THE JOURNAL

2016 READERS’ CHOICE AWARDS

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2016 READERS’ CHOICE AWARDS
Who reigns supreme in our second-annual survey of K–12 technology pros? Our tech-savvy readers name their favorite technologies in dozens of categories, from flipped learning software to tablets and convertible laptops.
By Dian Schaffhauser

9 STRATEGIES FOR MANAGING BYOD IN THE CLASSROOM
While BYOD can offer an opportunity for 1-to-1 programs in districts that might not otherwise be able to afford them, the downsides are not inconsequential. How are BYOD schools managing?
By Leila Meyer

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Even as schools continue to push toward digital, educators argue that students still benefit from traditional print resources. Meanwhile, open educational resources (OER) are beginning to gain traction, potentially displacing traditional, for-profit textbook publishers.

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K–12 leaders should prepare for a world where everything is connected online.
Educators Know Their Favorites in Technology

IT'S CLEARER THAN EVER that educators, despite considerable maligning by some education reformers, are enthusiastic about technology and are actively involved in innovating the way education is delivered. That was evident in our Teaching with Technology Survey from our previous issue, and it's reinforced this month in our second-annual Readers' Choice Awards.

More than a thousand tech-savvy educators and administrators voted in our awards program this time around, and the enthusiasm was palpable in their responses.

That’s a testament to our readers and to the education technology manufacturers, developers and publishers who continue to excel at delivering the tools our schools need to educate those 50 million students.

The Big Players

Big technology players like Google, Microsoft and Apple are having an enormous impact on education. Google with its G Suite for Education (formerly Apps for Education) and related software received a plethora of awards, including several platinum and gold honors, while Apple continued to shine with its ever-popular iPad and iPhone.

Microsoft was a hit not only for its traditional office products and its Surface tablet line, but for Skype and Minecraft as well.

Lenovo, HP, Dell, Cisco, Asus and Adobe had strong showings as well.

Ed Tech Companies

But education-specific companies fared at least as well as the tech giants. Lexia, for example, took first place overall in an open-ended question asking educators for their pick for the “most valuable” technology.

Google came in second place there, with another education player, Edsby, coming in third place.

In a similar open-ended question, Apple and Google tied for most valuable technologies educators are currently using in their capacity as professionals.

Promethean, Smart, Lexia, Renaissance, Microsoft, Epson, Boxlight Mimio, Edsby and Schoology also had an excellent showing on the list.

New This Year

In this second-annual survey, we added several new categories for readers to choose from as well, including favorite reading, math and science tools, along with STEM tools like coding products, robotics systems and, of course, 3D printers.

We also expanded it to include games and gaming systems, along with augmented reality and virtual reality tools and brought in additional hardware and software systems from the IT side of the house, particularly networking and security.

What the voting and comments from our participants this year shows is a level of sophistication that belies the undeserved reputation for obstructionism educators have in some circles.

We congratulate all of our winners and thank all of our readers who participated in this year’s survey and look forward to the innovations the coming year will bring.

To continue the conversation, e-mail me at dnagel@1105media.com.
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Our tech-savvy readers name their favorite technologies in dozens of categories, from flipped learning software to tablets and convertible laptops. **BY DIAN SCHAFFHAUSER**
EDUCATORS AND staff who work in schools and districts are a busy group. When they’re not keeping kids on track, communicating with parents or cultivating their own skills, somehow they’re expected to stay on top of technology that can help them do all of those jobs better. With that in mind THE Journal offers its second-annual Readers’ Choice Awards. We went out to our readership and requested their votes in numerous categories. People told us about their favorite products — from 3D printers to anti-virus to assessment and augmented reality headsets to student information systems to videoconferencing and wireless access points.

The overall results offer a portrait of a changing landscape. Because we told respondents to vote only in those categories where they had real favorites, we could tell which ones also attract the most attention these days. No longer is K–12 focused on the hardware. While categories related to computing devices drew plenty of attention, the real rallies took place this year in the voting on software related to learning — reading, math, learning management and professional development.

K–12 education is shifting away from delivering technology to keep the show running behind the scenes and placing new emphasis on main stage performances: engaging learners in innovative ways to improve student outcomes.
Most Valuable in Your Schools
When we asked people to name the most valuable technology for their school or district in an open-ended question, three names showed up in vote after vote: Lexia, Chromebooks and Edsby, in that order.

As one of many fans reported, platinum winner Lexia’s literacy program “is valuable mainly for the students, but it is incredible for the teachers. The teacher database is one of [a] kind. It allows the teacher the ability to pinpoint just what the student needs. The teacher is the ‘miracle’ worker of the program, and Lexia provides the necessary information to improve student achievement.”

Grabbing the gold this year was the Google Chromebook. As one enthusiast summed up, “Because of their affordability, ease of use and setup and integration with [G Suite for Education for Education, formerly Google Apps for Education], these are ideal fits for our cash-strapped districts.”

Edsby, which took silver, earned this accolade from a respondent: “It continues to be the heart of our school community online. It has increased the voice of our students, centralized announcements, assignments and document resources and given staff a way to work differently together.”

🌟 Platinum: Lexia Learning
🌟 Gold: Google Chromebooks
🌟 Silver: Edsby

Top 10 Favorite Technologies Currently Used
We also asked readers in an open-ended question to share their three favorite technologies they currently use in their capacity as education professionals. We added those choices up, figured out which ones garnered the largest number of votes and ranked them by count. Two companies kept popping up: Apple, for its hardware, and Google, for its software. After those choices, people expressed their affection for interactive whiteboards, literacy education technology company Lexia, and, more broadly, having as many computing devices in the classroom as possible. Multiple companies were named that also showed up as winners in other categories — with two exceptions. Boxlight Mimio sells all products interactive — whiteboards, touch boards, projectors, flat panels, ink capture and software. Edsby offers an online learning management system with data reporting and analytics.

1. All things Apple, most especially iPads, but also MacBooks and iPhones; and all things Google, particularly Apps for Education, Classroom and Drive
2. Interactive whiteboards, particularly from Promethean and Smart
3. Lexia
4. More computers, tablets, desktops and carts
5. Renaissance, especially Star 360 and Accelerated Reading and Math
6. Google Chromebooks
7. Microsoft Office and Office 365
8. Projectors, particularly Epson’s; and Boxlight Mimio interactive solutions
9. Edsby and Schoology
10. Document cameras

Best Reading Program
The top prize goes to Lexia, whose Reading Core5 programs blend reading help with assessment in a game-like environment that runs on multiple student computing devices. Gold was claimed by Renaissance and its interactive reading software. Silver went to Houghton Mifflin Harcourt’s Read 180 Universal, a blended application that helps students in grades 4 and up build reading comprehension, vocabulary and writing skills.

🌟 Platinum: Lexia Learning
🌟 Gold: Renaissance Learning Accelerated Reader 360
🌟 Silver: Houghton Mifflin Harcourt Read 180

Best Math Program
Platinum in this category went to two education tech leaders, IXL, with its gamified math challenges, and Renaissance, with its “math practice adventures.” Gold was claimed by DreamBox Learning, which delivers 2,300 standards-aligned lessons. Silver was earned by Houghton Mifflin Harcourt for its K-8 math classroom curriculum.

🌟 Platinum (tie): IXL Math and Renaissance Learning Accelerated Math
🌟 Gold: DreamBox Learning
🌟 Silver: Houghton Mifflin Harcourt GO Math!

Best Science Program
Discovery Education won platinum for its expansive combination of high-quality streaming media and interactive science textbooks, otherwise known as “tech-books.” Delta Ed’s FOSS won gold by building up a fan base for its project-based approach to science that adheres to the Next Generation Science Standards.

🌟 Platinum: Discovery Education
🌟 Gold: Delta Education’s Full Option Science System (FOSS)

Best Robotics System/Curriculum
Hands-down, the favorite source for education-oriented robotics was Lego, which offers the middle school-oriented Mindstorms line, with bundles and curriculum for teaching science, technology, computer science and math. Vex Robotics took gold for its combination of robotics kits and student competitions. Wonder Workshop emphasizes first-time robotics that teach the basics of coding.

🌟 Platinum: Lego Education
🌟 Gold: Vex Robotics
🌟 Silver: Wonder Workshop Dash & Do Coding Robots

Best Coding Tool/Curriculum
When educators consider their best options for teaching coding to students, what comes to mind more than anything else is platinum winner Code.org, a nonprofit that promotes an annual Hour of Code to encourage every teacher and every student to take up the practice. Gold goes to Tynker, which delivers self-paced programming lessons and curriculum for the classroom.

🌟 Platinum: Code.org/Hour of Code
🌟 Gold: Tynker

Best Formative Assessment
Some online programs do an excellent job of stealth assessments that students don’t
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even notice but still help teachers figure out what should be next for instruction. At that top of that list, earning platinum, is Renaissance with its Star 360 reading and math platforms. Close on its heels, taking gold, is Kahoot!, which helps the teacher create games that get kids jazzed about learning. Achieving silver in this category are two companies: Houghton Mifflin Harcourt, whose GO Math! offers functionality to let teachers create formative and summative assessments; and NWEA, a not-for-profit with a well earned reputation for building solid adaptive assessments, such as Measures of Academic Progress (MAP).

☆ Platinum: Renaissance Learning Star 360
☆ Gold: Kahoot!
☆ Silver (tie): Houghton Mifflin Harcourt GO Math! and NWEA

Best Summative Assessment
Two of the same companies that won medals in the last category dominate in this one too. Renaissance grabbed platinum. And NWEA took gold with MAP.

☆ Platinum: Renaissance Learning Star 360
☆ Gold: NWEA MAP

Best Learning Management & E-Learning
Google Classroom, the top reader choice for LMS this year, is the same online service that won platinum last year. Described by the company as "mission control for class," the application helps teachers create classes, distribute assignments, collect homework and deliver feedback. Perhaps most importantly, it’s free with Google’s G Suite for Education. A new addition to the list, Schoology received gold this year for its attractive combination of LMS and assessment capabilities. This is the second year that silver winner Edmodo made it to the podium, with its emphasis on connections and collaborations among teachers, students and families.

☆ Platinum: Google Classroom
☆ Gold: Schoology
☆ Silver: Edmodo

Best Education Networks/Professional Communities
When it comes to honing skills, educators have a lot of places they can turn for online connections and lessons. The most popular places among THE Journal readers are quite different environments. The Discovery Educator Community hosts online and in-person events, delivers teaching resources and shares community stories; Twitter is a place where people congregate for rapid-fire chats on specific topics and “follow” others in the community who may share their sensibilities and interests. Both of those won platinum this year. Gold winner LinkedIn adds a career-oriented touch by allowing participants to build a professional profile and maintain connections with others in the same or related fields, read articles posted by members and hear about new opportunities in research and professional development. Silver winners simpleK12 and Teaching Channel both offer a broad collection of online training specifically for teachers.

☆ Platinum (tie): Discovery Educator Community and Twitter
☆ Gold: LinkedIn
☆ Silver (tie): simpleK12 and Teaching Channel

Best Adaptive/Personalized Learning Tool
If the shopping suggestions offered up by Amazon amaze you with their uncanny connections to what you care about, imagine the same technology being applied to a student struggling to understand a new concept. The best adaptive and personalized learning tools do just that. Lexia took platinum in this category with its Reading Core5 product, winning nearly a quarter of all votes. Renaissance secured gold for its reading and math programs. Silver was a three-way tie between Edgenuity, Read 180 and Scientific Learning Reading Assistant, all of which aspire to apply data to deliver just the right learning experience to the student at the moment it’s needed.

☆ Platinum: Lexia Reading Core5
☆ Gold: Renaissance Learning
☆ Silver (tie): Edgenuity and Houghton Mifflin Harcourt Read 180 and Scientific Learning Reading Assistant

Best Intervention & Remediation Software
Whereas adaptive software works for every student, a slightly different category helps identify students who are struggling and may be going off track in order to bring them back onto course. Each of the winners in this year’s ranking address reading and/or writing. Platinum winner Renaissance, which is showing up a lot this year in the awards, won for its early literacy assessment program. Gold was a tie between Achieve3000, which customizes its reading and writing instruction to each student’s Lexile reading level, and Scientific Learning’s Fast ForWord, which uses brain science to create software for reading intervention. Silver winner Read Naturally focuses its many programs and tools on helping struggling readers achieve fluency.

☆ Platinum (tie): Renaissance Learning STAR Early Literacy
☆ Gold (tie): Achieve3000 and Scientific Learning Fast ForWord
☆ Silver: Read Naturally

Best ePortfolio
The best ePortfolio, according to our readers, is usually the same one built into the learning management system already in use. Perhaps that explains why three of the same LMS companies that took medals last year also appeared on the leaderboard this year. Blackboard Learn achieved platinum after winning gold in 2015. Open source, community-supported Moodle snared gold. And Instructure Canvas collected silver, alongside Seesaw, a dedicated ePortfolio product. The latter program allows students to document what they’re learning through photos and videos and then share it.

☆ Platinum: Blackboard Learn
☆ Gold: Moodle
☆ Silver (tie): Instructure Canvas and Seesaw

Best ‘Other’ Education Tool
Some education products defy common categories, so we’ve added a catch-all “other” vote for just that type of offering. Khan

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accomplishing silver, is the new kid here, taking gold for Skype, Office for Education. Microsoft also has its including Hangouts, Classroom and Apps this year, with 70 percent of the vote, is standing at the top of the podium to do the same, they have a bunch of out of the classroom or want their students to share the transformation away from paper-based lessons and towards student use of technology and digital content, with an emphasis on developing digital literacy.

Best Student Response Systems & Classroom Clickers
It used to be that “student response” referred to classroom clickers where the kids could answer questions posed by the teacher to keep their attention up. Nowadays that’s just one way to do the job. Kahoot, platinum winner, helps educators add gaming components to their lessons. Socrative, gold winner, delivers a passel of tools for managing classes, assigning work, creating on-the-fly quizzes and adding gaming into digital activities. Smart response 2, silver winner, fits the traditional definition of student response by allowing the teacher to create a question set that students can answer on their various computing devices.

Best Collaboration Tool
When teachers want to get together in or out of the classroom or want their students to do the same, they have a bunch of choices. Standing at the top of the podium this year, with 70 percent of the vote, is Google with its many collaboration tools, including Hangouts, Classroom and Apps for Education. Microsoft also has its many fans, taking gold for Skype, Office 365 Education and Classroom. Nearpod, accomplishing silver, is the new kid here, with an online service that allows teachers to create or download multimedia presentations that they can share with their students for interaction, response and assessment purposes.

Best Student Information Systems & Data Management Tool
As data comes to the forefront as a powerful tool for improving each child’s educational experience, the student information system is the most obvious place to start that use. PowerSchool earned platinum in this category for growing into a powerful suite of applications for managing school processes, including learning in the classroom, handling assessments and providing analytics and reporting. Skyward attained gold with its extensive collection of school and classroom programs for handling everything from attendance to test bank management. Silver winner Infinite Campus combines SIS and enterprise resource operations in one integrated product.

Best Lecture Capture/Screen Recording
As the flipped classroom goes mainstream, educators have a lot of choice when considering how to record their lectures or presentations. This year’s platinum winner, Screencast-O-Matic, offers a free version that lets the user make 15-minute recordings from the screen and the webcam and save them as a video file or post them to YouTube. (The $15/year version covers longer recordings, includes editing tools, and lets the user publish to additional places.) TechSmith drew both gold and silver with its basic and high-end products. Snagit grabs perfect screenshots and allows for quick, one-take videos. Camtasia provides video editing, animations and special effects for users who want more complete control over their videos.

Best Document Camera
Document cameras have grown way beyond their initial purpose of sharing notes or zooming in on a specimen. Now they can display content from the instructor’s device, record presentations for later viewing and provide microscope-caliber images for up-close examination. Last year’s gold winner, Elmo, collected platinum this year. AVer, which has multiple kinds of document cameras, picked up gold. And Smart, whose document camera integrates with its interactive whiteboards, achieved silver.

Best Classroom Management System
Classroom management goes far beyond keeping kids stapled to their seats and listening. This year’s platinum victor, ClassDojo, is a free app that helps teachers create a positive culture and then share those experiences with parents and that helps students record examples of their great work. PBIS, gold champion, is an online repository where the U.S. Department of Education’s Office of Special Education Programs makes its many tools available to schools and districts that want to transform how students and staff treat themselves, each other and school personnel. Silver winner Google Cast is better known for letting people broadcast their favorite shows from their small screens to their large screens. The education version does something similar by allowing teachers and students to share their screens wirelessly.

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**Best Projector Maker**
In this category the ranking was exactly the same this year as last year. And once again, one name stood considerably taller than the rest. Epson earned platinum with its education-friendly pricing and broad array of projector types — interactive, 3D, short-throw, large room and ultra-portable. For the same reasons, Hitachi secured gold, and InFocus won silver.

- **Platinum:** Epson
- **Gold:** Hitachi
- **Silver:** InFocus

**Best Interactive Whiteboard, Display, Flat Panel or Kiosk**
As was true with the previous category, this one also perfectly matches last year’s results. Even as projection technology is merging and expanding, the votes mostly went to platinum winner Smart Technologies, which long ago outgrew its interactive whiteboard roots to produce interactive displays, learning software and dry-erase whiteboards whose contents can be saved and shared. Promethean took gold with its popular collection of interactive whiteboards, walls and tables. Epson, silver winner, doesn’t offer a whiteboard per se; but then again, with its interactive projector technology BrightLink in place, who needs one?

- **Platinum:** Smart Technologies
- **Gold:** Promethean
- **Silver:** Epson

**Best Videoconferencing & Web Conferencing Tool**
Online sessions are no longer exclusive to distance learning. Google Hangouts, the platinum winner, is part of G Suite for Education. That version, which is free, can accommodate up to 10 participants; the “work” edition can handle up to 25 people. Gold winner Microsoft Skype takes classes on virtual field trips, makes lessons with experts available and offers “Mystery Skype” to bring classes from around the world together. Web conferencing pioneer and silver winner WebEx continues to supply reliable video and audio connectivity for any size of group.

- **Platinum:** Google Hangouts
- **Gold:** Microsoft Skype in the Classroom
- **Silver:** Cisco WebEx

**Best Virtual Classroom/Meeting Software**
This category and the previous one share functional boundaries. Two web conferencing winners also appear here: Google Hangouts for platinum and Skype in the Classroom for silver. Citrix’s GoToMeeting acquired gold in a competitive field with two dozen contenders.

- **Platinum:** Google Hangouts
- **Gold:** Citrix’s GoToMeeting
- **Silver:** Microsoft Skype in the Classroom

**Best Classroom Audio Distribution/Sound Enhancement System Maker**
Few would question the need for audio technology in a college classroom. So we’re a bit boggled by how few K–12 classrooms provide the same gear. Audio and sound enhancement products can help the teacher preserve his or her voice when the classroom is at its loudest (and most rewarding) level. Three of four winners showed up in last year’s tally, although in different orders. First comes Lightspeed Technologies in platinum position with its multimedia hub for amplifying audio. Smart, succeeding with gold, offers a couple of classroom amplification systems that integrate with its interactive whiteboards. Silver was a tie between Califone, which specializes in the “sounds of education,” and FrontRow, which accommodates all kinds of important sound in the school building: intercoms, paging bells, mass notification, classroom audio, lesson sharing and audiovisual controls.

- **Platinum:** Lightspeed Technologies
- **Gold:** Smart audio
- **Silver (tie):** Califone and FrontRow

**Top Educational Game or Gaming Tool**
Kahoot, which took a medal in the category dedicated to student response, also wins platinum in the gaming category with its easy-to-use platform for creating games. Gold winner Minecraft has long entranced kids with its immersive worlds that, depending on what kind of day the students are having, can be explored, built up or blown up.

- **Platinum:** Kahoot!
- **Gold:** Minecraft and Minecraft Education Edition

**Top Non-education Game Used for Instruction**
Although an argument could be made that Assassin’s Creed offers lessons in history and League of Legends teaches teamwork, those games won’t find a place in the classroom anytime soon. However, Minecraft has long had a home in K–12, as readers pointed out by voting it into the platinum position. Nothing else came close.

- **Platinum:** Minecraft and Minecraft Education Edition

**Best Gaming Platform**
Apple’s mobile device operating system, iOS, snared a third of the votes in this category to claim platinum. The games that play on the iPad or the iPhone are inexpensive and engaging, and most students feel like they’re getting a real treat. Gold went to the Sony PlayStation and the Windows Xbox, which require more investment, but nobody can deny just how immersive gaming environments can be when they’re fed from these consoles. Windows’ gaming capabilities triumphed for silver, whether the hardware is a Surface, a PC or a phone.

- **Platinum:** Apple iOS
- **Gold (tie):** Sony PlayStation and Microsoft Xbox
- **Silver:** Microsoft Windows

**Best Virtual/Augmented Reality Headset or Hardware System**
As educators figure out how to use VR and AR to bring a lesson to life by immersing students in new places and experiences, Google Cardboard, which won platinum, has become the favored method of delivery. It’s inexpensive and...
simple to operate. Up a big step is Samsung’s Gear VR, which collected gold for its Oculus-powered headset. And silver was a tie between Facebook’s Oculus Rift and Sony PlayStation VR.

🌟 Platinum: Google Cardboard
🌟 Gold: Samsung Gear VR
🌟 Silver (tie): Facebook Oculus Rift and Sony PlayStation VR

Best Virtual/Augmented Reality Software/System
Of course, without something to explore, those VR/AR winners in the previous category are really just clunky headbands. Only one company’s augmented reality platform emerged as a true victor. Platinum winner HP Aurasma is a smartphone app that allows users to blend their real world with interactive content or “auras,” such as videos and animations.

🌟 Platinum: HP Aurasma

Best Classroom Presentation Software
With a bit of rank shuffling this category features the same products as the 2015 winner’s list. Grabbing platinum for two years running is Microsoft PowerPoint, a true classic for presentation work built into Office and Office 365 Education. Gold this year went to Google Slides, built into Google’s G Suite for Education. Attaining silver is Prezi, the online slide-sharing program that offers a free plan for education users.

🌟 Platinum: Microsoft PowerPoint
🌟 Gold: Google Slides
🌟 Silver: Prezi

Best Office/Productivity Suite
This year’s rundown for best productivity suite exactly mirrors last year’s. Winning almost half of the votes, Microsoft Office and Office 365 Education achieved platinum. Second on the podium was G Suite for Education. Third for silver was Apple with its Productivity Apps.

🌟 Platinum: Microsoft Office/Office 365 Education
🌟 Gold: Google G Suite for Education
🌟 Silver: Apple iWork

Best Multimedia Authoring Suite for Education & Creative Software
This category too replicates last year’s two winners. Accomplishing platinum for the second year in a row was Adobe Creative Cloud with its robust collection of downloadable visual tools and education pricing. A favorite among Mac and iOS fans, Apple creativity apps attained gold with its mix of productivity apps and Photos, iMovie and GarageBand, available free for Macs and iPads.

🌟 Platinum: Adobe Creative Cloud
🌟 Gold: Apple creativity apps

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Best E-Learning Authoring Tool
For creating classroom content, two-thirds of teachers turn to the programs inside G Suite for Education, according to our vote, giving it platinum. Vying for gold in a tie were two very different kinds of products. iBooks is specifically intended for Mac users to create interactive texts for redistribution. Adobe’s Creative Cloud includes a mass of tools for building websites, cool visuals and other capturing output.

☆ Platinum: G Suite for Education
☆ Gold (tie): Apple iBooks Author and Adobe Creative Cloud

Best Media Tablet by Maker
Who makes the best media tablet for the classroom? Wooing seven in 10 votes, Apple’s masterful iPad, with its potential to run 1.5 million apps, zoomed to the top of the list to take platinum. Google Android-outfitted tablets claimed gold. And Samsung, a winner last year as well, claimed silver with a wide mix of tabs and views.

☆ Platinum: Apple
☆ Gold: Google
☆ Silver: Samsung

Best Chromebook by Maker
Chromebooks rock for quick boot-up, fast access to free productivity tools and lightweight form factors — perfect in K-12. The favored makers are HP, which won platinum this year; Dell, for gold; and Lenovo for silver.

☆ Platinum: HP
☆ Gold: Dell
☆ Silver: Lenovo

Best Windows Tablet by Maker
It would make sense that platinum would be earned by the company that understands Windows better than anybody else. And thus, Microsoft with its Surface line of tablets topped the list. Dell, HP and Samsung, which all offer Windows operating systems on some of their tablet models, accomplished gold. And Lenovo won silver with its ThinkPad tablet designed for education.

☆ Platinum: Microsoft Surface/Surface Pro
☆ Gold (tie): Apple iBooks Author and Adobe Creative Cloud
☆ Silver: Lenovo

Best Chromebook by Maker
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☆ Platinum: Chromebook by Maker
☆ Gold: Dell
☆ Silver: Lenovo

Best Convertible Notebook/2-in-1 Notebook by Maker
Two-in-ones serve multiple functions: Students can be productive in laptop mode, creative in tablet mode and on the move with foldback mode. Two companies won platinum medals for supplying convertibles to educators: HP and Lenovo. Dell’s inexpensive Inspiron line and pricier XP line succeeded in taking gold. Asus Transformers collected silver.

☆ Platinum (tie): HP and Lenovo
☆ Gold: Dell
☆ Silver: Asus

Best Education Notebook by Maker
The same roster of winners that swept this category last year did the same this year, albeit with new models across the board and one new vendor squeezing onto the podium. First came Apple with more than half the votes for its MacBook and MacBook Pro machines. Dell tied with HP in winning gold with numerous lines of laptops; for Dell that covered the Latitude, Inspiron, XPS and Mobile Workstations. For HP the popular models include the “Education Edition” laptops. Lenovo obtained silver for the second year running with several configurations of notebooks.

☆ Platinum: Apple
☆ Gold (tie): Dell and HP
☆ Silver: Lenovo

Best Virtual Desktop and Thin Clients
To simplify the process of keeping computers up to date and to extend the life of older hardware, schools and districts have turned to virtual desktops and thin clients to keep their computer labs humming. VMware, a new addition to this year’s winner’s circle, took platinum with its Horizon solution. Lenovo’s ThinkCentre line drew the votes to give it gold billing. Dell Wyse accomplished silver with its hardware and software components for delivering virtualization.

☆ Platinum: VMware Horizon
☆ Gold: Lenovo ThinkCentre
☆ Silver: Dell Wyse

Best Wireless Access Point or Hotspot
While platinum victor Cisco and gold champion Netgear appeared in last year’s ranking in the same positions, two new winners — Aerohive Networks and HP Aruba Networks — vied for silver this year. All of these winners offer help with E-rate planning and have deep experience in working with schools and districts.

☆ Platinum: Cisco Systems
Gold: Netgear
Silver (tie): Aerohive Networks and HP Aruba Networks

Best 3D Printer
In spite of all the froth and foam over the past two years in the 3D printing business, one company rises above all others. Long-time 3D printer maker MakerBot, a division of 3D printer pioneer Stratasys, won platinum for its relatively inexpensive printers and many education resources.

Platinum: Stratasys MakerBot

Best Network Management, Analysis and Monitoring Tool by Maker
This new addition to the Readers’ Choice offered more than three dozen products to vote for, but two familiar names took the medals: Microsoft with its comprehensive System Center for platinum and Cisco for gold. Both work well in the data center that uses the technologies and applications offered by the respective companies, whether those systems are on premise or in the cloud.

Platinum: Microsoft
Gold: Cisco Systems

Best Mobile Device Management Solution
Google Mobile Management was the surprise winner in this category, a startling win for a company that only entered the MDM space a year and a half ago. Google Apps for Work administrators can manage Android and Apple iOS mobile devices as well as Microsoft Windows phones, smartphones and tablets that use Exchange ActiveSync. AT&T’s gold prize goes for a solution with multiple suites to cover mobile devices, mobile content and application management, with AirWatch-hosted MDM at its core.

Platinum: Google Mobile Management
Gold: AT&T AirWatch

Best Anonymous Reporting Tool
Giving students a way to report anonymously on the activities going on in the hallways and after school can make the difference between building a school culture that teaches how to look the other way when bad stuff happens or one that shows kids how to tackle complex problems in a thoughtful, safe way. Platinum was claimed by MySafeSchool. Gold was taken by CyberBully Hotline. Both solutions have found fans in K-12 by providing simple reporting tools for use by students and effective workflows for follow-up work by the adults.

Platinum: MySafeSchool
Gold: CyberBully Hotline

Best Emergency Notification System
Whether it’s an intruder on campus, a bad weather alert or a case of head lice in the classroom, parents expect schools to communicate with them through the mechanisms they like to use. Platinum leader School Messenger and gold winner Blackboard Connect both give users a platform that unifies their messaging from a single console and accommodates multi-modal delivery.

Platinum: SchoolMessenger
Gold: Blackboard Connect

Best Firewall Software
Choosing a firewall these days is akin to picking out what level of car wash you want. Do you go for the underbody treatment with the deluxe package or stick with the overall clear coat that every deal includes? Do you choose the program that prevents unauthorized people from turning on your webcam or do you stick with the basics — keeping your machine safe from baddies like viruses, spyware and malware? In this voting, readers chose Kaspersky, lifting it into platinum position with a comprehensive set of security solutions. Close behind, winning gold, was Norton 360. And claiming silver was Windows Firewall, built into every copy of Microsoft’s operating system.

Platinum: Kaspersky
Gold: Symantec Norton 360
Silver: Windows Firewall

Best Firewall Hardware/Appliance
In this category Cisco achieved platinum with a quarter of the votes for its FirePOW-ER line of appliances. Although McAfee secured gold for its NextGen series, earlier this year that business was acquired by Forcepoint, which said it would bolster its own Stonesoft next-generation firewall with the addition of McAfee’s security experts.

Platinum: Cisco Systems
Gold: MacAfee/Forcepoint

Best Antivirus Tool
Platinum winner McAfee, which was recently peeled off of Intel Security to become its own corporate entity, blocks viruses, ransomware and malware and handles other chores, such as “shredding” sensitive digital files. Gold winner Microsoft has the advantage of building its AV tools right into the operating system and delivering it free from there. Silver turned out to be a tie between Avast, with its free PC/Mac/Android/iOS antivirus, and Norton AntiVirus from Symantec, which provides basic functionality to stop viruses and spyware for safe online activities.

Platinum: McAfee AntiVirus
Gold: Microsoft
Silver (tie): Avast and Norton AntiVirus

Best Classroom Furnishings by Brand
As classrooms evolve to become hotbeds of projects, inquiries and problem-solving (was it ever not that?), teachers have discovered that students do better when they have room to move around. Long gone are tiny matrices of chair-desk combinations. Mobility rules. In this new category Steelcase captured platinum with its education line of chairs, tables and planning resources. Bretford, claiming gold, offers a similar line of products and adds on carts for computers and tablets. Childcraft, a division of School Specialty that took silver, emphasizes early childhood learning and toxic-free furnishings and toys.

Platinum: Steelcase
Gold: Bretford
Silver: Childcraft

Dian Schaffhauser is a writer who covers technology and business for a number of publications. Contact her at dian@dischaffhauser.com.
As they implement 1-to-1 initiatives, school districts and teachers are striving to find a balance between the traditional textbooks still in use and new digital texts — from traditional book publishers, new software entrants and open educational resources. Part of the challenge is setting the proper pace for the transition and meeting student preferences for digital versus print reading material. Another is providing enough professional development and technical support for teachers as they move between print and digital.

“We don’t want teachers to use digital reading material all the time because students are bombarded with digital text,” said Nadine Aitch, assistant superintendent of St. Clair R-13 School District in St. Clair, MO, which launched a 1-to-1 initiative during the 2014-2015 school year. Tablets and laptops were provided to every student and teacher in every grade level. “We want to have a balance between print and digital,” she said. “The majority of small group instruction is still with a print book, especially at earlier ages.”

But St. Clair, which adopted a balanced literacy model several years ago, found that traditional print books couldn’t address varying student needs well. “We had textbooks that weren’t meeting the needs of all the students. The textbooks don’t challenge high flyers or meet the students who have special needs.”

St. Clair had some teachers who wanted to expand outside traditional print books to see if they could at times bring digital resources into small group instruction and get students excited about opening their Chromebooks or using their tablets to read. The district adopted an online literacy program from MyON, which personalizes reading for students by recommending books based on their interests, reading level and ratings of books they’ve read.

The digital platform for literacy gives teachers and administrators back-end data about how many books students are reading. And teachers say they are able to teach note taking and highlighting in ways that they weren’t able to do with a print book, she said.

Deephaven Elementary School in Minnetonka, MN, has turned to a platform for digital books called pivotEd in its 1-to-1 program. “Basically, it facilitates engagement between student and student and student and teacher,” said Kelli Whiteside, Deephaven’s media specialist. Each lesson in pivotEd is based on a Capstone book, and an e-book is included.

Deephaven has its students start in early grades learning how to do research both in print and online and to think about when to use each, Whiteside said. For instance, a third-grade student studying leopards learns how to search for books and articles from print magazine articles and to find reliable material in databases such as PebbleGo. Students in fourth and fifth grade are required to have an active library card because they need to access public library system databases. “Kids in elementary school do still need print material,” she stressed. “They like to interact with it and learn about all the features of a nonfiction text. They learn about captions, glossaries and things like that.”
Print Novels, Online Curriculum

If you visited Mike Saenz’s high school English class in Marble Falls Independent School District in Texas, you would most likely see students with a laptop in one hand and a novel in the other. The course work resides in a program called Odysseyware, which provides customizable curriculum and instructional tools. Saenz provides students print copies of novels and plays to choose from while he crafts customized questions about the book for them to address in Odysseyware.

“My thinking wasn’t that I needed to get just the right mix of technology and printed material,” said Saenz, who teaches in an alternative school with 50 students. “My thinking was just that we wanted to give the students more choice as far as novels and plays go. We want to get them reading more. Since we have such a diverse student population in terms of intellectual gaps, being able to assign or have them pick different novels or plays seemed to be the way to go,” he added. “and the easiest way to do that was to have the actual books there.”

The more advanced students he can steer toward Shakespeare or Cyrano de Bergerac. “That is a little more challenging, and we have other novels that are easier,” he said. “Some students will come in and say they haven’t read more than a paragraph before. Reading a novel is kind of intimidating.”

Saenz hands students a hard copy of the questions with the book, and he has created the lessons and questions in Odysseyware. The students are comfortable working online, he said. They like being able to see their progress. They can see how many assignments they have, what is coming up and what percentage of the coursework they have completed. “That is why I realized that if I wanted them to do something outside of Odysseyware, I needed to put it in Odysseyware,” Saenz said. “Fortunately it is really customizable, and you can make it do what you want.”

Giving Students Digital/Print Options

Patrick Larkin, assistant superintendent of Burlington Public Schools in Burlington, MA, has put a lot of thought into supporting teachers and students in the transition from print to digital.

“I know that there are districts that have mandated that everyone go digital. That is one mentality,” he said. Burlington Public Schools encourages teachers to use both digital and print and give its students experiences with both. Larkin said the learners should decide if digital or print is best for the task at hand. “I think it is unfair to ask a high school student who has gone most of their educational life doing things with paper and using traditional books to just pull the plug on that,” he said. “It is a workflow...
issue. It is going to slow them down and be frustrating. So we want them to be able to get their work done both ways and have choice. That is what we are looking for.”

Larkin said traditional textbook publishers are starting to offer digital resources to extend access but added that he doesn’t know if the value has necessarily increased. “Our new K-5 math program has a lot of online resources. Students can play games on an iPad that help solidify certain concepts. That is great every once in a while for certain topics.”

The sales pitch from the textbook publishers has changed from “with your textbook you get online resources” to “we’ll sell you the online resources and give you the textbooks,” but the price point hasn’t changed much, Larkin said. “We are trying to be conscious of the quality of the resources. We are wondering if with time and support, we could create some of this ourselves. If we create the resource, we could go back and revise it instead of being held hostage by a certain textbook resource. With open educational resources (OER), however, it is overwhelming for teachers to have the time to navigate through all the resources available to find things that are valuable.”

He sees a need to build a bridge to help teachers make the journey from their current reality of having pre-packaged resources purchased and given to them to allowing them some experience in choosing from a menu of resources where they have more control over the final product. “Thinking that we could just allow teachers to go out and search the web for materials and then find quality resources was a bit of a stretch,” he said. “My current thinking is that we need to have someone else, such as a third party or a new position in the school, curate quality resources for teachers and then house them in an organized web-based portal where teachers can access them.”

Larkin said he sees room for growth in the types of uses of digital devices in Burlington’s 1-to-1 classrooms. The students have devices and can access things online, but he said the goal has to go beyond just having students taking notes and reading things online.

“I think we have cleared the lower level hurdles of sharing resources online,” he said. “But as far as looking for significant things happening that are vastly different because of the access to technology, that hasn’t changed a lot, which is not surprising. We are hoping to move from lower-level uses to higher level, where teachers can do more creative things and make connections beyond the school’s walls because of access to the resources.”

**Phasing Out the Textbook**

Evergreen School District in Vancouver, WA, began a digital transformation a year ago, and that means the traditional print textbook is gradually being phased out, said Chris McMurray, assistant superintendent of teaching and learning. “We won’t be buying a text set again. It is not going to happen.”

The district’s curriculum specialists, knowing they were on track to having 1-to-1 devices by 2017, wanted to make sure that those devices would be used to extend learning and promote personalization. “To facilitate personalization, we needed to have flexibility in the resources, which meant we couldn’t be tied to any one book set,” McMurray said. “And that meant we couldn’t be tied to the traditional seven-year adoption cycle. We wanted to make sure our students had the best and most recent material possible, so that meant the teachers were going to be using digital content. We have been working on pilots of those and have moved to a digital assessment platform.”

McMurray said digital resources offer a greater opportunity to personalize the learning experience. “Bopping into Amazon or any online bookstore and being able to choose any book to read, and match up with your reading proficiency and your skill needs is an amazing thing you can’t do with a physical library,” he said. “That is where technology is allowing us to do the thing we have always wanted to do — address the individual need of each student. I don’t see books going away, but I do see us guiding the process of learning in the teacher’s mind and the student’s mind, so that the assignment of those resources is much more specific and pinpointed to the thing that needs to be done and where the student wants to go.”

But like Larkin, McMurray said there still is room for paper in a personalized environment. Every student is going to have unique needs, and not every resource is going to work for every kid,” he said. “We need to provide a resource for a student who really needs to have video or a student who really loves text and digs into paper. We need to address the diversity of learners.”

Evergreen is moving to OER, but the district only wants to go to OER that has been vetted, McMurray said. “OER began as this collection of random ‘Pinteresty’ types of lessons. You didn’t know what you were going to get and it wasn’t tied to a learning progression. Organizations such as Open Up Resources are taking this material and making sure it matches up with the same rubric you would use to assess any more traditional resource. That elicits something vetted and more trustworthy.”

**Professional Development Is Key**

Nadine Aitch of St. Clair, MO, said no effort to combine print and digital reading material will be successful without adequate professional development support for teachers. “Professional development is the game changer, in my opinion,” she said. “When we first implemented balanced literacy and 1-to-1, we hired literacy coaches and instructional technology coaches. You can give teachers all this great stuff, but if you don’t check in with them and make sure they are using it properly, they don’t have the time to do a lot of the discovery on their own.”

She said St. Clair also seeks to study data about the impact of the digital resources. “How are students growing in terms of reading levels as opposed to three years ago when we only used print? There has to be accountability and data review to make sure you are impacting student achievement the way you think you are.”

David Raths is a Philadelphia-based freelance writer focused on information technology. He writes regularly for several IT publications, including Healthcare Informatics and Government Technology.
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How the Internet of Things Will Impact Schools

K–12 leaders should prepare for a world where everything is connected online.

In Washington’s Snoqualmie Valley Schools, Operations Director Bill Davis can monitor and control several building-related systems from a computer or a smartphone, ranging from the heating and air conditioning to the clocks and security cameras — and even the locks on all the doors.

Having the HVAC systems connected to the district’s IP network makes controlling the temperature in each school easier, which helps save energy. Having remote access to the security cameras and door locks, meanwhile, could help save lives.

“We gave access to all of our first responders — police and fire — and they are behind us,” Davis said. “They’re going to be able to see into our classrooms if they need to. They’ll even be able to perform a lockdown in case of an emergency.”

Snoqualmie Valley’s example shows how the Internet of Things (IoT) is changing the way we interact with our physical environment. As more devices are made with software, sensors and network connectivity embedded within their components, K–12 leaders should consider how this trend could affect the future of their schools.

The IoT “is on a track to increase exponentially in the coming years,” said Kelly Calhoun, research director for education at Gartner. “Obviously, something so predominant is going to have a big impact on education as well.”

Calhoun said she used to joke not too long ago that even our toasters would have Internet connectivity. “Now, sure enough, you can buy a smart toaster that you can give directions to remotely,” she noted.

Applying the IoT to Learning

So far, the most common examples of the IoT in schools are “smart building” systems that help administrators manage their facilities, like the ones in Snoqualmie Valley.

Applications of the technology that can help with teaching and learning are largely
Some K–12 schools and colleges have begun using wearable fitness trackers to collect information about students’ exercise habits for physical education classes or student athletics.

For example, Oral Roberts University in Tulsa, OK, asks incoming freshmen to purchase and wear Fitbit’s fitness-tracking technology to record their steps for a required physical education class, with a goal of at least 10,000 steps per day. Tustin Unified School District in California is among the K–12 districts that are considering how to use fitness trackers and other wearable devices for learning.

In fact, the U.S. market for wearable technologies in education is expected to grow nearly 46 percent per year through 2020, according to market research firm Technavio, as students and faculty use smart watches, fitness monitors and other wearable technologies to collect and analyze information.

Becker said she believes there is a “citizen science” angle to the IoT that holds great potential for education. She pointed to a project being run for schools in the United Kingdom and Singapore by the U.K. company ScienceScope, called the Internet of School Things, in which students are collecting and analyzing environmental data using smart sensors.

“The ability for machines and devices to be connected through the internet so they can share data is particularly exciting,” Becker said. “Students are able to use sensing equipment to study the environment around them, and they can see the results of experiments in other schools — so they can compare these results to their own.”

The University of Oklahoma is using wireless beacons from Aruba to help students navigate its seven-floor, 400,000-square-foot library system. The beacons use Bluetooth Low Energy technology to communicate with students’ smart phones through a specially developed app.

Calhoun said the technology could be used to collect information about the kinds of resources that students are using as well. Each time a student enters the library, for instance, a network-connected beacon could log this visit — and campus leaders could use this information to watch for larger trends or even to build a profile of individual students’ habits.

Administrators could use this information to help identify at-risk students, she said, explaining: “How often is the student going to the library? In the cafeteria? Going to football games? Those are all signs of engagement, and they’re potential indicators of whether the student might be at risk of dropping out.”

**Issues to Consider**

Using networked devices to monitor student activity raises important privacy concerns, especially for K–12 leaders.

“Any device that gathers data brings the corresponding concern: What’s going to happen to that information?” Calhoun said. “You can understand why parents are super sensitive about what information is being collected, who’s allowed to see it and what happens to it in the future. Those are all issues that school leaders will need to work out.”

There are network implications to consider as well.

“You can’t have the Internet of Things without the internet,” Becker said. “The more devices you have online, the larger your network has to be.”

Marie Bjerede, who heads the Consortium for School Networking’s Smart Education Networks by Design project, said the remote sensors and controls embedded in most networked devices don’t take up much bandwidth. “Even if those sensors are all pinging once a second, it’s a fairly low data transfer compared to looking at a web page,” she said.

Still, many K–12 leaders tend to underestimate the demands placed on their network and how these can increase exponentially. Citing CoSN’s research, Bjerede said it’s not uncommon for school districts in the middle of a digital transformation to see year-over-year growth of 60 percent or more on their network demands — and that’s before other smart devices are added beyond student laptops or tablets.

Snoqualmie Valley’s smart building systems are controlled by Honeywell’s Enterprise Buildings Integrator (EBI) technology. All of the devices run on power over Ethernet, so they get their electricity from the network connection.

“We are very lucky that we have fiber running between all our buildings, which we own ourselves,” Davis said. Aside from the security cameras, the other networked devices aren’t very bandwidth-intensive, he said.

“One of the struggles we found early on was that we wanted to have our digital video manager centrally located, but that’s not a reality because there’s just too much going over our network,” he noted. “We have over 1,000 cameras in our district. Even the best fiber network in the world can’t handle that much data. So, we ended up putting [video] servers in all of our buildings instead.”

If you’re adding smart devices to your network, make sure you understand what the minimum specifications are for the equipment you’re buying, Davis advised, and then buy more than you think you need — whether it’s storage or power or bandwidth. Otherwise, you’re going to be buying something else six months down the road,” he warned.

Also, make sure all stakeholders who are affected by the change are involved in the planning, Davis said. Without a full partnership among IT, facilities management and/or curriculum specialists, any attempt to leverage the IoT in schools is “not going to work.”

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Digital Citizenship: It’s Not Just Good Curriculum, It’s the Law

What constitutes a good digital citizen? The International Society for Technology in Education (ISTE) has one answer. In its 2016 Technology Standards for Students, ISTE says good digital citizens “recognize the rights, responsibilities, and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.”

Meeting the objectives of that definition is no longer merely a matter of good curriculum. It’s a matter of law. At least it is for public schools and libraries that have received or hope to receive E-rate funds for their technology program.

As educators and IT professionals understand, in order to receive E-rate funds, schools and districts must be compliant with the Children’s Internet Protection Act (CIPA). CIPA requires schools and districts to have some sort of web filtering solution in place that protects students from harmful and inappropriate Internet content.

The CIPA policy goes a step further in its requirements for E-rate funding. Schools must also show that they are actively monitoring the online activities of minors and providing for the education of minors about appropriate online behavior. This includes interacting with other individuals on social networking websites and in chat rooms, as well as cyberbullying awareness and response.

For example, the Gilbert Public Schools in Gilbert, AZ, have adopted a comprehensive K-12 digital citizenship curriculum developed by CommonSense Media, an independent nonprofit organization dedicated to helping kids in a world of media and technology. The curriculum includes lesson plans, videos, short activities and assessments for each grade level and focuses on eight cross-curricular units (See “8 Cross-Curricular Units of Digital Citizenship”).

The state of Washington has taken this a significant step further. The governor Jay Inslee just signed into law a digital citizenship in public education bill, described as one of the first of its kind in the nation.

“A digital citizen,” according to the legislation, “includes the norms of appropriate, responsible, and healthy behavior related to current technology use, including digital and media literacy, ethics, etiquette, and security. Digital citizenship includes the ability to access, analyze, evaluate, develop, produce, and interpret media, as well as Internet safety and cyberbullying prevention and response.”

At Dell EMC, Adam Garry, Director of Education Strategy, and Dr. Katrina Keene, Education Specialist, work with educators on a daily basis to help them understand these objectives and how to integrate them into teaching and learning. “Being a good digital citizen has a lot of different strands to it,” says Garry. “One of them has to do with how kids are going to interact with information, whether they are consuming it or producing it.”

As Keene points out, it’s not a one-time lesson or instance. “Digital citizenship is not just a single event that happens once or twice a year at school. It should be embedded in every single lesson, every day,” she says.

Garry and Keene both feel educators realize teaching digital literacy is important. “We work with teachers every day to help them understand how they can integrate digital literacy into their curriculum and their teaching,” says Keene.”

8 Cross-Curricular Units of Digital Citizenship

Common Sense Media, a nonprofit organization dedicated to improving “the media and technology landscape for all kids, families, and schools,” has identified eight cross-curricular units of Digital Citizenship. Those units include:

- Internet Safety (distinguishing between inappropriate and safe connections)
- Privacy and Security (protecting data and identity)
- Relationships and Communications (thinking critically about online relationships)
- Cyberbullying and Digital Drama (determining what it is and how to prevent it)
- Digital Footprint and Reputation (aka Digital Shadow, “self-reflect before you self-reveal”)
- Self-image and Identity (realizing how students represent themselves online)
- Information Literacy (learning to find, retrieve, analyze, and use Internet information)
- Creative Credit and Copyright (legal and ethical dimensions)
Extend content filtering beyond the campus.

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BYOD (Bring-Your-Own-Device) initiatives can introduce challenges for schools, including network capacity limitations, equity issues for students who can’t afford their own device and support issues for teachers dealing with a variety of operating systems and device capabilities in the classroom.

Here are nine strategies employed by school districts to manage their BYOD programs in a way that ensures that student-owned devices contribute to, rather than detract from, classroom engagement.

**9 Strategies for Managing BYOD in the Classroom**

While BYOD can offer an opportunity for 1-to-1 programs in districts that might not otherwise be able to afford them, the downsides are not inconsequential. How are BYOD schools managing?

1. **Provide Training for Teachers**
   Introducing a plethora of student-owned devices to the classroom has the potential to cause chaos, so it’s critical to provide teachers with adequate training before launching a BYOD initiative. Before implementing its BYOD program, four instructional technologists at Lamar County School District in Purvis, MS, trained teachers how to use technology more effectively in the classroom. Ross Randall, director of technology at Lamar County Schools, said the training included “resources that help teachers utilize the students’ devices.” For example, teachers learned how to use tools like PollEverywhere for soliciting whole-class responses and Google Classroom for communicating with students and connecting the class.

   “Give the teachers resources and train-
ing for them to be able to incorporate those student devices into their class,” Randall said. “Just like any other technology that you integrate into a school, you want the teachers to be comfortable with using it.”

Calhoun County Schools in Anniston, AL, outsourced its BYOD professional development to Chalkable’s i21Zone. Jenel Travis, director of technology at Calhoun County Schools, said i21Zone’s trainers came into the school for two full days. The trainers modeled their BYOD concepts by recording a video, teachers collaborated with cadres of teachers to develop lesson plans.

“The professional development is a huge component of BYOD,” Travis said.

2. Provide a Buying Guide for Parents

While some school districts allow students to bring virtually any mobile device into the classroom, others place some requirements on devices students are allowed to bring to school. At Orange County Public Schools in Orlando, FL, students can bring only devices that meet the same specifications the district uses when purchasing devices for online assessments, “so that way students can practice in the same environment they’ll be assessed in,” said Mariel Milano, director of digital curriculum and instructional design.

To assist parents who want to purchase a device for their child, the district provides a BYOD buying guide that outlines minimum system requirements for laptops, hybrid tablets and tablets. “I think it helps the teachers, so if they want to plan a lesson where students are teaching each other concepts by recording a video, teachers know that every device in that classroom has a webcam and microphone. They might not all work the same way, but they have the same general functionality,” Milano said. “That allows teachers to find BYOD much less daunting.”

3. Provide School-Issued Devices for Students Who Don’t Have Their Own

There are always some students who don’t have their own device to bring to school, so many districts provide devices for those students to use for classroom activities. “Our district strategy has been to provide enough devices at every campus so that everyone has access to instruction and the materials that are needed to fulfill the classroom requirements,” said Frankie Jackson, chief technology officer at Cypress Fairbanks Independent School District in Houston, TX.

Calhoun County Schools has a similar approach. “Everyone in your class may not have a device, so we continue to provide carts of Chromebooks and checkout capabilities during the school day for students who do not have devices or cannot bring a device,” Travis said.

4. Establish a Student Code of Conduct for BYOD

In an effort to prevent issues with student-owned devices, Saint Lucie Public Schools in Fort Pierce, FL added a set of policies for responsible use of the network, internet and computers to its student code of conduct.

“It’s a part of the student code of conduct to ensure that it’s managed properly in the classroom for classroom management,” said David Jasa, program manager of information technology services. “So the teachers may say, ‘Right now I want you to put your devices away,’ and every student is expected to follow the teacher’s instructions.”

The district’s student code of conduct details responsibilities associated with digital citizenship, including rules related to cyber-bullying, expectations about student use of personal and school-owned technology and consequences for violating those policies.

5. Require Students to Use School Network

Although students at Lamar County School District are free to use texting and social media sites between classes, Randall, giving students the freedom to use their devices freely outside of class time reduces discipline issues in the classroom. According to Ross Randall, director of technology, giving students the freedom to use their devices outside of class time reduces discipline issues in the classroom.

Students at Lamar County School District, MS are free to send text messages or visit social media sites between classes. According to Ross Randall, director of technology, giving students the freedom to use their devices outside of class time reduces discipline issues in the classroom.
The district helps motivate students to use the school network by providing a very fast internet connection to its schools “so the students gravitate to it,” Randall said. “They want to get on there because their data plans are not nearly as fast as what we can offer.”

According to Milano, it helps teachers with troubleshooting and directing classroom instruction. “It also makes sure that there’s an element of control for safety,” Milano said. “If they ever navigate to a space that’s unsafe or they’re on a site that’s inappropriate, the teacher can shut that down right away. They don’t need to call the parent or get the parent to come to school or anything, which I think makes the BYOD process much less intimidating to school or anything, which I think makes the BYOD process much less intimidating to school.

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8. Provide Expert Tech Support
Inevitably tech problems will crop up that neither the teachers or students have the time or expertise to correct. Some districts have computer technicians on site at schools to assist with problems such as connecting to the network, logging on to online education resources and using the browser. While computer technicians at Cypress Fairbanks Independent School District aren’t there to repair student devices, they do what they can to help students who are having trouble with their device. “If a student’s having an issue and those technicians can solve a problem, then by all means, they’re going to work with that student to help them get onto the network and help them do anything possible,” Jackson said.

9. Remember that Devices are Just Tools
Regardless of what happens with BYOD in the classroom, it’s important to keep the focus on education rather than technology. “If the device isn’t working, that needs to be the least of the worries,” said Jenel Travis, director of tech at Calhoun County Schools in Alabama. “Most of the things that we’re doing on the devices are going to be internet-based, so … you should be able to move forward.”

It’s important to keep the focus on education rather than technology. “If the device isn’t working, that needs to be the least of the worries,” said Jenel Travis, director of tech at Calhoun County Schools in Alabama. “Most of the things that we’re doing on the devices are going to be internet-based, so … you should be able to move forward.”

The district helps motivate students to use the school network by providing a very fast internet connection to its schools “so the students gravitate to it,” Randall said. “They want to get on there because their data plans are not nearly as fast as what we can offer.”

According to Milano, it helps teachers with troubleshooting and directing classroom instruction. “It also makes sure that there’s an element of control for safety,” Milano said. “If they ever navigate to a space that’s unsafe or they’re on a site that’s inappropriate, the teacher can shut that down right away. They don’t need to call the parent or get the parent to come to school or anything, which I think makes the BYOD process much less intimidating for teachers.”

8. Provide Expert Tech Support
Inevitably tech problems will crop up that
Where you need us most.
Broadband access and network capacity are now the top priority among K-12 IT leaders, according to the Consortium for School Networking’s (CoSN) 2016 K-12 IT Leadership Survey. The fact that broadband access is now the number one priority for districts makes sense, according to CoSN. This is especially true since the two other top priorities are wireless access and mobile learning. “The ranking of ‘Broadband & Network Capacity’ as the number one priority,” the report concludes, “is a clear indicator that districts … are embracing online solutions.”

Of course, the issue for most schools is how to maximize their network investment for online teaching and learning, given the general budget constraints and lack of resources that most schools continue to face. The second E-rate Modernization Order, issued in December 2014, was designed to address the underlying connectivity challenges; as well as streamline and incentivize cost-effective purchasing in long-term scalable infrastructure solutions. Since the beginning of the 2016 funding year, E-rate applicants have been able to seek E-rate discounts for dark fiber (which, as the FCC has noted, can be an especially cost-effective option for some schools) self-provisioned fiber and lit fiber services that have previously been eligible for funding.

To further address cost-effective purchasing, the Federal Communications Commission recently adopted changes to the eligible service list (ESL) for funding year 2017. Among several proposed ESL changes was a revised description of eligible dark fiber service in Category One to read “Leased Dark Fiber.” The change is intended to help explain the distinction between lit fiber, leased dark fiber and self-provisioned fiber under E-rate program rules.

The proposed ESL changes also delete “special construction” from Note 2 under eligible Category One data transmission and Internet access service. This is intended to better reflecting the existing requirement that applicants who seek bids for either leased dark fiber or self-provisioned fiber also must seek and fully consider bids for leased lit fiber service. The FCC is now studying the responses to these and other proposed ESL changes prior to issuing any amendment.

Optimize the Investment
The importance of fiber to transform a school or district to a technology-rich learning environment is critical. Of course, which version of fiber a district selects makes the most sense depends on that district’s situation. As noted in the March 2016 report Maximizing K-12 Fiber Connectivity Through E-Rate: An Overview, “Fiber is generally accepted to be the only communications medium that can meet the bandwidth needs for all but the smallest school systems, but how schools acquire fiber connectivity in the most cost-effective manner will depend on the unique circumstances of each district.”

To help schools and districts to determine the best version of fiber for their particular situation, Smart Education Networks by Design (SEND—a CoSN leadership initiative that was designed to help schools and districts create scalable, affordable, and reliable networks) outlines some of the advantages of each version.

Leased Lit Fiber Advantages
- Lit fiber service provider handles setting up, managing, and maintaining a fiber optic network.
- Providers may be willing to absorb some or all of the cost of connecting the school to the fiber network.
- Connection costs necessary to connect the school to a lit fiber network are eligible for the E-rate funding.
- The application process for E-rate funding of lit fiber is less complex versus dark fiber and self-construction.

Leased Dark Fiber Advantages
- The cost of scaling the WAN bandwidth is typically much lower.
- There generally are fewer recurring costs (or operating expenditures) over time than with lit fiber.
- Dark fiber offers scalability, reliability and security benefits.

Self-provisioning Advantages
- This option offers the most flexibility in operating and maintaining the network.
- Self-provisioning offers scalability, reliability, and security benefits that come with controlling a network.
- Schools can potentially mitigate high up-front costs by letting other entities add their own fiber strands and build additional fiber connections off the school-owned fiber network.

Carefully considering the various advantages of each version can help schools and district optimize their investment in fiber.
DETERMINING BANDWIDTH NEEDS FOR 21ST CENTURY LEARNING: SOME GUIDELINES

According to the 2016 K-12 IT Leadership Survey, conducted by the Consortium for School Networking (CoSN), nearly 90 percent of K-12 IT leaders throughout the country expect their instructional materials to be at least 50 percent digital within the next three years. EducationSuperHighway, a non-profit focused on upgrading the Internet access in every public school classroom, has also reported that bandwidth needs in K-12 are increasing almost 50 percent every year.

According to a 2015 FCC report, though, 68 percent of all school districts in the country acknowledge not a single school in their district could meet the FCC’s long-term high-speed Internet connectivity target (described as 1 Mbps per student by 2018).

Given those reports, it’s more important than ever for IT consider a number of different issues that impact bandwidth requirements, including the type of digital learning applications being used, such as video, as well as on-line assessments, and administrative functions. The following guidelines can help.

The Potential Broadband Bottleneck

Recently, the State Educational Technology Directors Association (SETDA) revised recommended minimum bandwidth targets for the 2020-2021 school year. According to SETDA, district leaders should plan internal capacities of ranging from 300 Mbps for small districts, up to 2Gbps per 1,000 students/staff for an external connection to the Internet service provider and 10 Gbps for the district Wide Area Network.

Even that goal can be somewhat misleading in regards to broadband digital learning applications, especially video. While it’s important to evaluate the bandwidth requirements of individual applications, IT leaders also need to consider the impact of an application in total. That is, what happens when X-number of students in X-number of classrooms across X-number of schools in a district are simultaneously running a specific application?

Smart Education Networks by Design (SEND) created a scaled reference for the SETDA guidelines, using an active video session as an example. The scale shows that when 30 active video sessions are happening per room and there are 50 classrooms, the campus bandwidth requirement is 1 Gbps.

SETDA also notes there is no one-size-fits all model for digital learning. Bandwidth requirements will vary depending on the number of concurrent network users, the type of digital learning applications being used, and usage patterns.

Given some of those considerations, SETDA recommends download speeds ranging from 500 Kbps for email and simple web browsing to 1.5 Mbps to download a 1 MB digital book in .3 seconds for a single user. Of course, it’s necessary to multiply that by X-number of students in X-number of classrooms all downloading similar size digital texts at the same time.

SETDA fully recognizes schools’ broadband needs are “fluid” and may develop over time. Consequently, the association offers these broadband connection guidelines:

- Basic connectivity for supplemental enrichment, often located in a central computer lab: 10 Kbps per student/teacher
- Emerging Reliance on online education tools and resources, including partial 1:1 programs: 50 Kbps per student/staff
- Technology-rich Learning Environment, including formative and summative assessments: 100 Kbps per student/teacher (minimum)

Online Assessments

In any network capacity planning, IT leaders also need to consider requirements for on-line testing and assessments, such as the computer-based English and mathematics tests developed by the Partnership for Assessment of Readiness for College and Careers (PARCC). According to PARCC, based on a “per-user” basis, the minimum bandwidth requirement with caching is 5 Kbps/student. Schools that have students connect directly to the Internet during test administration should have 50 Kbps/student without caching.

As the PARCC guidelines state, “Minimum bandwidth requirements … account for the maximum level of connectivity needed to administer test content for any one portion of the assessments for mathematics and [English Language Arts/Literacy].”

Of course, digital learning applications and online assessments are only two of the requirements that IT leaders need to consider when planning for broadband capacity. School operations, including data systems operations, administration and reporting, and teacher professional development opportunities also affect bandwidth requirements. As SETDA concludes, the need for increasing bandwidth is clear, not only for the 21st century digital classroom, but “as core infrastructure for future innovation.”
FUELING THE EDTECH REVOLUTION: START WITH BENEFITS AND OUTCOMES

Does the rush to deploy digital learning technology risk taking the “personal” out of “personalized learning?” Districts across the country, along with their vendors, are pursuing various technology strategies to support 1:1 personalized learning initiatives.

The challenge is balancing the need to adjust the curriculum according to individual student and teacher abilities, with the scale and cost of deployment across all schools in the district. The risk is districts will select a system that focuses on a narrow aspect—such as tailoring the level of text based upon a student’s abilities. The real benefit of personalized learning is in tailoring a wide mix of educational activities—text, video, project, collaboration-based upon ability and providing a richer, more meaningful educational outcome.

Instead of focusing first on the technology that enables personalized learning, district IT leaders should focus on the wider instructional benefits and performance outcomes desired for students and teachers. Ideally the technology should provide students with choices on how they learn best, what motivates them, and what there are striving to achieve.

To bring all the various learning elements together into a robust “digital toolbox,” together with the increasing need to protect sensitive student data while enabling individualized learning, requires the same outcome-based approach to designing education networks.

Focusing first on the educational benefits and outcomes instead of the technology itself is what makes Ciena a game changer, says Daniele Loffreda, Ciena’s State/Local Government, Education & Healthcare Industry Advisor. “In working with school districts, we start by asking two critical questions,” he says. Those questions are:

■ What are the benefits of the specific network solution to the end users—students and staff?
■ How does that network solution help to improve their academic performance?

Those two questions, says Loffreda, are essential to Ciena, which he describes as both a network strategy company and a technology company. “Strategy is first,” he says. “It encompasses our personal engagement with the customer to understand their objectives, and includes our consulting, implementation work, and customer support.”

According to Loffreda, Ciena focuses on the business and personal outcomes, unlike a lot of other companies that focus purely on selling technology solutions. “Our interest,” he says, “is how the network can improve the district’s operation, how it can help a CIO do his or her job better, and what the network means for teachers and students in terms of personalized learning, graduation rates and curriculum retention.”

After fully understanding the expected outcomes of a district, only then does the company look at the technology. Then he says there are several additional questions they always ask, including:

■ How do we translate the best in class technology depending upon where a K-12 district is in their evolution towards a 1:1 environment?
■ How do we apply that best in class technology to a district’s particular situation through our high-touch consultative business engagement?
■ How can we help a district make a wise investment decision now, so they’re not just adding on additional band aids to the network in the future?

To answer those questions, Loffreda says it’s important for district administrators to understand the evolution of the network and the digital curriculum in planning their future broadband network needs. “We advise administrators to determine what their network requirements are going to be three to five years from now,” he says, “and then work back from there.”

Loffreda says that’s another example of Ciena’s unique position. “We try to help district leaders understand where technology is evolving in support of educational transformation,” he says, “instead of just knocking on the door trying to sell them something. We try to help them understand the evolution of the network and describe the choices they have based on that evolution.”

For example, Loffreda says school districts should figure a 50 to 70 percent year-over-year bandwidth increase. That recommendation is based on survey results from CoSN that project by the year 2020 at least 50 percent of a school’s instructional materials will be digital.

Of course, shrinking budgets are always a concern for most school districts. “That’s why CIOs and district IT professionals need to start thinking of the broadband network as a strategic tool, rather than a cost,” he says.

“When you’re requesting money for broadband—particularly from non-technical decision-makers—it’s important to quantify the impact of the bandwidth you’re requesting,” he says. “Link the network investment to the benefits, such as graduation rates or how it supports a richer personal 1:1 learning initiative.

In much the same way, Loffreda says, Ciena focuses on the benefits of the network solution for schools and districts and the users—the teachers, students, and administrators—and how that solution can improve their lives.

About Ciena: Ciena Corporation provides leading packet-optical platforms, intelligent software, and comprehensive services to ensure the performance, availability and security of critical applications—helping research and education networks keep up with the changing demands of a connected world. Ciena solutions leverage O

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Despite widespread acknowledgment of the advantages of mobile computing, students in nearly one-third of classrooms do not have regular access to mobile devices in the classroom — this according to exclusive data released to THE Journal by the national education nonprofit Project Tomorrow.

Project Tomorrow has been collecting data on the use of technology in American schools on a massive scale for more than a decade. Since 2003, the organization’s Speak Up Research Project has involved more than 4.5 million participants — teachers, parents, students, administrators and technology professionals — from more than 35,000 schools representing all 50 states.

A survey involving more than 38,000 teachers and librarians conducted last fall revealed that 49 percent of educators’ schools assign devices to students for use in the classroom or allow those students to use their own, and another 31 percent have devices available for checkout as needed.

Survey participants cited a number of advantages for using mobile devices in the classroom, including enhancing student engagement in school and learning (77 percent), extending learning beyond the school day (74 percent), providing access to online textbooks (72 percent) and providing a way for students to review class materials after school (70 percent).

The survey from which these data were taken was conducted in fall 2015 and involved, according to the organization, “415,686 K–12 students, 38,613 teachers and librarians, 4,536 administrators, 40,218 parents and 6,623 community members representing over 7,600 schools and 2,600 districts. Schools from urban (25 percent), suburban (40 percent) and rural (35 percent) communities are represented. More than half of the schools (58 percent) that participated in Speak Up 2015 are Title I eligible schools (an indicator of student population poverty).”

Project Tomorrow’s latest Speak Up Survey is open now and will run through Dec. 16. To participate and view results from past surveys, visit tomorrow.org.

David Nagel is editor-in-chief of THE Journal.
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