MOTOROLA

MOTOROLA LEADERSHIP SERIES

YOUR INFRASTRUCTURE WILL SUPPORT YOUR SCHOOL'S NEEDS 3 TO 5 YEARS FROM NOW.

TRUE OR FALSE?

INSIDE:

FIVE QUESTIONS K-12 SCHOOL DISTRICTS SHOULD ASK THEMSELVES AS THEY PREPARE STUDENTS, TEACHERS AND TECHNOLOGIES FOR THE FUTURE.

The simple "True or False" question asked in the headline of this report is in reality not so simple at all. It carries within it all the complexity and uncertainty of constantly evolving learning environments, including the movements toward digital platforms, increased personalization, 1:1 classrooms, online assessment, powerful learning management systems, ubiquitous network access, collaborative learning, streaming video and much more. It's not an easy question to answer, yet the answer is all-important for school districts dedicated to improving student performance by providing the best educational technology tools available.

WIRELESS: THE TECHNOLOGY OF TOMORROW

As they ready their networks and technologies for the future, most districts and schools are working in an environment that provides at least some legacy wired connectivity. In most cases, however, expansion of these wired networks to accommodate evolving e-learning environments and applications is both cost- and time-prohibitive. Most K-12 districts are quickly discovering the cost and performance benefits of network solutions that make increasing use of powerful wireless technology.

Virtually all K-12 districts and schools find themselves working with two distinct but interrelated networks: outdoor and indoor. Each has its own mandate and its own challenges. Outdoor networks must deliver sufficient bandwidth to school facilities to allow for maximum usage of bandwidth-demanding e-learning applications. Indoor local area networks (LANs) must provide for the use of this bandwidth in classrooms and other learning locations. As K-12 educators and IT departments prepare to plan and deploy or expand their networks, they are realizing that the most efficient and cost-effective educational networks are those that incorporate robust wireless technologies.

"[STUDENTS] HAVE ACCESS TO THE TECHNOLOGY THROUGHOUT THEIR WHOLE SCHOOL DAY. STUDENTS CAN USE THEIR TABLET COMPUTERS, THEIR SMART PHONES, THEIR PDA DEVICES AND VARIOUS TYPES OF TEACHING AND LEARNING TOOLS WIRELESSLY… IN THEIR CLASSROOM, FROM OUTSIDE, FROM ANYWHERE ON THE CAMPUS."

- JOE GRIFFIN, CHIEF TECHNOLOGY OFFICER
KELLER INDEPENDENT SCHOOL DISTRICT, KELLER, TEXAS

FIVE CRUCIAL QUESTIONS

As you consider your network needs for the fast-moving learning environments of the present and future, it helps to know the right questions to ask. To help ensure that your networks will meet both present and future demands, there are five relevant questions to ask your technology team. They're difficult and they're complex, but when you find the best answers, you'll be able to anticipate, define and deploy the educational technology solutions that will best prepare your educational networks for success over the next one to five years.

1. IS YOUR DISTRICT OR SCHOOL PREPARED TO SUPPORT ONE OR MORE WIRELESS DEVICES PER STUDENT?

The ideal 1:1 computing environment is perhaps best illustrated by some of our higher education institutions that provide a laptop computer for each incoming freshman. This may be ideal but it's also expensive. Most K-12 school districts simply can't afford to provide a computing device for every student. But that doesn't mean they cannot adopt a 1:1 model, because the reality is, most students will have their own devices, ranging from smart phones with Internet connectivity to the new pad computers to traditional laptops and netbooks. The point is, educational wireless local area networks (WLAN) must be prepared to support these wireless devices by providing high-performance Intranet and Internet access from a wide array of wireless devices. Wireless LANs deliver the power, performance and reliability for applications as diverse as video-on-demand, interactive collaboration and online testing and assessment in very dense environments such as 1:1 classrooms.

2. DO YOUR SCHOOLS AND REMOTE CAMPUSES HAVE THE BANDWIDTH THEY NEED TO SUPPORT THE GROWTH OF APPLICATIONS AND DEVICES IN THE NEXT FEW YEARS?

Many K-12 districts have rural or remote campuses or schools that serve students in communities that do not have broadband, and who have no access to digital learning content simply because of distance. In these locations, existing commercial

fiber networks are not as common as they are in the city, and the cost of expanding a wired network is almost always overly costly simply because of the distances involved. For a growing number of school districts around the world the answer again is wireless.

Today's wireless broadband technologies, such as point-to-point, point-to-multipoint and mesh solutions can deliver the performance and reliability needed to ensure that every student has access to the best learning solutions, even at the edges of the network. Wireless networks management systems, such as Motorola's One Point Wireless Suite, also provide the remote management and troubleshooting capabilities so important in a geographically diverse network. In addition, as with all wireless broadband solutions, deployment is fast and affordable, and able to support the entire array of student wireless computing devices.

"MOTOROLA'S POINT-TO-POINT WIRELESS NETWORK PROVIDED US WITH EVEN MORE BANDWIDTH THAN WE EXPECTED, SO WE CAN OFFER OUR 15,000 STUDENTS NEW AND INNOVATIVE INTERNET-BASED PROGRAMS NOW AND IN THE FUTURE."

- DERRICK HOFFMAN, SENIOR SYSTEMS ENGINEER
THOMPSON SCHOOL DISTRICT, LOVELAND COLORADO

3. IS YOUR NETWORK KEEPING UP WITH FACULTY NEEDS TO INTEGRATE MORE MULTIMEDIA AND OTHER DIGITAL CONTENT INTO THE CURRICULUM?

Teachers the world over are embracing digital educational programs and content to help increase personalization. School districts and schools must be prepared to provide the bandwidth necessary to deliver higher-performance content well beyond traditional solutions. In dense classroom environments with 30 or more students each using his or her own computer, an application such as streaming video will generally be both unresponsive and unreliable over slower connections.

High-speed 802.11n networks can help this situation by providing increased bandwidth, but traditional WLAN architectures still hold many bottlenecks that hinder the performance of high-bandwidth applications in dense user environments. Motorola's unique Adaptive Architecture has been designed from the ground up to support high-bandwidth applications like video in dense environments such as multiple 1:1 classrooms, delivering consistent, reliable, high performance content and download speeds to each student device (see sidebar).

MOTOROLA'S INTELLIGENT ADAPTIVE ARCHITECTURE

Not all 802.11n technologies are equal. Unlike traditional "thin" architectures, Motorola's innovative adaptive architecture uses highly intelligent access points to route information directly to its destination anywhere in the world while still taking advantage of the benefits of a centralized controller. This significantly reduces network congestion and enables the use of high-bandwidth applications like video, multimedia, and online testing in very dense user environments such as multiple 1:1 classrooms. At the same time, Motorola WLAN access points, including the industry's only tri-radio access point, are capable of providing the dual function of access and network management, allowing Motorola AirDefense security solutions to be run on an alternate radio. For both security and compliance, Motorola Network Assurance and Infrastructure Management solutions can be run on a single piece of hardware, eliminating the need for — and expense of — separate dedicated sensors.

4. DOES YOUR NETWORK PROVIDE ACCESS TO STUDENTS ANYWHERE, ANYTIME THEY MAY CHOOSE TO COLLABORATE AND LEARN?

Wireless supports the "digital native" students who have grown up with technology, and who want to be connected virtually everywhere. They want the same kind of reliable connectivity that lets them access Facebook virtually everywhere to enable them to connect with their school network virtually everywhere, too. In the classroom. Across campus. At the town library. In neighborhood coffee shops. Even on school buses and in cars.

Today's wireless broadband networks can offer reliable, high-speed WiFi connectivity on campus and even off-campus. They also support mobile connectivity. Many districts are, in effect, extending the school day by extending their WLAN to school buses, allowing students to use resources on the school's secure network while traveling to and from school, even at highway speeds. Use of buses as mobile classrooms is especially important for rural students and members of athletic and academic school teams who often travel long distances.

5. EVEN IF YOUR NETWORK IS FUTURE-PROOFED IN TERMS OF LEARNING TECHNOLOGY, ARE YOU LEVERAGING ITS ABILITY TO IMPROVE OPERATIONS?

Wireless networks are fast becoming the standard for digital learning programs and e-learning initiatives, providing the impetus for enhanced personalized learning and improving results in student performance. But that's only part of what wireless networks are capable of delivering. More and more schools are leveraging wireless for "converged campus communications" that provide a common platform and allow virtually every type of fixed or mobile device to interoperate seamlessly. These devices

include Voice over WiFi smart phones for administrators who need phone, email, Internet, and two-way radio capabilities in a single portable device. They also include handheld computers for facilities personnel who need access to maintenance records and online parts. They even include two-way radios used by school administrative staff and other workers and employees. Interoperability among all these devices helps enhance response in emergency situations and deliver the voice and data connectivity to streamline administrative processes.

In addition, network security systems such as Motorola's AirDefense Solutions keep outsiders out by providing gap-free 24/7 monitoring, detection and automated removal of rogue devices, and keep insiders in by preventing student devices from connecting to outside non-school hot spots. AirDefense also offers protection of student records in compliance with the most stringent industry standards and allows technicians to troubleshoot wireless issues across the district remotely, without travel. Wireless networks also provide for enhanced student, faculty, staff and campus safety with video surveillance of perimeters, parking lots and buildings themselves, emergency notification solutions and more. GPS capabilities allow tracking of school buses, and technologies like RFID can allow educators and administrators to keep track of students participating in school-sponsored off-campus activities. The bottom line is, the value of wireless broadband networks goes well beyond learning applications.

"THE MOTOROLA WIRELESS NETWORK… LETS US ADMINISTER OUR STATE-MANDATED TESTS IN A STRESS-FREE ENVIRONMENT BECAUSE OUR STUDENTS HAVE RELIABLE CONNECTIVITY TO THE PROFICIENCY EXAMS."

- LYLA DOWNEY, ASSISTANT SUPERINTENDENT OF TECHNOLOGY
CAMPBELL COUNTY, WYOMING, SCHOOL DISTRICT

FINDING THE RIGHT ANSWERS

If you need help in finding the right answers to these crucial questions, talk with Motorola. We offer more than 80 years of wireless leadership and innovation, and we're one of the education industry's most respected wireless communications partners. We're currently helping an ever-increasing number of K-12 and higher education customers with cost-effective, high-bandwidth wireless connectivity in 802.11n indoor WLANs and point-to-point, point-to-multipoint and mesh outdoor applications. We are the ideal partner in making certain you can answer the question proposed at the beginning of this report with a resounding "True."

MOTOROLA LEADERSHIP SERIES

This article is one of a series examining the challenges, the opportunities and the realities of how technological innovation is affecting the markets that most influence and affect the global community.

Motorola, Inc. 1301 E. Algonquin Road, Schaumburg, Illinois 60196 U.S.A. **www.motorola.com/education**

RO-29-108