Implications of Shifting Technology in Education

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Abstract

This article examines the implications of shifting technology trends by looking at what we've lost or are losing, where we are, and where we need to go for making the needed transitions in knowledge and skills. Areas of growth within new media and the tech industry are good indicators of our growing interests in mobility, improved quality, and personalization, all happening within our increasingly global community. With the tremendous technological shifts, we need to consider the potential gaps or missing bits of knowledge slipping through the cracks. Then, determine where we need to go while forging ahead to provide the meaningful integration of new technologies through the selection of quality tools aligning to current best research based instructional practices to foster powerful, meaningful, engaged learning opportunities.

Keywords: technology, instructional technology, instructional design, instructional design and technology, technology trends, shifting technology

Instructional Gaps

While talking to an engineer volunteering to work with middle and high school students on a robotics competition, he expressed his surprise at how the students did not have a basic understanding of simple everyday concepts like clockwise and counterclockwise. A school nurse complained how sick students came into her office and when handed a phone to call their parents, they did not know how. At a recent workshop presentation for middle and high school students they were told to e-mail the information to the group leader then to their own account. It was surprising how many did not know how to do it. How can this be happening in this day and age? Were the students not taught the knowledge and skills through authentic experiences, did they not have access to the technology, are they using different terms or formats for communications? These events cause one to wonder what the root causes might be and to think about whether they need to be addressed. If so, how, especially when considering ourselves to be in this technologically advanced era?

Shifting Technologies

From simple observations, reading magazines, newspapers, and Internet articles, to watching the TV news we are seeing many new technologies arrive and old ones go away, so it is important to reflect on what we are gaining and losing in the shuffle. Think about the recent losses of or declines in the markets for stopwatches, calculators, compasses, print cameras, network TV, portable radios, tapes, CDs, DVDs, GPS units, big box games, rolodex organizers, maps, books, magazines, newspapers, travel agents, and greeting cards; just to name a few. Locally the large bookstores and news stands have disappeared, video stores closed, office supply store stocks dwindle, no local printing presses anymore, even the local newspaper is making deep cuts in hardcopy, while working to develop an on-line presence.

Radios and TVs are being challenged at every turn to keep people interested in their nearly real time media. We have a younger generation often more interested in what the Internet has to offer than the traditional entertainment options. The newer media offers a more personalized, interactive method of learning, socializing, and entertainment on a reduced or no cost basis.

The major greeting card companies are

slowly reducing employees. This is happening as digital card use continues to grow with the added features of audio, video, and animation provided at a reduced or no cost basis. The selling of card stock paper for self-printed cards, again demonstrates the digital shift towards increasing user control. We are seeing traditional magazines and books going to digital formats. According to various popular press articles, more books are being sold as e-texts than as hard copy or paperback combined. Learners now have small, compact, increased access using mobile devices. The subsequent increase in self-publication software and apps provides a way for anyone to publish then share globally within a richer media platform while bypassing editor restrictions.

It seems like the current level of expectation to produce more at a faster pace has resulted in writing being shorthanded in most of our everyday communications. Elementary classroom teachers have been discussing whether students still need to know how to physically write with everything going digital today. Though typing electronically is quick, voice command typing is even faster. In addition, digital writing offers the support of immediate spelling and grammar checking. It is not fool proof and still requires a good foundation in writing basics. With the decline of writing checks for bill payments and an increase in electronic banking transactions, it is also reducing the need for handwriting. So, when reflecting on how handwriting has been so centrally necessary to building and preserving our culture, it takes a shift in mindset to see it should still be preserved even if performed electronically. I believe we can all agree, no matter what medium is used, students still need to have the knowledge and command of effective two-way communication skills including recording their thoughts, knowledge, opinions, discoveries, and inventions in a clear and concise way.

No sooner do we have to decide whether to save writing skills, and then smartphones arrive with their heavy and direct affect on new technology shifts. Most students are now packing an impressive set of apps used for learning, sharing, and even entertainment, all in their pocket with access at an all time high. One smartphone app called TuneIn (2012) currently advertises access to over 70,000 radio stations and two million podcasts with listeners from 230 countries. Talk about seductive and personalized, just shake your phone and it will locate similar stations, how sweet is that? It is only logical to see where this could be headed

with continued growth. How long until our cars are standard equipped with this expanded access? Imagine the possibilities of students having this type of access to timely International news and the ability to hear reports in different languages, as we become a more global society.

Many of the older technology declines are directly attributable to technology shifts with quick direct open access through the Internet, for personal e-mail, chat, social media, new and improved software, tools, mobile devices, and apps. As a result, digital alternatives are quickly taking the place of our more traditional tools with the lure of small, mobile, quick, easy to use devices, improved quality, with increased user control and choice. It is not a bad thing, but there are implications, whether it is simply a new medium, or whether we might be missing some of the underlying bits of important knowledge needed to carry us forward in a digital era.

Technology Growth Areas

Where are consumers spending their money in the tech sector? According to CNN Money (2012), the "7 Fastest-Growing tech companies" include Cirrus Logic, making circuit components for tablets, Biadu China's search engine with a custom personalized homepage based on the users' search patterns, Apple's voice recognition phone, IGI Phototonics fiber lasers, 3D Systems creating three dimensional parts found in smartphones and other devices produced, Priceline online international travel booking, and Acme Packet security gateways reflecting the incredible growth and profits within the industry. The same consumer desires mentioned earlier are also reflected here with fast-personalized searches, shifts toward voice-activated communications, use of mobile devices, and increasing globalization.

Growth of technologies in the workplace are expanding to improve innovations and to expand the bottom line. According to the Deloitte Technology Trends annual report, called "Elevate IT for digital business" (2012) examines actionable practices used to achieve improvements within five major technology forces over the past several years in, analytics, mobility, social, cloud, and cyber security. Areas targeted for growth include, social business, gamification, mobility, user empowerment, cloud services, big data, geospatial visualization, digital identities, measured innovation, and outside-in architecture. Author's Cearley and Claunch (2012) The Top 10 Technology Trends for 2012 point to Gartner's annual list reflecting the tremendous growth in mobile computing

in the workplace. The top 10 strategies include, "media tablets and beyond, mobile-centric applications and interfaces, contextual and social user experiences, Internet of things, app stores and marketplaces, next-generation analytics, big data, in-memory computing, extreme low-energy servers, and cloud computing" (Cearley & Claunch, 2012, p.1). It looks like one can find different items when looking at the various listings but it is easy to see major overlapping trends in mobile and social technologies. The current workplace knowledge-based economies are requiring more high-level creative thinking skills with workers adept in problem solving within expanded global markets.

Oftentimes, areas of growth in the workplace extend into the educational arena at some point in time. The "NMC Horizon Report > 2012 K-12 Edition", research from the Consortium of School Networking (CoSN), and the International Society for Technology in Education (ISTE) provides a list of the top emerging technologies, trends, and challenges impacting teaching, learning, and creative inquiry over the next five years. Within one year it is anticipated adoption will increase for, cloud computing, collaborative environments, mobiles, apps, and tablet computing. In two to three years adoption of digital identity, game-based learning, learning analytics, and personal learning environments is anticipated. From four to five years, augmented reality, natural user interfaces, semantic applications, and tools for assessing 21st century learning skills. Key trends are reflecting the shift towards more access, mobility, online, hybrid, and authentic active challenge-based collaborative learning models to develop leadership and creativity (NMC Horizon Report, 2013, p. 1).

According to authors Trucano, Hawkins, and Iglesias in EduTech (2012) blog article called "Ten trends in technology use in education in developing countries that you may not have heard about" provides a list of instructional technology trends in developing countries including, "tablets, social learning networks, translations, the great firewall of … everywhere, earlier and earlier, special needs, e-waste, open data, big brother data, getting school leadership on board, going global locally" (Trucano, Hawkins, & Iglesias, 2012, p. 1). The list reflects the trend towards increasing mobility and social learning within globalized learning environments.

With the release of mobile broadband wireless multiport Internet access, gaining Internet access on the go is ever more accessible, not only at home and from hotels, but literally traveling in the passenger seat riding the highways of America. It is arguably a step forward when exercising the potential for Internet access while becoming an effective use of what would normally be down time, now used productively. This is not to advocate working 24/7 but to create flexibility for hectic schedules. In the next section, we will examine some of the current best research based instructional practices to see how they can be aligned with the use of new technologies.

Literature based current best educational practices

New technologies offer a great way to invigorate instruction, whether in traditional classrooms, online, or in blended learning environments. We are finding many new digital tools allow learners to actively research, collaborate, innovate, and share their ideas. Collaborative tools can be used to increase knowledge acquisition quickly and efficiently while making global connections for broader perspectives. Providing meaningful integration of new technologies through the careful selection of quality tools aligning to best instructional practices can alter how learners and instructors engage with concepts and each other to achieve powerful learning. The following sections provide some background knowledge on the current best instructional practices found in the research literature used as the bases for aligning instructional needs directed towards technology enhanced teaching and learning.

Mobility

One of the biggest trends in education is the ability to be mobile. Time magazine, April 1 (2013) states the percentage of U.S. phones that are smartphones has reached 57%. According to Apple's released reports, more than 40 billion apps were downloaded for the iPhone, iPad and the iPod Touch, in 2012. It is hard to deny the success realized with approximately 83 million iPads sold by the third fiscal quarter of 2012 (Nations). To put their impact into perspective, iPads have now surpassed Mac OS sales with the new mobile iOS (Caulfield, 2011). These sales reflect the strong consumer demand for this new media. There are many iPad contenders such as Amazon, Archos, Disgo, Acer, Asus, HTC, Google, Android, Motorola, Toshiba, BlackBerry, Sony, Samsung, Microsoft, Dell, Vizio, HP, and the e-book readers including the Kindle, Kobo, and Nook. Users are drawn to the sleek design, small portable size, long battery life, in store

support, inexpensive, intuitive natural interface, with a vast number of quality content apps to run on the mobile devices, as well. Learning can then be extended beyond the classroom to working from home, on the go, and in the field. "We really have reached the point where we do have magic, and thus we have the opportunity to ask what we should do with it" (Quinn, 2012, p. 3). In the corporate environment educational applications range from training, performance support, increased access, collaboration to learning. In the educational setting, learners are gaining new content, communicating, capturing information, analyzing data, presenting, sharing, and even using location based activities. "To have mobile learning work well, power has to shift from instructors and managers to the learners themselves" (Woodill, 2011, p. 165). It is a self-directed or do-it-yourself (DIY) approach to learning.

Problem-Based Learning

Problem-Based Learning is an instructional method in which learners, usually working in teams, are given complex authentic problems or challenges and are asked to solve it. This approach is often used to increase learner interactions by working together collaboratively. Teams determine the needs, and work through the steps to solve the problem. Barrows (1986) describes problem-based learning as a way to motivate students' solutions through self-directed explorations while gaining additional practice. Problem-solving models of instruction are based on contributions from Dewey (1916, 1938). Dewey defined a problem as anything giving doubt or uncertainty. His active learning experiences included providing an appropriate learning topic, which was important and relevant.

Inquiry Learning

The researchers Bigge and Shermis (2004), Holcomb (2004), Joyce and Calhoun (1998), Van Zee 2001), and others define inquiry learning as capitalizing on students' interests in discovering something new or finding alternatives to unsolved questions or problems. Learners often work together to conduct research, experiment, synthesize, classify, infer, communicate, analyze, draw conclusions, evaluate, revise, and justify findings. In inquiry learning, students are responsible for problem solving, discovery, and critical thinking to construct new knowledge through active experiences. "Inquiry teaching requires a high degree of interaction among the learner, the teacher, the materials, the content, and the environment. Perhaps the most crucial aspect of the inquiry method is that it allows both students and teachers to become persistent askers, seekers, interrogators, questioners, and ponderers" (Orlich, Harder, Callahan, Trevisan, & Brown, 2007, p. 296).

Motivating Learning

Keller's (1983) ARC (attention, relevance, confidence, satisfaction) model of motivation provides insight into providing motivating instructional learning environments. In general, gaining attention involves capturing learner interest, stimulating inquiry, and maintaining it. Relevance includes identifying learner needs, aligning them to appropriate choices and responsibilities, and building on prior experiences. Confidence includes building positive expectations, support, competence, and success. Satisfaction includes providing meaningful opportunities to apply new knowledge and skills, reinforcement, and positive accomplishments. In Gagne (1985) "Conditions of learning" he indicated it is necessary to gain students' attention before they will be able to learn. Ongoing studies in the field of educational motivation continued to expand with additional research by Wlodkowsky (1999), Brophy (1983, 1998), and others. They determined additional traits of motivated learners include the desire to, learn, work, meet a need, personal value, reach a goal, complete task, engaging, curiosity, successful effort or ability, achievement, and personal responsibility. In a constructivist framework, motivation includes both individual and group generated knowledge and concepts.

Communications and Collaborations for Learning

In the learning environment building professional relationships through collaborating, coaching, and mentoring are all social interactions directed towards learning to share ideas, give and receive feedback, and offer support (Carr, Herman, Harris, 2005). The concepts of social learning can be traced to Bruner (1961) and Vygotsky (1978) and others. Quality instructional design directed towards technology-enhanced learning requires a great deal of student interaction. Promoting learner-to-learner interactions can increase engagement through negotiations, reflections, and shared understandings. The interactions allow students to expand viewpoints and build social connections to each other. Dialogue directed towards learn-

ing can provide students a way to expand ideas, extend concepts, and apply theory in authentic ways to solve challenges. "The focus of this work is ongoing engagement in a process of purposeful inquiry designed to improve student learning" (Carr, Herman, Harris, 2005, p. 1-2). "Collaboration forms the foundation of a learning community online-it brings students together to support the learning of each member of the group while promoting creativity and critical thinking" (Palloff, Pratt, 2005, p. xi). Some of the constructivists contributing to social learning included Piaget (1969), Jonassen (1995), and Brookfield (1995). Social presence creates the "feeling of community and connection among learners, has contributed positively to learning outcomes and learner satisfaction with online courses" (Palloff, Pratt, 2005, p. 7). Researchers finding a strong connection between social presence and improved learning, interaction, and satisfaction include Picciano (2002), Gunawardena and Zittle (1997), Kazmer (2000), and Murphy, Drabier, and Epps (1998). With the wide range of collaborative tools available for communications and collaboration, it forms the perfect foundation for social interactions and collaboration directed towards learning.

Multimedia Rich Learning

Multimedia refers to the use of text, graphics, sound, video, animation, simulation, or a combination of media. By appropriately aligning rich media to the content message, it can provide additional clarity and increase student focus rather than detract from it. Using a variety of media can increase interest and motivation while allowing unique opportunities to reach diverse learners. Mayer conducted many studies from comparing lessons presenting content with words, to lessons presenting content with words and relevant visuals (R. C. Clark & Mayer, 2003); Mayer 2001). The results have consistently demonstrated the positive impact of appropriate instructional visual selections. "Rich media can improve learning if they are used in ways that promote effective cognitive processes in learners" (Reiser & Dempsey, 2007, p. 315). Whether an educator prescribes to the learning principles of Skinner in the 30's by changing behavior, the 70's cognitive psychology focus on memory and motivation, the 80's constructivist focus on real world application, or a mixture of approaches, multimedia used effectively can help students to learn. Some media considerations include, gaining and keeping attention, memorable, using an appropriate speed, level of difficulty, comprehension, placement, easy access, media

matching the purpose, image content value, discovery, and level of interaction to improve effectiveness. "Ultimately good learning environments begin with the principles of learning and instruction, but require evaluation, revisions, and fine tuning to balance these competing values and ensure that the benefits are accrued for all intended learners" (Alessi & Trollip, 2001, p. 41). Multimodal learning can include a wide range of multimedia and interactive tools used to engage learners, thereby providing multiple modes of interfacing within the system.

Diverse Learners

Students learn in different ways and have unique abilities and preferences on how they best acquire new information. The exceptionalities in intellectual ability, communications, sensory, behavioral, physical, and combinations, sometimes require special learning accommodations'. One benefit, digital tools can provide is the unique interface differing from traditional computing with gesture controlled navigation, the offering of computer-assisted programs, ability to increasing the size and contrast for text, images, audio, audio readers, audio text recording, audio commands, video media, interactive and collaborative tools to target specific learning needs. In addition, there is an increase in multi-language support. This can include assistance for both special needs, low and high, as well as the ever-increasing diversity of learners from all over the world joining our classes and workplace.

Globalization

With the tremendous increase in travel, immigration, and communication technologies the world is becoming more diverse, connected, and interdependent. Globalization has accelerated the exchange of ideas and perspectives thereby increasing the overall knowledge base. Current digital tools provide increased opportunities for extending content and perspectives to transform knowledge into innovative ideas shared. Using integrated curriculums, team teaching, media rich instructional technologies, forming partnerships, and fostering innovation, we can create knowledge and skills to prepare learners to work in future markets. Success in global markets as we are now experiencing, demands successful interactions with a diverse, wide range of individuals and cultures. It begins with intercultural knowledge, skills, and respect for our combined contributions and strengths. As educators, we need to become international

stewards sharing insights and preparing learners for the future. The dramatic increase in mobility and digital communications now "connects people and facilitates transnational understanding" in ways not previously possible (Bryan & Vavrus, 2005, p. 184). As a result, the International information infrastructure allows learners to interact and share multimedia resources easily with anyone across the globe. Current technology tools easily allow for original creations and global sharing.

It seems like it would be beneficial to offer classes on global language basics including key functional survival skill words through the use of immersive practice with multiple-languages. Subsequently, providing the potential to foster international relationships, travel, and commerce needed for an increasingly global society.

Active Hands-On Learning

Hands-on refers to the learning activity involving practice on actual equipment, or in this case digital tools. The learning activity is designed with the goal of promoting the transfer of knowledge through application. In an active learning environment students are active, working in teams, and socialization is directed toward learning productively. "Students must be actively involved in the learning process if their classroom experience is to lead to deeper understandings and the building of new knowledge. Students (and adults, as I have discovered) need to hear it, touch it, see it, talk it over, grapple with it, confront it, question it, laugh about it, experience it, and reflect on it in a structured format if learning is to have any meaning and permanence" (Nash, 2009, p. xi). The dialogue provides time for learners to digest new information, exchange ideas, and engage with others in authentic, active hands-on way for expanded perspectives, and memorable learning experiences.

Creative Learning

Open-ended digital tools allowing for original solutions to problems or challenges provide the perfect environment for creative thinking. Students can demonstrate understanding through a wide variety of digital resources to present and share their unique solutions. It is critical to develop learners who can think beyond the box and lead us to new innovations. Simply reading and testing over material will not develop the creative original thinking needed to move our society forward. Instructors often use Bloom's Taxonomy (1956) to ensure inclusion of high-level knowledge and

skills as can be found in original creative work.

Learning New Content With Practice

The main consideration when selecting content resources is the relevance to the desired topic, and how clear the main ideas are communicated to learners. Providing learners with a graphic organizer is a nice way to show what will be studied by providing a brief overview of the content. By isolating facts, concepts, and generalizations it makes it easier to understand new content. The higher level of knowledge integration teaches learners how items are related, similar, different, and how to compare so they can understand more complex relationships. Interactions with the content and others can provide additional practice to better retain new information. Some instructional activities are designed to provide learners with opportunities for review of previously learned information through repetition. Some digital tools provide the needed practice activities using repetition to ensure retention into long-term memory. It is important to identify the objectives and align them with the learning activity.

Feedback, Support, and Assessment

By providing learners with timely information about their actions they will know how they compare to the desired level of criteria. "We should ensure that they receive feedback about their success and failure, are appropriately resourced with support to ultimately succeed, and ideally can share tasks and learning with one another" (Quinn, 2012, p. 24). Learner feedback can take many different forms such as traditional instructor exams with rating scales or comments for students. Another alternative is to use student self-evaluations using checklists or rubrics for individual or group work to learn to monitor their own success. Sometimes instructors will also use checklists or rubrics for evaluation and providing student feedback. Instructors can use a pretest to assess learners' current level of knowledge, diagnostic test to assess areas of strengths and weakness, formative assessments to measure ongoing progress, and summative letter grade assessments to make judgments on the quality and completion of projects. The data gathered by the instructor can be used to monitor learning and make adjustments as needed as the course progresses or for changes to be made before teaching the lesson, unit, or module again. It is important to identify the

desired learning of "behaviors, activities, and knowledge you will be evaluating" (Orlich, Harder, Callahan, Trevisan, & Brown, 2007, p. 332). Instruction can include the teaching of knowledge, performance skills, and attitudes such as found in collaborative group work. Another consideration is whether the learning goal aligns to standards and provides feedback in this regard to students, parents, instructors, and administrators, as needed.

Objectives for Learning

Mager's (1975) model for objectives, indicates quality objectives include the following three elements: 1) statement of the conditions or context of performance, 2) statement of the task; and 3) measurable way to evaluate the performance. Meaningful objectives are the backbone for instructors to create learning activities designed for knowledge to be retained, transferred, and applied to similar situations. It is accomplished by providing a specific statement of what learners will be able to do when they complete the lesson. A measureable performance objective statement describes the behavior students will demonstrate at the end of the lesson, the conditions under which they will be demonstrated, and the criteria for acceptable performance. Identifying the objectives becomes the guiding force for the selection of appropriate digital tools to get to the desired learner outcomes.

Flipped Classroom

Flipped classrooms are a more recent trend used to transform the way instructors are providing information by inverting traditional classroom lectures into online video and screencast presentations, so learners can view them prior to attending class. At home, learners can watch step-by-step explanations of concepts with visual examples to better understand complex concepts. The digital presentations allow each student to learn at their own pace with the ability to pause and replay as much as needed, on their own personal schedule when they are the most receptive to learning, to acquire the needed foundation knowledge. Class time is then flipped, so students complete homework and practice activities applying the new concepts in class. When attending class, students are engaged in student-to-student interactions, collaborations, and critical thinking with the instructor serving as a facilitator to support learners, as needed. The classroom is transformed into an active, authentic, learning environment where students can deal with complex issues related to the content topic.

The Flipped classroom can be an alternative to traditional lecture-based models or can be used as a blended learning environment to engage student learning. Screencast technology is often used to leverage learning outside of class, so a teacher can spend more time facilitating project-based learning during class. This is most commonly being done using teacher-created videos students view outside of class time. Then, the learners spend class time on problem solving, thereby increasing interactions between students and instructors. With the tremendous growth and availability of mobile devices, learners have ever improving abilities, to view the videos on their own time. As noted, this just keeps increasing the chances the class time can be spent on problem-based collaborative learning.

Emerging Technologies

On a CBS This Morning show segment called "Gadgets and Gizmos Galore" with Brian Cooley, he reported on the 2013 Las Vegas, NV, International Consumer Electronics Show. He talked about how we are starting to move into a post-mobile era. It does not mean getting rid of mobile devices but rather seeing a merger of devices such as computers, phones, TV, and tablets so we will not be thinking about what device we are using. One example of this trend is the movement towards hybrids such as the Phablet, where the phone and tablet are combined. Cooley also talked about exciting developments through body gesturing such as Vuzix's ®™ eye motion control, Leap Motion's ®™ sensor on the device screen controlled by hand movements, and InteraXon's ®™ Muse headband reading brainwaves for device control. Within ten years we may no longer be using the mouse and touchscreen technology. It seems like the new devices will have the potential to increase usability access for diverse learners while being a more tactile and engaging way to interact with technology resources.

Conclusions and future implications

When searching the literature for recommendations practitioners could consider, when dealing with shifting technologies and the pursuit of quality learning environments within the K-12 setting, a Freakonomics podcast provides some insight. Stephen Dunbar's (2011) podcast tells about how the New York City Department of Education pilot program called "School of One" personalized educational plans so each individual student has a chance to excel. Dunbar

interviewed the program founders Joel Rose, Chris Rush, and chancellor Joel Klein. They implemented a technology algorithm, similar in concept to what is used to personalize Pandora radio, to analyze how each individual student learns the best. Based on the analysis results, learning was customized the next day to maximize learning efficiency. The learning modality was also aligned to how each individual student learned best; whether alone, in small or large groups, synchronously or asynchronously to practice learning concepts. One shared success story pertained to a student, one who initially took ten to twelve exposures to learn, but after targeting how this individual student learned best, the number of exposures was reduced to two to three. Rather than guessing what students have learned, it is statistically analyzed at the individual level to ensure it is happening through personalization. Along the same line, the U.S. Department of Education report (2012) states

> The realization of productivity improvements in education will most likely require a transformation of conventional processes to leverage new capabilities supported by information and communications technologies". In sum, rigorous evidence is needed to support effective practices to foster the adoption of efficient, effective paths to learning.

We have three sets of insightful recommendations for Higher Education. They include "growth, even with the accompanying pains, is generally welcome because it provides energy, new ideas, and attention to innovations. Often, however, a snazzy new technology becomes the sole focus, not the ideas or innovative uses that lead to improved learning" (Wilson, 2005, p. 1). It is important to consider instructional needs alongside new and emerging technologies aligned to desired outcomes. If we do not, we may find ourselves marching towards obsolescence as we fail to adapt to changing educational goals, objectives, and new technologies. "Most universities are using the same methods to teach all of the same stuff. This is very dangerous as the world is changing so quickly that entire fields and bodies of knowledge risk being outdated/outmoded very quickly" (Moravec, 2013, p. 1). Moravec goes on to state we "need to stop behaving as consumers of education, but become creators, producers, and prosumers. At the same time, learning needs to become more immersive and personally-meaningful (subjective experiences) to each learner" (Moravec, 2013, p. 2). In a video interview with Douglas Rushkoff, he makes a good comment about how students need to ask themselves the following questions. "Am I learning? Am I becoming a smarter more innovative human being? That's what's going to serve you in the real job market of tomorrow. By the time the corporation has told the city college what skills it wants from its future workers you are going to graduate and those skills will have changed anyway" (Rushkoff, 2013, p. 3). The factory and banking models are no longer relevant and students are now demanding interactive, relevant learning experiences, as they well should.

Recommendations for business training include actionable improvements to add measurable value to the company. With the influx of digital natives into the workplace, social technology use is increasing. "Leading enterprises today are applying social technologies like collaboration, communication and content management to social networks – the connected web of people and assets that impact on a given business goal or outcome – amplified by social media from blogs to social networking sites to content communities. Yet it's more than tools and technology. Businesses are being fundamentally changed as leaders rethink their core processes and capabilities with a social mindset to find new ways to create more value, faster" (Ramsingh, 2012, p. 1). According to author Ron Zamir, keeping "learners engaged and motivated in training through rich media, bite-sized content and gamification are essential for creating training that is both palatable to the learner and creates real workplace change" (Zamir, 2013, p. 1). Zamir's goal is to design innovative solutions to create better training using new technologies "not just simply rehashing old, unchanged content" (Zamir, 2013, p. 1). Other current trends found from the Training Zone (2013) website include the integration of rich media, mobile learning, online learning, conferencing, and the shift to globalization. It is critical to first know the learners and organizational goals to better meet their needs. The best training is personalized, accessible, and engaging in both the training and support materials offered. The technology itself is not the magic bullet, it is what you do with it to reach the business goals. The training is a means to an end, with the end resulting in a positive impact.

Integrating quality research based instructional practices as new technologies are released is one way to fight against knowledge gaps at all levels. When one analyzes the learning needs, goals, and objectives, then selects and aligns the best tools to accomplish the tasks, one increases opportunities for exceptional learning.

Looking at where we need to be going with technology infused education, eSchool

News has an article called eSN Special Report: Keeping students on a path to graduation. The author states "educators are determined to find that relevance by giving students more of the skills they'll need to succeed in a globally competitive economy—the so-called "21st-century skills" such as problem solving, critical thinking, communication, and collaboration" (Nastu, 2012, p.1). By integrating technology through meaningful applications, learners are more likely to stay the course needed for college and future careers. Students tend to learn best through the application of concepts to functions via meaningful work tasks, integrating those concepts through authentic relevant connections.

With so many tremendous technological shifts happening, we need to be mindful of the missing bits of information, which still need to be taught. Ask people from all walks of life what is missing, what are we no longer teaching that needs to be included no matter what medium is used? Keeping in mind, the knowledge and skills valued by our society are also in a state of flux.

The concepts of collaboration and social interactions directed towards learning can continue to play a great roll in the digital transitions. Could we be at a point where we think those brains, properly educated and trained to collect data, to think about problems through deeper root cause evaluation processes might be ready to start coming up with solutions to issues, concerns, and problems? Could we be ready to embrace a little change? Might we be ready to start exploring ways to maximize the potential of each individual? This article points to the need to conduct various needs analyses, identify relevant learning goals and align them to current best research based instructional practices, no matter what technologies are selected while staying flexible and adaptable to the changes that are sure to come.

A story by Sugata Mitra from NPR's Ted Radio called Unstoppable Learning is a wonderful example of the resilience of learners. He found by putting computers in villages in rural India, who had never seen computers before, with absolutely no resources to teach them how to use it, they taught themselves. My favorite quote "you gave us a machine that only works in English, so we taught ourselves English to use it" (Mitra, 2013). By providing challenges then standing back to watch we will be amazed at what the human spirit of inquiry is capable of learning.

In looking at the New Horizons Report (2013) for K-12, Higher Education, and online resources for new and emerging technologies in industry, there are some very exciting new developments happening from augmented reality, wearable technologies, 3D printing, and much more. It will be fun to see how these technologies can be used effectively to have a positive impact on learning.

Closing suggestions for future researchers include: continue to examine effective ways to personalize instruction, examine goals and learners, tailor instruction or training specifically to the learner. Then, we may find the keys to additional innovations in teaching, training, and learning.
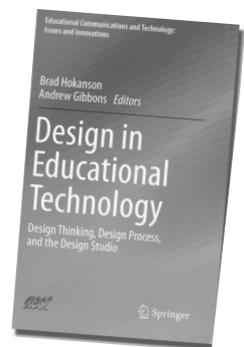
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