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MAY/JUNE 2014

A PROFESSIONAL JOURNAL FOR THE TECHNICAL SERVICE AND SUPPORT COMMUNITY

## K-12 GOES

# MOBILE

### Tablets in the Classroom



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**K-12 Goes Mobile:** Tablets in the Classroom

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# K-12 GOES

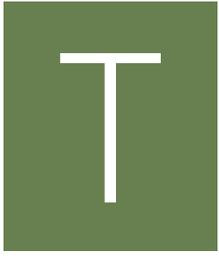
# MOBILE

## Tablets in the Classroom

By Peter Dorfman



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**T**en to fifteen years ago, America's public schools began wrestling with the issue of what to do about personal digital devices. Schools had already become technology-intensive operations, with electronic grading, district and school websites, and increasingly sophisticated network infrastructures. Cell phones, however, were widely banned from classrooms: teachers and administrators viewed them as distractions, prone to disrupting traditional lecture-style teaching, and suspected of providing ways for students to cheat on exams or harass one another.

But public education is seeing a radical shift in attitudes toward personal technology. Wireless is welcome in today's K–12 schools. In fact, about 40 percent of schools are fully wireless-enabled, according to *The Atlantic*, and the US Department of Education views broadband as a must-have for schools nationwide.

And cell phones? Some high-profile districts, such as New York City's under former Mayor Michael Bloomberg, have clung to bans, but nationwide, those prohibitions are being swept away, in part because parents have demanded that their children carry them for safety, but also because personal devices—most recently tablet computers—are catching on as educational tools.

Schools have long offered technology education, taught by specialist computer teachers, typically in dedicated labs, in high schools, middle schools, and even at the elementary level. But today, large and small districts across the country are adopting mobile devices as essential tools, and far from walling them off in computer labs, they've brought wireless-enabled PCs, Apple iPads, Google Chromebooks, and other devices into the classroom.

Large districts, like Orange County Public Schools (Orlando, FL), and smaller districts as well, such as New Braunfels Independent School District (New Braunfels, TX), have established programs that match students one for one with devices, supporting thousands of iPads and other computers that are issued to the students and stay with them for the entire school year, for use both in the classroom and at home.

A very large school system like OCPS—the tenth largest in the US, with 185 schools, approximately 190,000 students, and 23,000 employees—must roll out a program like this gradually. OCPS’s effort was approved in April 2013, and went live in August. They rolled out a technology program that provided multiple types of devices—iPads, iPad Minis, Chromebooks, and several types of laptops—to the first seven “digital schools” at the beginning of the 2013–2014 school year, according to Valerie Hall, an assistant director in the district’s Information, Communications & Technology Services (ICTS) office. If the budget for it is approved, the district will add three new digital schools in the 2014–2015 school year.

The program is just one of a number of technology initiatives rolling out in OCPS; the district is looking to replace its student information system as well. It’s a critical program, but it will require upgrades to back-end systems to enable mobile device monitoring (MDM), rostering, and the distribution of digital content.

New Braunfels is a small city located between San Antonio and Austin, TX, and its school district supports about 5,000 students. While it has a smaller student base and a much smaller budget than OCPS, it’s rapidly digitizing its schools, and it to achieve district-wide adoption of its iPad program in just a few years, according to Matt Jones, exec-

utive director of technology for NBISD.

NBISD has twelve campuses, including eight elementary schools, two middle schools, and two high schools. The iPad program initially focused on the two high schools, but it has since been expanded to include the two middle schools and is now in the process of pushing iPads down to the fifth grade. The program currently includes approximately 2,500 students, and will double to 5,000 when the adoption is completed.

## **Support Challenges**

Needless to say, each of these districts is entering a whole new world of end-user support complexity.

It's not hard to imagine the myriad disasters that could arise from handing thousands of expensive electronic devices over to kids as young as ten or eleven years old: shattered touchscreens, ports gummed up with gunk, software corrupted or erased...the possibilities are endless. But OCPS and NBISD seem unfazed, and, so far, the incidences of lost, stolen, or damaged devices don't seem to be out of line with those of other districts.

Public school districts, which are funded primarily by state and local taxes, are always closely constrained by cost considerations. As anyone who's ever browsed an Apple Store knows, the cost of an iPad isn't trivial. However, vendors offer significant discounts to put such purchases within reach of school systems, and the purchase cost of the devices turns out to be less significant than the costs of managing the infrastructure, licensing and distributing digital content, and training and supporting teachers, students, and parents.

Most districts provide centralized infrastructure support through a conventional district-level help desk. But districts that have begun issuing iPads across grades, or school-wide, have found that inventorying, tracking, supporting, and maintaining hundreds or thousands of simultaneously used devices is qualitatively different from old support models, which focused on network availability and bandwidth.

Another novel challenge, even to veteran support managers, has been maintaining and tracking inventories of mobile devices—across multiple campuses—and keeping them current, with the most up-to-date software, which generally is managed centrally and pushed to the individual devices. Most MDM systems are expensive and complex, with many features that make sense for a corporate enterprise but are overkill for the needs of a school system.

## **Motivations**

What motivates school districts to take these challenges on, especially with the pressure on superintendents to keep costs (and thus, the local taxes that fund them) down?

Clearly, there's a perception that personal devices can support programs that help students achieve more and score higher on state-mandated standardized tests. Tests scores are critical metrics, not just for individual students but for the schools as well. State and federal education funding is tied to a district's average test scores, so anything that raises scores is viewed as a worthy investment.

Critics question whether iPads and Chromebooks can help students engage more deeply with learning, arguing that children and adolescents already spend too much time online, interacting with electron-

ics in nonconstructive, irresponsible, even harmful ways. Supporters, however, point out that much of the work that students are expected to do—in school and in their future careers—involves researching and using information that is readily available and primarily consumed online. The issue, then, is not whether time spent online is harmful, but rather whether students can be trained and equipped to use online resources responsibly.

Some districts are also adopting nontraditional educational models in hopes of improving student performance, or of gaining greater output from their current staff and facilities without increasing costs. Computers can be tools to support new ways of teaching. An example is the concept, adopted by NBISD and growing in popularity in districts across the US, of “flipping the classroom,” which turns conventional teaching methodologies on their head.

In conventional, lecture-style teaching, teachers deliver lectures and students listen. Then, students work through practical exercises in class, enriching and reinforcing the lecture content with additional reading and exercises at home (homework). In a flipped classroom, students take in the bulk of the educational content at home, through recorded material, and use classroom time for enrichment and reinforcement. The teacher’s role shifts from that of a primary source of content to a primary source of facilitation, tutoring, and interactive reinforcement.

After the first year of the technology rollout at NBISD, the digitized schools began flipping their classrooms. This was a “24×7 process,” Jones says. Flipped classrooms lend themselves to “project-based learning,” which is why students needed ready access to digital devices.

These devices enable students to consume recorded content (including lectures in video), but they also facilitate collaboration between students working together on projects and provide access to online enrichment resources, as well as applications designed specifically for the class (digital content).

## **Critical Issues**

In order to succeed, school districts that aspire to put an iPad in every backpack must address several critical issues.

### **STAFFING**

OCPS uses a conventional help desk to provide support for the district. Each of its 185 schools has a part-time technical resource, and each middle school has a full-time technical resource, with two at each high school. Thomas McNabb, director of the ICTS's infrastructure team, says the district has tried a number of schemes for allocating technical resources, but the digital school model is a new paradigm. "You might say we're building this airplane while we're flying it," he mused.

Each of NBISD's twelve campuses has a full-time technical resource and a library/media specialist who serves as the main point of contact for students and the training lead; they share access to the five-person Instructional Technology team. The IT team visits each middle school and high school two days per week. The objective is ultimately to have a full-time technology assistant for each campus, which would be a new model for NBISD.

### **TRAINING**

NBISD's iPad training program has three legs:

- **Staff:** NBISD teachers have had iPads for the last two years, but the district has taken extra steps to prepare them for the digital school program. Teacher Readiness for iPads (TRiP), a training program rolled out more than a year before the device rollout, provides initial training on the basics of the device, including integration with the educational workflow, content delivery, and grading. Training includes ten to twelve weekly lessons, incorporating face-to-face and online training (with homework, of course). Teachers then attend a two-day boot camp for hands-on training over the summer, before the school year begins.
- **Parents:** After spring break, training is offered to elementary and middle school parents. Parent training is optional.
- **Students:** Students begin receiving iPad training the spring before their first year in a digitally-enabled grade; training is ongoing for fifth to eighth graders.

Continuous learning is encouraged and reinforced through a district website called Tec21 University, with materials developed or curated by NBISD staff.

The diversity of devices being adopted required a broader approach to training at OCPS, according to McNabb. At six pilot schools, teachers got Windows laptops; at a seventh, teachers received Windows laptops or MacBook Airs. Students were issued a variety of devices according to grade level. Kindergartners and first graders, for example, received iPad minis. "We're experimenting to see which devices give us the best educational experience for the least

cost,” McNabb explains. “Going forward, we’ll narrow down to a smaller number of choices.”

## **CONTENT**

Textbooks are among a school’s largest expense items, but in many (though not all) fields of study, print textbooks are rapidly being replaced by digital textbooks. Schools must keep up with this trend.

The textbook market is dominated by a small number of publishers, who are gradually transitioning from the world of bound books to digital publishing; Apple, through iTunes University, is an increasingly important source of digital content for schools.

Leaders of districts that are going digital give the old-line publishers mixed reviews. “We make a clear distinction between digital curriculum and digitized content,” McNabb asserts. “We’re not looking for a 200-page PDF. We’re looking for interactive material that really takes advantage of the digital platform, and traditional publishers have been very slow in delivering it.” Nevertheless, OCPS’s digital schools made the transition to digital textbooks in the 2013–2014 school year; those schools didn’t issue a single bound textbook. (This transition to digital textbooks is also a welcome development for parents who, for decades, have voiced concerns about the physical burden of heavy backpacks.)

NBISD is also experimenting with new models for digital content. “In many of our classes,” Jones notes, “kids can get by with the iPad and one notebook.” NBISD is participating in a pilot for the Digital Content Leadership Academies, a digital content development initiative of the Texas Association of School Administrators

(TASA). The program encourages the development of new content from within Texas districts, which TASA distributes free of charge. NBISD teachers are asked to create their own digitized content—although this is a request, not a requirement—and Jones indicates that the district has begun to produce sustainable, possibly even marketable digital content.

OCPS also produces original content, though thus far teachers have not been asked to generate it. The district has a very regimented procurement process, McNabb says, and it's unlikely to abandon its commitment to conventional publishers. However, the district is using more iTunesU content, and McNabb foresees increasing reliance on a music-industry-style model for content delivery.

## **IMPACT ON PEOPLE**

Intense media coverage of cyberbullying, exposure to inappropriate material on the Internet, and overindulgence in online gaming and social media have led to concerns that constant access to Internet-connected devices will distract students and encourage unproductive behaviors. However, thus far, Jones says, the widespread use of the devices doesn't seem to have led to any increased misbehavior. Parents are allowed to opt their kids out of the program, but few have.

“There have been parents who didn't want their kids taking the devices away from the school campus,” Jones said. “We give them options; the student can go to the Hub [a depot facility located in each school's library] and check the device in and out each day.”

NBISD also publishes an Acceptable Use Policy, which is posted

on a website where parents can read it; parents are responsible for ensuring their kids' compliance. The policy spells out an array of unauthorized uses, and makes it clear that only approved apps may be downloaded to the devices, and that the district reserves the right to inspect devices, either physically or remotely, to confirm compliance.

On the other hand, students are encouraged to personalize the devices: adding their own desktop images, naming their devices, etc. In the OCPS digital schools, students were prompted to take "selfies" (G-rated, of course) and put those on their desktops.

Students also are encouraged to set and maintain passwords, although these generally aren't required. Parents often object to passwords, Jones notes, because they make it more difficult for them to get into their kids' devices. "We don't encourage students to deliberately lock their parents out," he said.

For some students, these digital tools are the first computers in their homes. These initiatives have exposed the "digital divide" between households with Internet access and those without. The district can't equip every student's home with an Internet connection, but it can avoid exacerbating disadvantages between students who are and aren't connected at home. Thus, assignments that require online research or the use of cloud applications are limited to school hours. All homework can be done without an Internet connection.

## **SECURITY**

Even with generous education discounts, the devices schools are

handing their students are expensive, and there are legitimate concerns about sending them out with students, on and off campus. An obvious concern is theft. "Every device we put in a student's hands has inventory data etched in very large Comic Sans lettering on the outside," McNabb says. "Law enforcement finds this very helpful and has been grateful for it." OCPS also installs CompuTrace software on each device, he added.

Neither OCPS nor NBISD has seen any real tendency among the kids to abuse the devices. "I can remember one instance," McNabb says, "when a student got upset, threw an iPad down right in front of an administrator, and jumped on it. That was fairly dramatic. But generally, students have taken good care of the devices we've issued."

These devices are, of course, insured. The Orange County school district provides an accidental damage policy with a \$100 deductible, for which the student's family is responsible. The student is not responsible for the full replacement price; the deductible policy is simply a way of imposing consequences when the device is misused.

Nor has there been an epidemic of irresponsible usage or hacking. "Sure," McNabb acknowledges, "the stereotype of the fifteen-year-old hacker breaking security or downloading things he shouldn't has a grain of truth. On the other hand, when we identify a kid with technical skills, we put him or her on a future employees list. Why not channel that kid's technical sophistication toward doing some good?"

Maintaining an inventory, tracking what happens to each device as

it comes and goes from campus, and managing the apps for the entire device population is a complex undertaking. For NBISD and OCPS, creating, implementing, and managing a disciplined MDM program has been an eye-opening experience.

NBISD uses Airwatch (recently acquired by VMWare). Devices used by a particular class or grade can be registered in groups, and when necessary, apps can be pushed to an entire group. Similarly, devices used by teachers and other school personnel can be differentiated from student devices for purposes of app distribution and other management processes. However, while the tool is working well for NBISD, Jones does feel it's too complicated for the district's needs. "We need to track devices, lock them down sometimes, and push applications to them—but there's so much additional functionality there that, really, we don't use and don't need," he explains. "We would like to find something simpler."

Jones suggests that MDM vendors huddle with content providers to develop a clearer scheme for controlling what can and can't be downloaded to students' devices. "We need to be able to whitelist or blacklist apps to control what we approve and disapprove," Jones says. "Right now, the MDM system allows us to filter URLs but not apps. And Apple hasn't been helping. We source a lot of content from iTunesU, and what we allow isn't necessarily what Apple allows."

Devices running Apple's iOS can be managed entirely remotely. "We no longer need to actually touch anyone's device to put it in supervised mode," McNabb notes. "All of our iOS devices are in supervised mode by default. It's a function of the device's profile.

Of course, a smart kid can figure out how to change the profile, but we can see that.”

In addition to managing content, managing device availability has been a challenge. School districts have invested in network infrastructures with a focus on bandwidth, only to discover that the real challenge is being able to make enough concurrent connections available. “It isn’t just the number of devices in the building,” Jones says. “Each app is a connection. When we began this process, we tried to ask our network vendors the right questions about capacity, but even the vendor sales guys weren’t always up to speed on capacity in terms of concurrent connections.”

OCPS has found that not all of its schools are ready for the number of devices it must roll out. “We had to update the fiber optic backbone at one school,” McNabb says. “They just weren’t going to have the wireless capacity for all these devices.” Few campuses, in fact, are fully prepared for dense wireless access. The goal is to have a wireless access point in each classroom, but this will require additional time and investment.

Perhaps the most crucial lesson for both of these districts has been that technology change in a school setting should never be driven by technology managers; it always should be driven by the instructional side, to ensure that no one loses sight of the academic mission. “The program isn’t about the device,” Jones says. “It’s about classroom transformation.”



## About the Author

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