



ENTERPRISE & MOBILITY

Extending the Classroom Without Breaking the Bank

This document is one of a series examining the challenges, the opportunities, and the realities of how technological innovation is affecting the global education community.

BROCADE

HIGH-LEVERAGE TECHNOLOGY

A K-12 district in Saskatchewan or a community college in Kuala Lumpur face the same basic educational technology challenge: How can you provide the connectivity, the bandwidth, and the reliability crucial for e-learning, while dealing with budgets that are constrained and are likely to go lower? Multiple single-purpose technologies are cost-prohibitive. A technology that can be leveraged for multiple uses costs less and provides agility to respond to growing and emerging needs.

For a growing number of schools and districts, the answer lies in increased use of high-speed wireless technology. Although most schools have existing wired systems that still provide value, as e-learning needs grow to include new applications, leveraging one IP network to provide connectivity for multiple uses is widely preferred to the cost of adding additional networks. More and more institutions are turning to outdoor wireless broadband networks and indoor wireless LANs as more cost-effective alternatives to wired expansion as the education technology revolution takes hold. These wireless networks can be used simultaneously for data and file transfer, automated testing, video learning, video security, voice calls, and inventory management.

Wireless broadband networks and WLANs are proving themselves in all levels of digital learning environments. Wireless point-to-point (PTP) and point-to-multipoint (PMP) solutions are used to connect to a building; IEEE 802.11n mesh networks and wireless local area networks (WLANs) provide the access for IP-enabled devices such as testing devices, computers, printers, phones, laptops, and IP video cameras. Wireless solutions are also faster and easier to deploy and simpler to manage than wired solutions. And only wireless technology enables the mobile access that is crucial for the delivery of anywhere, anytime learning on- or off-campus. With these solutions, each classroom is enriched with data, video, and voice connectivity, while the same network provides connectivity to technical and support staff so that students' activities are coordinated, and supplies and facilities are fully prepared.

Fiction? Vaporware? Not really—there are schools doing this today with great results.

EXTENDING THE CLASSROOM

In a rural school district in the northeastern United States, students are first bused to a central gathering location, then transferred to a different bus for the ride to school. By state law, the second bus trip is designated as instructional time, with the school day actually beginning on the ride. To help students begin working immediately, the district is considering making each bus an "extended classroom" by providing riders with access to the school's network on their wireless devices. Students can: begin working on learning management tools such as Moodle, access digital content from applications such as SAFARI Montage, submit work to teachers, and have access to the school's virtual private network (VPN), making the bus ride productive learning time and enabling the district to comply with state law.

One of today's hottest topics in education is the idea of extending the school day, as well as its corollary—extending the classroom. As students become more dependent on using their mobile computers and wireless devices (such as smartphones and tablet computers), they can use them to learn anytime and anywhere. Wireless technologies help schools extend the school day by enabling students to safely and securely access the schools' learning tools and other education-appropriate materials available on the Internet. This enables them to work collaboratively with peers and to interact with faculty from anywhere on campus. In many cases, they can also access the network from home and from within the community. Some of those especially interested in creating a learning environment on buses are rural districts—in locations as diverse as northern Canada and the Australian outback—whose students must spend hours a day commuting to and from school. Other institutions use connected school buses for athletic teams, so that they can do schoolwork while riding to and from events, and for classes or groups on field trips.

MANAGING AND TRACKING ASSETS

The combined eighth-grade classes of a large suburban school district are embarking on a field trip to an art museum in the city. There are two full busloads of students, and keeping track of each group is crucial. The school district uses Radio Frequency Identification (RFID) technology to automate the task. Each student is issued a card with an RFID chip identifying the individual. RFID readers at the bus doors confirm that the right students are on

the right bus, that all students are accounted for, and that no one is inadvertently left off the bus or left behind at the museum.

Every school at every level has vast numbers of human and equipment assets that must be accounted for and tracked on a regular basis. Wireless technology that keeps track of students—for example, as they enter and leave a school vehicle or as they enter a lecture at which attendance is mandatory—is also ideal for keeping track of valuable equipment and assets. Tracking equipment—ranging from document cameras to smart boards to classroom furniture and sports equipment—using passive RFID tags helps schools use their assets more efficiently and productively. Institutions can also use wireless technology to assist in yearly supply and equipment audits. Imagine being able to use a handheld wireless scanner to audit a storeroom in 30 seconds, rather than spending hours manually checking items.



CAMPUS-WIDE OUTDOOR CONNECTIVITY

A major university with a multiacre campus is served by a WLAN that provides students and faculty with good interior coverage. However, in response to student and faculty requests, the school decides to also provide blanket outdoor voice and data connectivity. So it deploys a campus-wide Wi-Fi network that enables students and teachers to work and communicate online wherever they are, from the quadrangle to parking lots. At the same time, the outdoor wireless network provides all school employees—from maintenance to landscaping to security and more—to communicate in real time outdoors as well as indoors, helping to increase operations efficiency. The university is also using the network to deliver powerful security solutions, including remote video surveillance.

Whether they are going to school in Alaska, the Netherlands, or Dubai, digital native and millennial students want to be able to use their computers and wireless devices everywhere, just like they do at home. They want connectivity not just in the classroom or the library, but over the entire campus. And they want more than the erratic “bleed through” coming from indoor systems; they want full-service connectivity. Today’s wireless broadband technology is fast becoming the system of choice for schools that want to provide ubiquitous campus coverage, both to meet existing needs and as a competitive advantage. Wireless broadband networks deliver reliable, high-performance outdoor connectivity and are fast, easy to deploy, and exceptionally cost-effective.

PERSONALIZED MULTIMEDIA LEARNING

A multilocation regional school district is planning for 1:1 classrooms, as it initiates its strategy of providing a more personalized learning environment. The goal is to deliver the bandwidth necessary to support the so-called “worst-case” scenario in terms of demands on bandwidth. In the true 1:1 classroom, students have individual laptop computers, notebooks, tablets, and smartphones, and they are able to simultaneously view streaming video content from the web or from a third-party educational video management system. Each individual student is able to view and work with the content in his or her own way, and also is able to work more closely with the teacher in one-on-one sessions. The district strongly believes in the potential of 1:1 learning to effect significant improvement in overall student performance.

Delivery of bandwidth-intensive e-learning applications such as streaming video and multimedia is a challenge for virtually every school, whether K-12 or institutions of higher learning. This is a dual challenge. Institutions must deploy a network that can support the high levels of bandwidth needed both outdoors and indoors. Outdoor networks must deliver the bandwidth to the facilities; indoor networks must ensure that the bandwidth is available to classrooms and other areas within the school building. Some schools reduce their bandwidth requirements by using a single video feed per classroom, using projection technology to allow the video to be seen by the entire class. For schools dedicated to increasing personalized instruction, however, the goal is still true 1:1 computing. Schools preparing for this not-so-distant future are increasingly deploying outdoor wireless broadband networks and 802.11n WLANs that make use of the most advanced networking technologies. One example is networks that are based on the Brocade® intelligent adaptive architecture, which enables the use of high-bandwidth applications like video, multimedia, and online testing in very dense user environments, such as multiple 1:1 classrooms.



ONLINE STUDENT ASSESSMENT

In a major K-12 school district, administering standardized tests mandated by the government to be taken online causes a major disruption several times a year. In the past, the district has taken over gymnasiums for days at a time, running cables to a battery of computers set up on the floor. Students take the tests in shifts, which can often cause two or more days of disruption to the school’s normal routine. To make compliance with state mandates easier, the district has begun to deploy wireless LANs that offer the same performance and reliability as wired systems, yet allow students to take the tests simultaneously in their classroom. Testing time is dramatically reduced; testing supervision is simplified, and the school’s routine for those not being tested remains unchanged.

Online assessment is an idea whose time has come, especially since, in some parts of the world, it is about to become mandatory—or close to it. In the United States, for example, many states face pressure to adopt more rigorous new national educational standards and to enable online assessment within the next few years. Other governments around the world are considering similar initiatives. But government mandates are not the only reason schools are planning for online assessment. They also appreciate that computer-based testing enables faster reporting, more efficient data management, and increased security to comply with increasingly stringent testing regulations. Ultimately, especially with wireless technology beginning to be considered the standard testing solution, online and computer-based testing will increase the efficiency and effectiveness of standardized assessment, while reducing the cost of test administration and decreasing disruption of normal school schedules.

INCREASED SAFETY AND SECURITY

A large state university on the eastern seaboard of the United States is integrating its wireless broadband with RFID functionality to help manage and increase security in restricted areas of the campus. When someone swipes a card at an RFID reader at the entrance to a restricted area, an adjacent video camera automatically begins recording the person. Simultaneously, the system alerts security personnel at a centralized control point, who immediately confirm access through visual identification.

Educational technology helps improve campus life in ways that go well beyond digital learning and 1:1 classrooms. Security is one of the most important. Wireless networks that connect the campus both indoors and outdoors are ideal solutions for increased security for people and things. High-speed wireless infrastructures are proving to be exceptionally valuable by integrating existing and new video, access control, and asset management solutions into a more proactive, intelligent campus-wide security system managed at a centralized command center. Such a security system is easy to use, making monitoring simpler and more effective through built-in intelligence and automatic alerting mechanisms. Results include enhanced situational awareness and a faster, more effective response. Many schools also use wireless technology to create powerful temporary networks for improving security at special events, such as basketball and football games or parents' weekends. Through the use of video surveillance and real-time voice and data communications, security is heightened, and events can be managed more efficiently and effectively.

VISITOR MANAGEMENT

On football weekends, a university belonging to a major athletic conference faces a significant increase in traffic. Visitors regularly circumvent campus parking regulations, and the university's security staff is forced to spend valuable time ticketing offending vehicles. The school decides to leverage its wireless broadband network to deploy an e-citation system, in which each ticket is automatically entered into a system that enables online payment of fines and automated follow-up on unpaid fines. Results are significant. The system frees personnel from the time-consuming tasks of manual citation management, while at the same time improving the rate of first- and second-notice payment, resulting in increased revenue for the university.

Having a connected campus is one of the biggest competitive selling points for colleges and universities and even some private secondary schools. When visitors—including parents and siblings, students and faculty from other institutions, and spectators at sports events—visit the campus, the universal Wi-Fi access is both impressive and appreciated. Wireless networks enable the set-up of VPNs that let visitors access the Internet but that shield them from the school's network. This increases access while preserving network and data security. Visitor access can also provide a valuable source of revenue, for example, by charging visitors for Wi-Fi access or by implementing an e-ticketing system for parking and traffic violations. Many higher education institutions also use wireless technology for secure credit card transactions, both for tuition payments and for purchases at bookstores, sports stadiums, cultural events, and restaurants. Wireless networks also help attract campus recruiters and streamline the recruiting process, which grows more costly every year. Schools are in competition to schedule recruiters; providing Wi-Fi access to help them work more efficiently and productively offers a significant competitive edge, with students being the ultimate beneficiary.

SUMMARY

Universities, colleges, and K-12 school districts around the world are rapidly migrating to wireless or combined wired/wireless campus-wide communications environments. That is not surprising. High-speed wireless technology provides the bandwidth necessary to optimize the benefits to students from e-learning applications. Indoor and outdoor WLANs prepare educational institutions of virtually every size for the digital learning future in the form of 1:1 classrooms, increased personalization, and more timely and accurate assessment. The ability of wireless technology to provide anytime, anywhere access dovetails with digital native students' reliance on their wireless smartphones, tablet computers, and laptops. Wireless technology also allows administrators to monitor and manage a single network from a single command center, helping to increase campus safety and security, network availability, and performance consistency. Equally important, wireless education networks offer a measurable return on investment (ROI), lowering technology, deployment, and operational expenses and reducing total cost of ownership (TCO).

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