocabulary they'll need to support academic discourse.

"We saw this as a great opportunity to help students build their English literacy," Alejandro said. "We wanted to expose them to the vocabulary they would need to be successful in school."

In Nashville, TN, nearly 14,000 students (about 15 percent of the total student population) are English language learners who speak more than 130 different languages,

### Scaffolding Instruction

To support English language learners as they develop their language skills, it's important for educators to scaffold their instruction across the curriculum, Cummins said.

Technology can help teachers provide this scaffolding with handy supports that are embedded in the content, such as native language assistance and pop-up definitions or visual demonstrations of key vocabulary terms.

About 10 percent of the digital books within myON are available in Spanish or dual-language versions, and all titles include a built-in dictionary and audio

## **Nationwide, nearly four and a half million students participate in ELL programs, according to the United States Department of Education, and this continues to rise.**

English speakers academically, said Jim Cummins, a University of Toronto professor and ELL expert.

That's because academic language is more complex and less accessible than conversational language, he said: It contains many low-frequency words that students find only in classrooms and in printed texts, rather than in conversation with their peers.

Also, native English speakers continue to develop their proficiency with academic English as students who are learning English are trying to catch up. In essence, English language learners "have to run faster," Cummins said, "because they're trying to chase a moving target."

Spending extra time developing English literacy skills during and outside school is essential to this process, said Cummins, who recommended that educators create more opportunities for what he calls "engaged literacy" — and technology can help by extending students' learning beyond the allotted class time.

For instance, Weslaco's partnership with myON allows parents and students

said Kevin Stacy, ELL director for Metropolitan Nashville Public Schools. The district has outlined a \$38 million plan to meet their instructional needs. As in Weslaco, the plan extends beyond students and out into the larger community — and technology plays a key role.

Metro Nashville holds frequent community nights in which it hosts language and literacy programs for entire families, Stacy said. In addition, the district uses cloud-based software such as Imagine Learning and Achieve3000 to support English literacy instruction, so students can access the programs from home as well as school.

Both Nashville and Weslaco have discovered that parents of English language learners are taking advantage of online access to instructional tools to advance their own English skills as well.

"We found that parents were reading the myON books after their kids went to bed," Alejandro said. "Seeing parents developing their language skills was a big plus for us because it helps reinforce the language for students at home."

support that can be turned on or off. Students can hear the text read aloud as the words are highlighted on the screen, so they learn to associate the written words with the sounds they are hearing, Alejandro said.

Metro Nashville is using Imagine Learning for literacy instruction as part of a station rotation and during intervention time for struggling readers and English language learners, Stacy said. The program includes a number of supports to help ELLs learn vocabulary with the help of videos, pictures, glossaries and direct translations.

For instance, before students read leveled informational texts, key words are clarified and defined in the student's first language — and this support is available for more than a dozen different languages.

"Students coming in with low English proficiency can get instruction on day 1," Stacy said.

The district is using Achieve3000 as a resource to help older students acquire more advanced literacy skills. The program is available in four options: English

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By hovering their cursor over a word or menu item, students can see the English or Spanish translation of the word — and as they read informational texts, a glossary on the side of the page provides definitions and pronunciations for difficult vocabulary terms.

“No matter what level of proficiency they are at, students can get on and practice their reading skills,” Stacy said.

### Personalized Learning

Because English language learners come to school with very different English competencies, technology’s ability to quickly hone in on students’ skill levels and deliver precisely targeted instruction is a huge benefit — allowing teachers to meet each

software’s data dashboards help teachers clearly understand each child’s progress, so they can intervene with one-on-one instruction or additional support as needed.

This highly prescriptive instruction is helping English language learners close the gaps to their peers more quickly, Pena said.

In Weslaco, the myON digital library has students take an initial literacy exam and surveys them about their interests — and then the platform generates a personalized list of recommended books for each child, helping students choose titles at their reading level that will appeal to them. myON also tracks students’ literacy growth and reading activity, helping educators group students by ability so they can differentiate their instruction appropriately.

In Nashville, the use of Imagine Learn-

teachers and ELL coordinators in Hartford (CT) Public Schools, Middlebury Interactive Languages has developed a series of supplemental online modules for English language learners in the middle grades.

### Bridging Communication Barriers

In Cincinnati, about 6 percent of the district’s 33,000 students are English language learners, but the city has seen “exponential growth” in this number over the last few years, said English as a Second Language (ESL) and Foreign Language Manager Marie Kobayashi.

“Five years ago, we had probably half that population,” she said.

To meet the diverse needs of this student population, Ohio’s third-largest school district has teamed up with a

**Although basic conversational fluency typically occurs in one to two years, it often takes English language learners at least five years to catch up to native English speakers academically.**

child’s needs more effectively.

The Edinburg Consolidated Independent School District in south Texas is using technology to help personalize instruction for its K-8 students, which is having a “big impact” on English language learners in particular, said IT lab specialist Ita Pena.

Every elementary school in this 33,000-student district has federally funded computer labs that classes rotate through for 30 minutes of daily math or literacy instruction. In kindergarten through second grade, students use Waterford Early Learning software, Pena said. In grades 3–5, they use Pearson SuccessMaker, and in grades 6–8, they use iReady from Curriculum Associates.

All three programs contain built-in diagnostic tools to assess students’ abilities and an adaptive instructional engine that serves up lessons tailored to each child’s specific skill level. What’s more, the

ing and Achieve3000 also helps teachers target their instruction more effectively.

“I’m a huge proponent of using technology for ELL instruction,” Stacy said. “It’s adaptive, so it’s constantly assessing where each child is and what he or she needs. It’s also very engaging — and it helps teachers dial in their lessons for small-group instruction.”

### World Language Companies Target ELL Instruction

Many of the leading companies that make software for learning world languages have targeted the ELL market with solutions intended to help U.S. students who are not native English speakers enhance their English skills.

Cincinnati Public Schools’ campuses, for example, are among the roughly 3,000 schools nationwide that are using Rosetta Stone’s online English language modules for ELL instruction. And in collaboration with

neighboring district on a state-funded grant project to offer Rosetta Stone’s ELL and World Language programs to all students, staff and parents at no cost to these users.

“Our staff need to learn how to communicate with English language learners more effectively, and ELL families need opportunities to learn English so they can participate fully in their children’s education,” Kobayashi said.

Rosetta Stone’s English Foundations content includes guided lessons in a linear progression for students and others who are just beginning to learn English. Its English Advantage content, designed for more advanced instruction, is presented as a series of flexible modules that teachers can customize and assign as appropriate, said Tanya Mas, Rosetta Stone’s senior marketing manager for K-12 education.

Both products include instructional

videos, and both use voice recognition technology to enable students to practice their speaking skills and receive online feedback.

“The biggest challenge that students have when they are learning a new language is the fear of speaking in front of others,” Mas said. “Our voice recognition technology allows students to practice their speaking in a comfortable environment that removes this fear.”

The content covers all four domains of language instruction, Kobayashi said: speaking, listening, reading and writing. It also goes deeper than what she called “survival English” to address the academic language that students must learn to be successful.

Because the content is cloud-based, it can be accessed from any computer with an Internet connection — and there are apps for using the content on a smart phone or tablet as well.

Cincinnati is in the second year of using the content as a supplemental resource, and educators report their students are learning English more rapidly, Kobayashi

percentage of English language learners in Connecticut, with close to 20 percent of students learning English as a second language.

These 3,700-plus students come from very diverse backgrounds and speak more than 80 different languages, and they are often a very transient student population — which creates a significant challenge for the district, said Monica Quinones, director of ELL services.

“We wanted a solution that could help meet the needs of our most challenging ELLs with a curriculum that was delivered on grade level, and not watered down,” Quinones said. “We also wanted to take a blended-learning approach that would offer content in different modalities, while giving students the flexibility to work at their own pace.”

District leaders turned to MIL, which developed a series of supplemental online modules for ELLs in grades 4-8 with input from Hartford educators. Hartford middle schools have used these instructional

students at different levels.”

The modules focus on helping students develop the academic English they’ll need to succeed in school. Research suggests that English language learners have the most success when they see their cultural identity affirmed and can relate their own experiences to the curriculum — and this idea is reflected in the content as well.

As students progress through the units of study, they are accompanied by a virtual companion who encourages them, suggests learning strategies and offers support. Students can choose their virtual companion from a range of ethnically diverse characters.

MIL has made its new middle school ELL curriculum available to school districts nationwide, and, with Hartford’s help, the company is now developing additional ELL content aimed at high school students.

An evaluation of Hartford’s use of these materials, conducted by researchers at

**“I’m a huge proponent of using technology for ELL instruction. It’s adaptive, so it’s constantly assessing where each child is and what he or she needs. It’s also very engaging.”** — Kevin Stacy, ELL director for Metropolitan Nashville Public Schools

said. What’s more, hundreds of staff members have accessed the world language content to forge stronger connections with their English language learners.

“In the past, our staff have felt helpless not being able to communicate with families in their own language,” she said. “Now, we see them trying to talk with families. That’s something you can’t measure, when you see a family come in and the look on their faces when someone welcomes them in their own language — when they know they’re in a place where the staff is doing everything they can to make their child feel welcome.”

## Teaming Up for Success

Hartford Public Schools has the largest

resources during their intervention blocks and in self-contained ESL classes within the pilot schools.

The curriculum aligns with themes the students already are studying, such as habitats and environments, inventions, natural disasters and mythology, as well as the Common Core standards. Each unit includes project-based activities to build students’ reading, writing, speaking and listening skills.

“We wanted to ensure that students were learning by doing,” said Aline Germain-Rutherford, MIL’s chief academic officer and a tenured linguistics professor at Middlebury College. “We have tried to scaffold the activities so they can adapt to

Johns Hopkins University, found a steady increase in the English language assessment scores of participating students. Just as importantly, the attendance of English language learners is up significantly in the pilot schools — suggesting students are more engaged.

“Students have appreciated the blended-learning lessons, which they can complete at their own pace,” Quinones said. “They have developed pride and confidence in their learning.” 

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**TI/H E JOURNAL** (ISSN 0192-592x) is published 6 times a year, Jan/Feb, Mar, Apr/May, Jun/Jul, Sep, and Nov by 1105 Media, Inc., 9201 Oakdale Avenue, Ste. 101, Chatsworth, CA 91311. Complimentary subscriptions are sent to qualifying subscribers. **Subscription inquiries, back issue requests, and address changes:** Mail to: **TI/H E JOURNAL**, 9201 Oakdale Avenue, Chatsworth, CA 91311, E-mail [privacy@1105media.com](mailto:privacy@1105media.com) or call (818) 814-5223, fax number (818) 936-0267.

**POSTMASTER:** Send address changes to **TI/H E JOURNAL**, 9201 Oakdale Avenue, Chatsworth, CA 91311. Canada Publications Mail Agreement No: 40612608. Return Undeliverable Canadian Addresses to 9201 Oakdale Avenue, Chatsworth, CA 91311. © Copyright 2016 by 1105 Media, Inc. All rights reserved. Printed in the U.S.A. Reproductions in whole or part prohibited except by written permission. Mail requests to "Permissions Editor," c/o **TI/H E JOURNAL**, 9201 Oakdale Ave., Ste. 101, Chatsworth, CA 91311.

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# INNOVATOR

**PHILIP D. LANOUE, PH.D., SUPERINTENDENT  
CLARKE COUNTY SCHOOL DISTRICT, ATHENS, GA**

**BY DAN GORDON**

*Under Lanoue's leadership, a high-poverty system has received numerous state recognitions as a model technology district. A former principal and teacher, Lanoue assumed leadership of the Clarke County School District in 2009, and, under his leadership Clarke County was recognized by the State of Georgia as being the leading large district in closing the achievement gap. Lanoue was named 2015 AASA National Superintendent of the Year.*

## ➤➤ What part has technology played in your vision for the district?

Well, let me give you the big picture. Clark County is a district of about 13,000 students. We're about 84 percent free and reduced lunch, and certainly six to seven years ago we had some major performance issues. But we started an aggressive tech initiative four years ago, in collaboration with the state of Georgia, and offered to be a model technology district looking at everything from furniture to changing instructional design. We modeled 1-to-1 initiatives for about a year and a half, much of it sparked by the fact that we were building new schools and wanted them to reflect a different learning environment. This year, students are taking home devices in grades 3-10, with accounts stored in the cloud. We're also a full Google platform, which is pretty exciting. We've added short-arm interactive projectors that act like a smart board, but untether our teachers and kids, which has created a lot of flexible spaces. Our goal is totally change our instructional design. What's most exciting for me is that we've taken a district with high poverty, closed the technology gap and changed outcomes.

## ➤➤ How does technology help to close the achievement gap?

It's equalized access to information for kids. It's also allowed them to collaborate

differently. Our kids now use these tools to be better stewards of their own education: They share with each other, develop tools with each other. Technology has brought an incredible opportunity and strength to collaboration among students, and I think that's contrary to what some people think. It also allows our kids to not think of education and learning as occurring only within the school walls. I think that's the big culture shift, is that student learning is now 24/7. The level of engagement is so different now. It's remarkable. When you come to our classrooms you can feel learning occurring as soon as you walk through the door.

## ➤➤ When you look around the country and see what's being done with technology, where do you see untapped potential?

Here's what I would say:

If you're going to use technology to do what you're currently doing more efficiently, don't bother. Those who do the same work as before, but just using digital tools, are missing an incredible opportunity. People will say,

"Well we've got books on devices."

But it's still a book. You use it the same way. What you really have to do is break away from some of the thinking that you had. You have to change your instructional model.

## ➤➤ So for you, the idea is to use technology to transform the way learning occurs?

Right. The way we think of it is we're trying to work with kids on how to seek answers to problems, and to use technology tools to help them do that — whereas in my day, if you didn't know it, you hadn't studied hard enough. We're changing how students approach their work, and the digital tools allow them to access information that better

## MY TOP 3...

### DIGITAL LEARNING TOOLS THAT REDEFINE LEARNING ENVIRONMENTS

#### 1) Progress-Monitoring Based on Practice:

I anticipate that new technology tools and analytics will allow us to better assess student achievement using practice rather than tests. We have worked for the last three years with Triumph Learning to develop new tools where student growth is determined in the student workspace, and where teachers can have immediate student performance information in real time.

#### 2) Tools that Allow Students to "Share Space":

We utilize Google Apps for Education, which has tremendous potential in providing a platform for students to share learning space. Using Google tools, students can collaborate, as well as share work for review and feedback with each other and with their teachers. Technology can have a reputation as creating isolation, but in our district we have seen the opposite.

#### 3) Access to Information and Resources:

to resources and communication streams that extend beyond school buildings and bell schedules. We are working closely with community partners to have increased connectivity at non-profits, community centers and businesses so that our students have an abundance of sites to access their education.



supports them in solving more complex problems. If you're not solving problems all the time — if you're using tools for just knowledge-base things — I think you've missed the boat.

## ➤➤ By its nature, technology changes rapidly. Where is it going in your district?

Yeah, by the time you go through the planning process and implement something new, something else has come along. I think you have to look at the broader picture. I would hope that our kids acquire essential skills around valid content and source materials.... I also see tremendous power in student collaboration. Students are becoming more astute at working in teams and solving problems collectively. That is counter to what many people think when they think of digital tools. 

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