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What **E-Living** is Teaching **E-Learning**

INSIDE:

Call him Joe. He's 13 years old and he lives in two places at once. He lives in Canton, Ohio, United States. But he also lives online. On a typical school day, he wakes up around 7:00 a.m. He immediately picks up his smartphone and checks e-mail and text messages, of which he has more than twenty. He returns texts while he gets dressed, checks scores online while he eats breakfast and begins Tweeting. He has more than 50 followers. He rides the school bus talking with his friends, while checking his Facebook Page, downloading a couple of music tracks and searching the Web for information on fault lines, the topic for his geography class second period. It's 8:45 a.m., and he's already been online for an hour and twenty minutes. Call him Joe, or call him Gerhard, Diego, Khalil or Hiroshi. He's a digital native and he's about to start his school day. The question is how does his school keep up with him?

The educational technology revolution is providing a three-pronged answer. The first is making sure he has access to the wealth of information available on demand on the Internet. The second is challenging him with a raft of innovative new e-learning applications. Last, but definitely not least, is reaching him through the high-speed communications networks that connect students both in and out of the classroom. No less an authority than the U.S. National Education Association's (NEA) says, "Communications technology is an effective tool to enhance the curriculum and support the restructuring of schools." The education technology revolution is beginning to connect students' e-living with their e-learning, and in the process helping to increase all-important student performance.

As a communications leader in both the e-living and e-learning universes, Motorola has a unique perspective that has helped us partner with and support educational environments — from K-12 to community colleges to universities — for decades. In this discussion, Motorola provides a technology-based perspective on the lessons e-living is teaching e-learning, and on where the educational technology revolution is likely to be headed.

There's no shortage of trend watching in the educational technology marketplace. A wide variety of sources — ranging from industry analysts to national and international standards bodies to teacher and administrator organizations and more — publish their best estimates as to what the future of education will look like as the technology revolution progresses. At Motorola, we view trending from a communications technology point of view. As we head into the 21st Century's second decade, the trends we are watching are not only helping to improve student performance effectively… but also cost-effectively.

Convergence of Living and Learning

The roots of the educational technology revolution are planted in the explosion of consumer and business technology usage. How do today's students — and teachers — use technology in their lives away from the classroom? In any number of ways: Internet browsing, texting, e-mailing, gaming, photo and video sharing, blogging, Tweeting, social networking, the list goes on and on. The old "one size fits all" classroom paradigm of a teacher lecturing to a classroom full of students cannot hope to compete with the ways today's digital natives learn on their own. Schools at all levels are racing to capture the interest and imagination of students by bringing the innovations of e-living technologies and applications into the classroom and the curriculum.

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More Personalized Education

The new education technology is beginning to make the term "class" seem outdated. Every teacher knows the frustration of trying to teach subject matter — whether it's first grade math or a graduate literature course — to a "class." What teachers prefer is being able to teach individuals: at their own pace and to their own levels of interest. Today's e-learning technology and applications are making more personalized education a reality at every level. Customizable e-learning applications and high-speed Internet browsing on individual or small group levels are leading to a more interesting, more in-depth, more personalized learning experience that is a major factor in increasing student performance.

Proliferation of End User Devices

Today's students, whether they are digital natives born in the late '90's or slightly older millennials, are leading a truly connected life. The respected Pew Research Group provides some astonishing statistics for school age children and teens in the U.S.: 93 percent use the Internet; 90 percent use cloud computing — for example, social networking on Facebook, saving photographs on Flickr or uploading videos to YouTube; 75 percent have their own cell phones or smartphones; 60 percent have their own desktop or laptop computer. Today's students live their lives having the coolest, most

functional devices imaginable. And they expect their schools to offer nothing else. Educators, of course, realize that. That's why 1:1 computing is becoming more prevalent, and why more and more personal end user devices are being used in the classroom.

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Greater Interactivity and Collaboration

In the introduction to its telecommunications recommendations, the NEA offers an excellent explanation of the changing nature of the classroom. "The (self-contained) classroom is an island on which a teacher, a group of students, standardized textbooks and other limited resources determine the educational process." Technology is changing this inward-looking model. "Instead of islands, classrooms have become links in communications highways transmitting data, video and voice to thousands of other sites… Teachers and students have easy access to vast databases and participate in joint activities that involve classes in other states and countries…" Collaborative computing enables students in the same program to work on projects together online inside and outside of the classroom, an activity not far removed, say, from social networking. Global connectivity also enables students to interact with their counterparts in other countries; exemplified by a third grade class in England establishing a video conferencing relationship with a third grade class in South Africa.

Preparing For What Can't Be Prepared For

Predictions of what is likely to happen in educational technology can be useful tools for helping the education community prepare for the future. But, especially in the technology world, reality often trumps even the most outrageous predictions. Five years ago, who would have predicted the popularity and the power of social networking, from My Space to Facebook to Namyz to Linked-In and more? How many foresaw that MP3-based downloading sites would become a resource for high-level educational content? Who knew that YouTube would become a collaborative learning environment? The point is, there are always going to be technologies and applications that are as unexpected as they are astonishing. In communications, the way to prepare for these new innovations is to plan and build networks that offer the flexibility, the interoperability and the agility to adapt quickly and seamlessly to whatever new equipment and applications may come along, no matter how unique or unforeseen.

Different User Perspectives

How do those most involved with education view the educational technology revolution? What do they like about it? What do they fear about it? What do they expect from it? What do they need from it? The fact is, e-learning has many constituent populations, each with its own perspectives on its usage and its value.

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Teachers. Over the past few years, many teachers have developed a nagging, underlying concern about what they are teaching their students. In short, they are concerned that by the time students graduate, what they've learned will already be out-of-date. It's no wonder then that most teachers seem to view technology as a positive force in education. They feel better about being able to teach using the latest information and being able to help their students adapt to the fast-changing world by being connected to a vast web of resources, interactivity and collaborative learning experiences. They also are largely pleased by being able to teach more personally on a student-by-student basis, but they want to make certain that e-learning applications can be tailored to their curriculum. On a practical level, they want to be sure that applications and devices are reliable and easy to use, and that they have a responsive, easy-to-access technology support system in place.

Teachers need to adjust content and personalize the learning experience to make it most effective for every student. To maximize learning opportunities, longitudinal learning data systems will play a bigger part in evaluating individual and class performance. They will also become a key tool that educators can leverage in enhancing the personalization of content. The wireless network and supporting technologies are a force multiplier in the classroom and enable personalization with limited teaching time and pressure to get through set lessons plans. The data systems and analytics in the front and back end are the tools that allow educators to adjust and personalize content quickly and intelligently for maximum student benefit.

Students. You won't find many students who are mourning the diminishing importance of the textbook. Most are more comfortable using their own personal devices or similar devices for learning both in and out of the classroom. Those who do not have computers are excited by the growing number of schools using the 1:1 computing model in which every student (and teacher) is provided with his or her own laptop computer or netbook. They like being able to access huge databases of information, and being able to interact with classmates and students in other locations around the world. But digital natives and millennials are also very demanding. They're not patient when they're used to high-speed access in their personal lives but are forced to use slower speeds at school. Or when there's no way to charge a battery in the classroom. They're also not tolerant of lack of performance, such as long delays while every student in a class of 30 is attempting to stream video onto their computers at the same time.

Administrators. At virtually every level of education, school administrators and principals constantly struggle to improve student and teacher performance while at the same time dealing with static or shrinking resources and budgets. First and foremost, of course, school officials must see that their educational technology programs are

effective. Is student performance being enhanced? Are test scores proving it? Does the technology make management of the school easier, e.g. with the use of online assessment and the new multi-functional Learning Management Systems?

Most administrators want networks that can help in a variety of other ways, too. These might include lowering the cost of voice communications with VoIP, promoting the building of virtual private networks that connect parents, students, teachers and administrators, and providing connectivity that can also help in campus-wide security, such as the use of video surveillance cameras to monitor remote locations. Educational networks must also offer network security, protecting student records and information from hackers. With today's economic realities, administrators also need telecommunications networks to be as effective at reducing costs as they are at increasing student performance.

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Communities.

The community — elected officials, administrators, parents and other residents — also has an important stake in educational technology systems. Most important, they want to be assured that their schools' telecommunications systems are helping their students succeed. Both communities and schools have a vested interest in seeing that *all* students succeed. Some rural areas and certain urban neighborhoods still suffer from the effects of the digital divide, having to cope with hard-to-reach locations and areas or neighborhoods where many students and their families are unable to afford either computers or connectivity or both. Community leaders want all students of all ages to have the high-speed connectivity that will enhance learning. This means having connectivity throughout the community, not just in homes, but also in local resources such as community centers and libraries. In some communities, public/private school, business and community partnerships are helping to deploy communication networks that provide connectivity to virtually every household and resident, helping to not only improve student performance but also improving communications for everyone.

Portrait of a Learning Network

What are the most important considerations a school, a school district or a college or university must take into account as they plan to deploy, extend or enhance their e-learning capabilities? What will best-in-class educational telecommunications networks look like? What are the attributes that must be in place in order to ensure network and student success? What are the most important educational—and operational— capabilities the system should be able to provide? What are the technology objectives school IT departments and administrators must keep in mind when planning and deploying a network?

Scalability and Growth

One of an educational institution's most basic goals is to build a backbone network that will not become limited or obsolete before its time. The best networks will be able to expand and grow quickly and inexpensively. The network must also have the agility to be able to quickly adapt to breakthrough technologies and applications that will be coming faster than expected. No educational institution can afford to rip and replace its communications network every few years. To provide optimum scalability, an education network must be stable and reliable at its core, be able to accommodate enhancements through software upgrades, support a multitude of applications and have the ability to seamlessly add new users and new devices.

Many schools at all levels also have fiber networks in place, and these networks by and large continue to provide good connectivity and value. As schools enhance and augment their wired systems with wireless communications networks, they must ensure that the two systems will complement each other and work seamlessly together.

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Crucial Network Attributes

In addition to providing for efficient, cost-effective network growth, there are numerous other network attributes educators and administrators must consider as they plan to develop or expand their telecommunications networks. To be a successful, performance-enhancing solution, an educational network must be capable of providing:

- Broadband Connectivity. The most crucial component of educational telecommunications networks is connectivity, more specifically, broadband connectivity. Not only must the network be accessible to student devices ranging from laptops to netbooks to devices, it must provide the high-speed connectivity that enables support for multiple bandwidth-intensive applications in environments in which dozens of students are using them simultaneously. These applications include Internet browsing, streaming video, video teleconferencing, interactive collaboration and countless others.
- High Availability. To be the foundation of the new e-learning system, educational networks must be available at all times. When a network has a reliability problem, the connected classroom is all too often put out of commission. Learning is disrupted. Students lose focus and teachers are frustrated. Lesson plans that rely on the Internet or e-learning applications may have to revert back to textbooks and lectures. Online testing may be disrupted. Student performance can suffer. In any school environment, reliability is paramount.
- Enhanced Security. Educational technology places an increased burden on network security. Students must not be able to hack into parts of the system where they don't belong or access inappropriate content from off campus networks. Criminal elements

must not be able to penetrate the network to steal student data and personal or school information. Wireless networks must be more than simply password protected; they must make use of today's strongest encryption and intrusion protection systems. They must also be in compliance with industry and governmental education communications and security standards.

- Interoperability. To provide the best service and value, educational telecommunications networks must co-exist and cooperate with legacy systems that are already in place. Ensuring that the network can work seamlessly with other systems assures that the campus network can be connected to off-campus networks, including community-wide residential and business telecommunications systems. Interoperability with local fire, police, EMT and other first-responder agencies enhances campus and personal safety, and connectivity between schools and educational networks enables more effective and more affordable online, remote and distance learning opportunities.
- Operational Efficiency. Administrators and IT departments are also looking for networks that provide functionality beyond strictly educational capabilities. They want communication networks that can also enhance operational efficiencies. These include capabilities such as real-time inter- and intra-departmental voice, data and messaging connectivity that helps improve both operational communications and employee productivity. Networks should also be able to help provide capabilities such as mobile connectivity for instant access to educational materials, staff resources and emergency assistance. In addition, they must be able to enable operations-enhancing applications such as Learning Management Systems, VoIP and video conferencing.

The educational technology revolution is well under way.

Technology Partnerships

The educational technology revolution is well under way. The focus for true success in integrating these technologies within the learning environment is two-fold: what capabilities and functionalities must educational communication solutions deliver; and how can schools ensure that these solutions garner early support from teachers and students for maximum benefit in increasing efficiencies and enhancing learning results. One of the most important steps to take is to partner with a leading technology organization, such as Motorola, that offers in-depth expertise and experience not only in wireless communication technologies, but the application of those technologies into a comprehensive solution in an education environment for maximum teacher, student and administrative benefit. Working together with Motorola and their highly knowledgeable and experienced partners, you'll be able to design and deploy an e-learning network that connects seamlessly with your students' e-living networks. The convergence of the two will lead to the ultimate goal of all educators: significantly accelerating improvement in student performance.

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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.

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