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The Evolving Educational Landscape

“Today’s kids are born digital—born into a media-rich, networked world of infinite possibilities. But their digital lifestyle is about more than just cool gadgets; it’s about engagement, self-directed learning, creativity, and empowerment.”

—Edutopia (2012)

INCREASED ONLINE ACCESS, MOBILE DEVICES, AND CONNECTIVITY

Societal shifts involving technology are beginning to have a profound impact on teaching, infrastructure, resources, stakeholder relations, and our learners. The opportunities include greater access to rich, multimedia content; the increasing use of online courses that offer classes not otherwise available; the widespread availability of mobile computing devices that can access the Internet; the expanding role of social networking

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tools for learning and professional development; and the growing interest in the power of digital games for more personalized learning (*Education Week*, 2011). Online access in particular has become embedded in the routines of daily life across the industrialized world (Livingstone, 2008). Understanding these shifts is key to developing a teaching and learning culture that best meets the needs of our students, while improving how we connect with our other stakeholders.

There are some interesting statistics that highlight people's use of technology. The average amount of time Americans spend online increased dramatically over the first decade of the twenty-first century, from 2.7 hours per *week* in 2000 to almost 2.6 hours per *day* in 2010. And that's the average; high school students are much more active users of Web 2.0 technologies (Rodriguez, 2010, p. 56). More than half (55%) of all online American youths, age twelve to seventeen, use online social networking sites, according to a national survey of teenagers conducted by the Pew Internet and American Life Project (2007). Three years later, this same project found that nearly three-quarters (73%) of online teens and an equal number (72%) of young adults use social network sites. Some 40% of adults 30 and older used the social networking sites (Pew Internet and American Life Project, 2010).

Other behaviors and trends are emerging as the world becomes more digital. In 2011, 71% of children, age eleven to sixteen, had their own games console at home, spending an average of 1.7 hours per day using this technology (Childwise, 2012). A study conducted by Andreu Casero-Ripollés (2012) found that young people's news consumption is oriented toward new media, especially social networks, while newspaper readership among young people is in decline. As a consequence, newspapers are no longer the primary source of information in the digital context (Lipani, 2008). Wi-Fi has become a mainstream wireless technology that provides Internet access at home to a wide variety of consumer electronics and mobile devices. Coupled with the proliferation of Wi-Fi-enabled devices, the continued expansion of broadband

services provides a solid foundation for further growth in home Wi-Fi adoption. Approximately 25% of all Internet-connected households in the world now have wireless home networks, which is about 439 million households worldwide (Strategy Analytics, 2012). The average U.S. household owns five devices connected to the Internet via Wi-Fi, wired, or cellular networks (Bloomberg, 2012).

These statistics verify a growing trend that the majority of our students, stakeholders, and teachers are engaged in online spaces and have ample means to access the Internet. Within these spaces they are creating, communicating, collaborating, and discussing. This is occurring on mainstream social media sites such as Facebook, YouTube, Twitter, LinkedIn, and Skype, as well as some relatively new ones such as Instagram, Pinterest, Tumblr, and Google+. Individuals find value in the amount of time spent using social media to connect with friends, read digital content, play video games, and create their own unique content. It is hard to deny the high level of engagement and interactivity that is taking place, all of which supports many of the essential skill sets that schools claim they want to enhance. This is the world into which our students are being born and within which all members of society are immersed. The conversation needs to shift from one that focuses on digital natives and immigrants to one that looks at the fact that technology now permeates virtually every facet of society. As the Internet continues to evolve, users will continue to adapt.

All these statistics paint a general picture of society's use, reliance, and infatuation with the Internet. Access to information in real time has become the standard, spearheaded by the continuous rise and evolution of social media sites. With the proliferation of mobile technology (smartphones, tablets, e-readers) and advances in wireless connectivity, it can be assumed that many of the statistics cited above are actually much greater. The following are some global statistics on mobile devices compiled by mobiThinking (2012):

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- At the end of 2011, there were 6 billion mobile subscriptions. That is equivalent to 87% of the world population and is a huge increase from 5.4 billion mobile subscriptions in 2010 and 4.7 billion in 2009.
- There were 11.1% more mobile devices sold in 2011 than in 2010.
- Total smartphone sales in 2011 reached 472 million units, up 58% from 2010. This makes smartphones 31% of all handsets shipped.
- The IDC predicts that 122.3 million tablets will be sold in 2012, rising to 172.4 million units in 2013 and 282.7 million units in 2016. By 2016, Windows will have made significant gains: iOS share will be 49.7%, Android 39.7%, and Windows 10.3%.

Society has a craving for accessing the Internet for a variety of purposes and now possesses the means to connect in many ways. In response to these shifts, some educational leaders have begun to recognize that the current structure and function of institutions of learning are not in tune with the real world that is continuously advancing beyond the walls of schools. Finally, conversations are taking place on how schools and leaders can take advantage of the phenomena associated with this digital-age renaissance. Once sparsely connected, we have now seen school investments in wireless networks that connect throughout buildings to the Internet. Having the infrastructure in place is one thing; using it to advance learning and enhance other facets of leadership is another. CoSN and the Metri Group recently conducted a survey of school administrators for the MacArthur Foundation and found that districts across the country are wary of venturing into the world of social networking during school hours (Lemke et al., 2009). The results of this survey are troubling, as we now have a generation of learners who are comfortable with and enthusiastic about using Web 2.0 technologies to collaborate and participate in the World Wide Web as creators rather than consumers (Rosen & Nelson, 2008).

As a result of the lack of initiative, fear, unwillingness to change, or not knowing where to begin on the part of school leaders, a natural disconnect has formed between key stakeholders and schools, because people are now heavily invested in using digital technologies for both personal and professional reasons. The longer this disconnect continues, the more meaningless and irrelevant our schools become to our students. It is time to transform schools into vibrant learning communities that are connected and allow access to numerous social media tools that can unleash the creativity of our learners. This will increase engagement and, ultimately, achievement. By understanding how reliant all stakeholders are on the Internet, leaders can develop strategies to better communicate information, enhance public relations, collaborate with other practitioners, discover opportunities to improve school culture, and be open to a nonstop pathway of new, innovative ideas.

ADVANCEMENTS IN EDUCATIONAL TECHNOLOGY AND CURRENT TRENDS

The Internet is not the only thing that continues to change. The advancement of existing technologies as well as the introduction of new tools has created a rich market for schools to utilize. Schools adopt educational technology to increase student engagement in learning; improve learning (i.e., higher standardized test scores); improve the economic viability of students (i.e., increasing students' abilities to succeed in a twenty-first-century work environment through teaming, technology fluency, and high productivity); close the digital divide by increasing technology literacy in all students; increase relevance and real-world application of academics; and build twenty-first-century skills such as critical thinking and sound reasoning, global awareness, communication skills, information and visual literacy, scientific reasoning, productivity, and creativity (Lemke, Coughlin, & Reifsneider, 2009).

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There seems to be no shortage of technology tools that are being used to increase student engagement, access and manage information, foster creativity, assess, curate content, and aid in conceptual mastery. Whether it is from societal pressures, marketing techniques, or a shift in vision, educational technology has become more prevalent in schools. Some schools have been adept at keeping up with those changes, while many others are falling far behind, creating a digital divide based largely on the quality of educational technology, rather than just simple access to the Internet (*Education Week*, 2011). How it is ultimately used and its relative effectiveness in improving teaching, learning, and leadership will be discussed later in this book.

Desktops and laptops have long been considered the standard when it comes to educational technology in schools. As these devices have evolved, their prices have dropped, making them much more attainable within school budgets. Many computer suppliers have instituted lease programs, which make their products even more attractive in these difficult economic times. In addition to computers, there are many common educational technologies that are being utilized in schools today and have begun to reshape pedagogy, conceptual mastery, professional development, and content consumption.

Interactive Whiteboards (IWBs)

Considered by many to be a standard in schools nowadays, the IWB is a presentation device connected to a computer and projector. It is typically mounted to a wall, but can also be configured to a rolling stand. A projector displays the computer's image in the IWB, and users can control the image using finger or interactive marker devices designed by the manufacturer. The appeal of IWBs lies in the opportunity for use of dynamic, interactive images, animations, video, and text of a size visible to an entire classroom (Lemke, Coughlin, & Reifsneider, 2009). The research has also found

that IWBs can have a positive impact on learning. Haystead and Marzano (2009) conducted eighty-five studies in fifty different schools and found large percentile gains in student achievement under the following conditions: The teacher had ten or more years of teaching experience, had used the IWB for two years or more, used the IWB 75% to 80% of the time in the classroom, and had possessed high confidence in using the technology.

Tablets

Tablets have exploded into the marketplace and have begun to be integrated into schools. These devices are more portable than laptops, and they are smaller and cheaper, which makes them very attractive centerpieces for 1:1 initiatives—that is, where every student has a device. Recent advances in digital publishing have resulted in many traditional textbooks now being available on tablet devices for a fraction of the cost. Apple has dominated the tablet market with its iPad, which launched in 2012. As of 2013, the Apple App Store supports over 700,000 apps for the iPad. Even with the iPad's dominance, the tablet market has become saturated with stiff competition from Android tablets such as those manufactured by Samsung. Tablets are a powerful educational tool because they provide access to informational tools for learning, and productivity can be used for research. In addition, they have the ability to replace traditional textbooks. For example, students and educators can access iTunes U for free and access entire courses of educational content for K–12 schools.

Document Cameras

These devices work very similarly to their ancestor, the overhead projector. Document cameras are connected to a projector in order to display the image of anything put underneath the camera, which is the main function of an overhead projector. What makes these devices more dynamic is their

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ability to record both video and sound, a useful feature that allows teachers to capture lessons and notes to make available to their students through a website. They are cost-effective, small, and portable. Some models even use wireless technology, so they don't have to be hardwired to a projector.

Chromebooks

Google developed this one-of-a-kind device that contains no operating system or hard drive. When the computer boots up, it connects directly to the Internet, and the entire process takes around ten seconds. They are very cost-effective, being hundreds of dollars less than laptops, popular tablets, and even netbooks. Users can create a free Google profile and log on to any Chromebook to access their Google Docs, favorite websites, or Web-based applications that they have added to their account. The major drawback to the Chromebook is that if the Internet is down, the device has limited functionality.

Apple TV

The allure of Apple TV is its ability to mirror images from any Apple device to a projector or television. The Apple TV device is connected directly to either an HDMI projector or HDMI port on a television. Once the mirroring setting is enabled on the Apple device, the image appears on the television or projector screen. Many schools have now begun purchasing and using an Apple TV, HDMI projector, and iPad to create a wireless IWB. Best of all, this setup costs about \$1,500 less than a mounted IWB, but maintains all of the benefits of this technology.

3-D Content

There has been a consistent rise in the use of 3-D content to enhance teaching and learning. From specialized projectors to visual learning solutions, content providers are continuing

to build upon their products to immerse students in virtual learning environments where they not only see, but hear and feel as well. These technologies are having a positive impact on learning. JTM Concepts of Rock Island, Illinois, began collecting data on the educational impact of its 3-D content in 2003. The results were impressive. Data showed that students who observed the 3-D simulations made a big jump from their prelesson to postlesson test scores while outperforming control groups who received traditional instruction (Gordon, 2010). A smaller study showed that students who observed the 3-D lesson improved an average of 32% from pretest to posttest, with substantial gains in every subgroup.

Cloud Computing

This term refers to any hosted service that can be accessed over the Internet. Many schools are now investing in virtual servers, which are much more cost-effective than traditional ones. For schools and administrators, the “cloud” has become a more effective and efficient way of managing documents, projects, and general information, as they can all be stored virtually and accessed anywhere. This has resulted in the adoption of Google’s suite of free tools by many schools and educators alike. As cost-effective and enticing as cloud computing is, many schools fear losing control of private student information. The Family Educational Rights and Privacy Act (FERPA) (20 U.S.C. § 1232g; 34 CFR Part 99) is a federal law that protects the privacy of student education records. The law applies to all schools that receive funds under an applicable program of the U.S. Department of Education. FERPA does not offer much guidance for schools on the selection and maintenance of cloud providers and the resulting relationships. The good news for school leaders, though, is that nothing in FERPA prevents schools from using cloud-based services, and schools across the country have embraced these solutions. When contracting any cloud computing solution, it must be clear that the party to whom the information is disclosed will not disclose the information to any other party

without the prior consent of the parent or eligible student. If this condition is not met, it is a violation of FERPA.

Web 2.0 Applications

Within the cloud are many applications commonly referred to as Web 2.0 tools. Many of these tools are free and work to promote essential skill sets such as collaboration, communication, creativity, and global awareness. Popular applications include Voicethread, Wordle, Animoto, Glogster, Prezi, Padlet, Poll Everywhere, Celly, and blogging platforms. Social media tools such as Twitter, Google+, wikis, blogs, and digital discussion forums are now becoming widely accepted as means to grow professionally. The only downside of Web 2.0 applications is that they are generally grouped together with mainstream social media sites such as Facebook and YouTube. As a result, many schools block them and prohibit access, feeling that their use is a violation of the Child Internet Protection Act (CIPA). Congress enacted CIPA in 2000 to address concerns over children accessing inappropriate content over the Internet. The Federal Communications Commission (FCC, 2011) provides details that schools need to know about CIPA:

Schools must certify that they have an Internet safety policy that includes technology protection measures. The protection measures must block or filter Internet access to pictures that are: (a) obscene; (b) child pornography; or (c) harmful to minors (for computers that are accessed by minors). Before adopting this Internet safety policy, schools and libraries must provide reasonable notice and hold at least one public hearing or meeting to address the proposal.

So why are the majority of schools blocking these amazing tools? School leaders are well aware of CIPA but are misinformed when it comes to the access of Web 2.0 applications. All that CIPA requires in order for schools to be eligible to receive e-Rate funding is that inappropriate websites are blocked.

In a 2011 interview, the Department of Education's Director of Education Technology, Karen Cator, explained that accessing YouTube and similar social media sites is not a violation of CIPA, and Web 2.0 sites do not have to be blocked for teachers (Barseghian, 2011). The takeaway here is that leaders must become advocates for the use of Web 2.0 applications in schools, working with all stakeholders to create an environment focusing on responsible use. They need to be active in creating and sustaining a safe online environment for students and Acceptable Use Policies (AUPs) that address misuse, and also ensuring that adequate supervision is provided at all times.

Mobile Technology

As mentioned earlier in this chapter, mobile technology (i.e., mobile phones, tablets, e-readers) have exploded into the marketplace and into homes. This trend has not gone unnoticed in the education world. Schools and leaders are beginning to see the value in purchasing mobile technology for 1:1 initiatives, while others are opting for more cost-effective programs that utilize the technology that students already own. These latter initiatives are commonly referred to as either Bring Your Own Device (BYOD) or Bring Your Own Technology (BYOT) programs. Regardless of the acronym, digital-rich environments are created as leaders begin to rethink existing policies that prohibited access to sites that have educational value and prevented use of student-owned devices that can be leveraged for learning. Mobile learning devices hold great potential since they can be used by a variety of stakeholder groups for assessment, content curation, research, organization, collaboration on projects, classroom walk-throughs, and observations.

Video Conferencing

As the Internet has evolved, so has video-conferencing technology. Long past are the days when this tool was only available to schools in affluent areas or through sparse grants. All one now

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needs is a webcam-enabled device (i.e., desktop, laptop, tablet, or smartphone), Internet connection, and either a program or app (e.g., Skype, iChat, Adobe Connect, Google Hangouts) to create a video feed. Schools now have the means to conduct virtual field trips, connect with authors, and collaborate with colleagues from across the globe. Using tools like Ustream (www.ustream.tv), schools can not only broadcast live events, but can even archive the footage for viewing at a later time.

OpenCourseWare (OCW) and Massive Open Online Courses (MOOCs)

One of the major recent advancements in educational technology has been the availability of entire courses from some of the nation's most prestigious universities and professors free of charge. The movement began with the Massachusetts Institute of Technology (MIT), which believed that making OCW available would enhance human learning worldwide by the availability of a web of knowledge (Vest, 2004). Harvard, Yale, Stanford, and the University of Michigan are just a sample of some of the universities offering access to their courses online through MOOCs. OCW is comprised of content in the form of university lectures, notes, and assignments with little emphasis on cohesiveness. MOOCs, on the other hand, are structured around lengthy courses aligned to online learning. In this setting, lectures are scheduled by professors or facilitators with associated deadlines, assignments, assessments, and community engagement. The accessibility and quality of OCW holds the promise of providing students and educators with more personalized learning options that can cater to diverse needs. In addition to universities across the globe, other organizations such as NIXTY (nixty.com) and Connexions (cnx.org) provide access to even more OCW options.

Virtual Schooling

Also known as cyberschooling or distance learning, this is a service that schools can invest in, available to students

anywhere at any time. Traditional schools can increase their current course catalogues by hundreds of new courses that cater to student interest. Key characteristics of virtual schools include credit attainment to complement studies at a local campus, and ability of students to work at their own pace; instruction is available year round, courses are taught by highly qualified teachers, and there is a wide range of courses available that are updated frequently (Kelly, McCain, & Jukes, 2009).

Electronic delivery provided by a virtual school can occur using synchronous communication, in which class members participate at the same time, or asynchronous communication, where participants are separated by time (Mielke, 1999). In a synchronous course, students meet with a live instructor at set times. The content is delivered using videoconference technology, and students submit their assignments to the instructor when due. In an asynchronous course, students can access the learning materials at times convenient for them, but all work and assignments are due within a specified period of time. As in a synchronous course, assignments are sent to a certified teacher. Virtual schooling offers students considerable benefits, including convenience of time and place (LeLoup & Ponterio, 2000). Popular providers include the VHS Collaborative (thevhscollaborative.org) and the Florida Virtual School (www.flvs.net/Pages/default.aspx).

Gaming

Long thought only to be a distraction, current research is beginning to tell a different story about gaming in education. James Gee (2007) derived a set of thirty-six learning principles from his study of the complex, self-directed learning each player undertakes as he or she encounters and masters a new game. He suggests that adherence to these principles could transform learning in schools both for teachers and faculty and, most important, for students. Steve Johnson (2006) even found that video games, from *Tetris* to *The Sims* to *Grand Theft Auto*, have been shown to raise IQ scores and develop cognitive abilities, skills that even books can't foster. Some

innovative schools have begun to seize the opportunity with educational gaming by investing in popular game consoles such as Nintendo Wii and Microsoft's Xbox 360 Kinect. Both of these systems can be used to support tactile and kinesthetic learning styles. This is significant, as ongoing research shows that students learn more quickly and easily with instruction across multiple modalities or through a variety of media (Lemke, 2008). One of the hottest gaming trends is *Minecraft* (minecraft.net), a world-building game that some educators have embraced to teach physics, geography, and the English language. Another exciting tool is VR Quest, where students can design 3-D virtual reality games aligned to the Common Core Standards. To learn more, visit www.vrquest.net.

A New Learner

"Our students have changed radically. Today's students are no longer the people our educational system was designed to teach."

—Mark Prensky (2001, p. 1)

The world has changed, as have the learners that schools are responsible for educating. They may be referred to as the iGeneration, Millennials, or Generation Y. Whether we like it or not, students today are immersed in an environment rich in digital media and tools. These tools have become status symbols, means of communication, and digital-age organizers. Many people would agree they have also become a student's nerve center, because so much of their lives are now influenced by the tools of the age. The attraction ultimately begins at a young and innocent age. All one has to do is observe a toddler with an iPad or a slightly older child building a virtual world in *The SIMS*. Observe enough, and it is tough to deny how technology does not spark curiosity, ignite ingenuity, and foster collaboration.

Students are engaged in their digital worlds, and they are learning without us. It has become a much more active process due to that ease of accessing information on the Internet and a wide range of tools that support constructivist

learning. Students are constructing meaning through the use of technology in ways that are relevant, meaningful, and fun.

Leaders of schools need to acknowledge that learners today are “wired” differently as a result of the experiential learning that is taking place outside of school. The learning styles of the active, digital learner conflict with traditional teaching styles and preferences. How can we possibly meet the needs of these unique learners if our practices are suited for a time that has long since passed? Ian Jukes, Ted McCain, and Lee Crockett (2010) provide the following characteristics of learners today and the resulting disconnects that they are experiencing in schools:

- Digital learners prefer to access information quickly from multiple-media sources, but many educators prefer slow and controlled release of information from limited sources.
- Digital learners prefer parallel processing and multitasking, but many educators prefer linear processing and single tasks or limited multitasking.
- Digital learners prefer random access to hyper-linked multimedia information, but many educators prefer to provide information linearly, logically, and sequentially.
- Digital learners prefer to learn “just in time,” but many educators prefer to teach “just in case.”
- Digital learners prefer instant gratification and immediate rewards, but many educators prefer deferred gratification and delayed rewards.
- Digital learners prefer to network simultaneously with others, but many educators prefer students to work independently before they network and interact.
- Digital learners prefer processing pictures, sounds, color, and video before text, but many educators prefer to provide text before picture, sound, and video.
- Digital learners prefer learning that is relevant, active, instantly useful, and fun, but many educators feel compelled to teach memorization of the content in the curriculum guide.

The learners that we now embrace in our schools grew up with laptops instead of books. They use keyboards more than they do pens. Students today want to know things all of the time. In their world, they can use numerous digital tools to learn whatever they want, any time and from anywhere. These students have been raised in a technology-rich environment, accept that this environment is the norm, and they have grown up surrounded by digital devices that they regularly use to interact with other people and the outside world (Prensky, 2001). They are what many refer to as Millennials or active learners.

As a result of the growing disconnect between their world and the world where they are supposed to receive a formal education, many students are bored with the classroom. The environment outside of school is more engaging, relevant, and meaningful. They routinely communicate with friends, see faces, hear voices, create works of art, and engage in conversations with other learners on the other side of the school world. *Their* world is drastically different from that of the schools they attend and the educators tasked with teaching them. The active learner often seeks knowledge online rather than using a textbook and has little tolerance for delays. This makes it important for educators to provide feedback to their queries. For many active learners, the idea of constructing knowledge within a social community has a great deal of appeal (Skiba & Baron, 2006).

Society has created these active learners that schools need to keep up with, not the other way around. They crave choices and want to be connected. Their connections mean everything. When they discover something they like, they are excited to share it with their friends using digital devices and social media tools. This is how they want their educational experience to be. Active learners want to learn collaboratively and to apply what they have learned through creative pathways. They prefer learning on their own time and on their own terms and want to be involved in real-life issues that matter to them. They want to use their personal devices to take

notes or, better yet, take pictures of teacher notes using a cell phone. At New Milford High School in New Jersey, this has become widely accepted by both students and teachers. The traditional way of doing things does not have the same impact it once did. Educators need to think about our own behaviors in the digital age and work to apply them for the betterment of learners of all ages.

It is important to understand that, even though today's active learners have grown up with technology, it does not always follow that they know how to use it effectively for learning. This is the responsibility of schools. We are tasked with preparing students for success in a world that is becoming more dependent on technology, a world that is also in need of a workforce that can think critically, solve real-world problems, and function entrepreneurially.

SUMMARY

Leaders need to be aware of the changing educational landscape, which includes societal shifts in technology use, advances in educational technology, and a new type of learner. Acknowledging and beginning to understand these changes are the first steps to developing a vision and strategic plan for creating a learning culture that provides access to tools that foster essential skill sets, celebrates success, supports innovation, and inspires students to learn and ultimately achieve. Digital leadership can begin here. If we discount the shifts occurring outside our walls and fail to embrace the new type of learner coming into our buildings, we will never develop the capacity to anticipate needed changes that will transform school culture for the better.