Positing the Future

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The future of our field

The third installment of this column, addressing the topic "*What is the future of our field? What should we be talking about that we are not?*", consists of two invited articles from Dr. Patricia Young, University of Maryland, Baltimore and Kyle Peck, Penn State University.

In her article, *Contemplating the Future of Educational Technology,* Young, emphasizes the importance of culture in our field and in the design of learning and learning tools. She identifies three areas that should be discussed further as we contemplate the future and growth in the field of educational technology: (1) Interdisciplinary applications of educational technology; (2) Culture's impact on learning and learners and (3) Considering culture-specific designs for learning.

In "*The Future of Learning Design: The Future's So Bright I Gotta Wear Shades.*", Peck reflects on his four decades career as a systems thinker and shares his optimism about the bright future ahead for the field. He argues that a "perfect storm" of forces lies ahead that accelerates changes in education and increases "the demand for well-prepared learning designers, learning-related tool builders, and learning-related researchers."

Contemplating the Future of Educational Technology

By Patricia A. Young
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Proposing what the future of educational technology should look like is a daunting assignment layered with possibilities. There is always the thought, "What if, I'm way off!" Despite this real chance, I am humbled by the future and encouraged regarding the growth in educational technologies across fields of study and throughout the world. In writing this paper, I felt the need to provide a context for the development of these ideas as presented on November 1, 2012 for AECTs Graduate Student Assembly Panel on *The Future of Our Field.*

A few months prior to the panel discussion, I completed reviewing a plethora of research in the areas of culture, learning and technology across disciplines such as Instructional Design, Human Centered Computing, Game Design, E-Learning, Science, Mathematics, Literacy, and Teacher Education (Young, 2014). This review covered much of what was published in the previous 10 years. The outgrowth of what the research revealed is briefly outlined in this paper with some elaborations.

The world is very much ethnically and racially defined. Worldwide population projections for 2050 show increases for most of the highest populated countries such as China, India, United States, Indonesia, and Brazil (Internet World Stats, 2014). The United States Census population projections from the 2010 Census report a growing racially and ethnically diverse population by 2060 and that this population will peak in 2024 (United States Census Bureau, 2012). This increase in ethnic and racial diversity should be moving all instructional designers to meeting the culture-based learning needs of this ensuing population. In the United States, in particular, we have failed to meet the basic literacy needs of many poor and ethnically diverse populations living in urban meccas (NCES, 2011a; NCES, 2011b). Specifically, the structure of schools and schooling, economic deprivation, social inequities and the politics of the day continue to stifle these populations. Further, the nationally adopted common core standards will maintain measures of knowledge to the dominant cultural ideologies versus providing a more eclectic representation of knowledge for all learners. Zhao (2012) argues that we need to educate everyone—every child should be seen as a valued asset to globalization. The failure to educate all will continue to leave certain groups of people behind in the technological globalization of the world.

This article will cover three areas for future growth in the field of educational technology: (1) Interdisciplinary Applications of Educational Technology; (2) Culture's impact on learning and learners and (3) Considering culture-specific designs for learning.

Interdisciplinary Applications of Educational Technology

To remain competitive as a field, interdisciplinary applications of educational technology need to be considered. These interdisciplinary applications would extend beyond the traditional disciplines of STEM, literacy or K-12 education. As these discoveries might include research

from computer science, engineering, human centered computing, game design and the like. The sentiment might be that we are already doing this.

There is a need to analyze where disciplines overlap and compare ideologies that are the same but are articulated in different ways. What is the research in computer science saying and doing that is relevant to the field of educational technology? What is the research in neuroscience saying about learning and designing technologies for learning? Can there be some collaborations? How is what these researchers (computer science) do different or the same as what we are doing? Or are we just replicating the same theories and practices in different fields?

Funding sources like the United States Department of Education's Institute for Education Sciences and European Union are also interested in these interdisciplinary collaborations. The idea is that transdisciplinary and interdisciplinary research allows for different analyses of the research and research process. Thereby, providing a comprehensive analysis of a society and any "unintended consequences" (EU, 2013, p. 28).

Researchers across disciplines are designing products, environments and systems of learning without instructional designers (Young, 2014). We have to help other fields see the importance of the instructional design work we do. Further, how we can assist in the design of learning technologies. Interdisciplinary collaborations are more likely to provide new innovations in the future and encourage the building of better products, services, environments and systems for learning.

Culture's impact on learning and learners

An examination of the many definitions of culture across disciplines and fields of thought reveals one thing (Geertz, 1973; Hall, 1976; Kroeber & Kluckhohn, 1966), culture is everything. Culture is everything known and unknown. Therefore, culture has an infinite number of aspects and attributes that matter to human existence.

Scholars continue to advocate for cultural considerations in the design, teaching, learning, and assessment of content area knowledge (Hood, Hopson, & Frierson, 2005; Swartz, 2009; Warikoo, 2009). This advocacy for the integration of culture seems to have made advances in school aged STEM (science, technology, engineering, and mathematics) related literature and in higher education literature on e-learning.

A review of current research in the areas of mathematics, science and elearning education found culture significant to the improvement of learning and enhancing instruction (Young, 2014). These studies concluded the following:

(1) Explicit instructional strategies were needed for ethnically diverse populations. This means that instructional strategies may need to be tailored for certain populations of learners. This tailoring of instruction means designing instructional content that is culture-specific (specialized) to the needs of learners.

(2) Research about learners should be more broadly structured to include anthropological and psychological factors that acquire a more holistic perspective of the learner and their learning. This means that a comprehensive analysis of learners can be acquired through research that collects data about the anthropological factors of a learner such as: lived experiences (Boykin et al., 2005; Chang, 2005; Emdin, 2010; Lewthwaite et al., 2010; Nasir, Hand, and Taylor's, 2008); behaviors (Yang, Olesova, & Richardson, 2010 ; Zhao & Tan, 2010) and communication styles (Yang et al., 2010). Further, learner's psychological factors should be examined such as: beliefs, feelings (Robottom & Norhaidah, 2008), attitudes (Caleon & Subramaniam, 2008; Chang, Hsiao, & Barufaldi, 2006; Ku & Lohr, 2003; Thompson & Ku, 2005); perceptions (Jung, 2011; Ku & Lohr, 2003; Liu & Magjuka, 2011; Wang, 2007), critical thinking (Al-Fadhli & Khalfan, 2009) dispositions, and interests (Ni et al., 2011). A comprehensive analysis assists in building learning applications that are more culture-specific (specialized) and appropriately aligned to learner needs. Studies that exclude the learner's anthropological or psychological attributes may be presenting a limited view of the learner. The idea is to build a context that is inclusive of multiple aspects of the learner. In acquiring data about the anthropological and psychological aspects of learners, research is more closely capturing the culture of the learner and authenticating the overall design.

(3) A variety of research methodologies can be used to acquire this comprehensive examination of the learner. However, ethnographies seemed to capture the learner best. This methodology was evident mostly in the science education research (Barton et al., 2008 ; Basu, 2008 ; Brown, 2004 ; Carlone et al., 2011; Elmesky, 2011; Lynch et al., 2005 ; Polman & Miller, 2010 ; Schademan, 2011; Seiler, 2001 ; Warren et al., 2001) . This means that studies that seek to capture the culture of a learner can be varied; however ethnographies provide the forum for such comprehensive analyses of the human being.

(4) Engaging learners in multiple assessment methods can determine measures of academic and affective learning (Hurley et al., 2009; Leonard et al., 2005; Ni et al., 2011; Taylor, 2009; Wong, 2002). Specifically, the evaluation of mathematical learning outcomes should be based on cognitive (i.e., knowledge), anthropological (i.e., behavior) and psychological (i.e., affect) states of the learner. Determining how learners feel about the academic experience may be as important as their academic progress. Again, this is about capturing a comprehensive analysis of the learner in multiple cultural contexts.

(5) Cultural considerations for the learner need to be taken into account in all contexts. For example,

the e-learning higher education research that focused on populations such as Chinese, Australian, Eastern Slavic and American found concern with the disregard for cultural considerations in an e-learning environment. Some of the concerns related to: cultural differences (Chase, Macfadyen, Reeder, & Roche, 2004 ; Yang et al., 2010), cultural influences (Hannon & D'Netto, 2007 ; Ku & Lohr, 2003; Zhao & McDougall, 2008) , cultural barriers (Hannon & D'Netto, 2007), and cultural orientations (Wang, 2007). This means that the lack or improper attention to culture can be detrimental to the learner and learning. Learners in these contexts needed support to perform and persist in the e-learning environment.

Considering culture-specific (specialized) designs for learning

Considering culture-specific (specialized) designs for learning is not new, but it is a new way of thinking about culture. Culture-specific is defined as specialized or localized to a target audience, culture or society (Young, 2014, 2013, 2009). In the field of educational technology most researchers have articulated culture-based contexts as multicultural (Amiel, Squires, & Orey, 2009); culturally diverse, culturally pluralistic (Igoche & Branch, 2009), culturally relevant (Jospeh, 2009; Scott, Aist & Hood, 2009), or culturally responsive (Frederick, Donnor, & Hatley, 2009). However, culture-specific (specialized) is not particular to multiculturalism or any of these terms. Culture-specific (specialized) is a targeted exploration of culture that may include examinations of anthropological and psychological attributes of an individual, group, culture or society.

Culture-specific (specialized) design efforts can be naturally born out of human need. As a result, there are examples throughout the literature of researchers engaging in what may be characterized as culture-specific designs for learning.

For example, Lee et al. (2008) developed *Promoting Science among ELLs in a High-Stakes Testing Policy Context* (P-SELL) a science and professional development intervention for elementary school teachers that promoted science achievement in English Language Learners. The curriculum integrated science terms in English, Spanish, and Haitian Creole, provided literacy development for English Language Learners in their native language, and used multiple modes of communication to educate the learner (e.g., visual, kinesthetic, textual). The integration of student's language and communicative lenses demonstrates specialization and exemplifies moving toward a more culture-specific (specialized) design for learning.

Learners bring to school their cultural stories and ways of problem solving; this "indigenous knowledge" can be utilized as instructional methods, avenues for learning and bridging home and school contexts (Kaahwa, 2011). Kaahwa (2011) offers examples of "teaching and learning in culturally specific contexts" (p. 52). In this Ugandan study, a child learns fractions through the cultural artifacts in the community. Bean pods are used to demonstrate the mathematical concepts of 'whole' and 'parts'. In this example, the use of the learner's cultural artifacts and context creates a more culture-specific (specialized) design for learning.

When designing a user interface for the Pitjantjatjar and Yankunytjatjara people in Central Australia, Hughes and Dallwitz (2007) made culture-specific design considerations such as using the Pitjantjatjara language throughout the interface and choosing to honor the tradition of not displaying images of deceased elders in the software until a specified time. In this example, the historical traditions of the Pitjantjatjar and Yankunytjatjara people became an important factor to abide by in the creation of this culture-specific (specialized) design for learning.

Conclusion

Determining how people learn, think, behave and understand has applicability across disciplines and could change what, why and how designers create technologies. That is, it is possible to build authentic information and communication technologies for Appalachian whites to the Han Chinese through culture-specific (specialized) designs.

The future of educational technology lies in changing how we think about designs for learning. It means broadening our notions of culture and exploring interesting avenues of collaborations. All fields of learning should consider culture as a factor in the design of information and communication technologies. The culture of the learner should be considered in the design of products, practices and paradigms of learning. It is imperative that we utilize all we know to educate all. To exclude culture in the design of educational technologies is to continue to travel in circles.

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The Future of Learning Design: "The Future's So Bright I Gotta Wear Shades."

by Kyle Peck, Penn State University

I borrowed the subtitle for this article from the "Timbuk 3" song, (McDonald, 1986) because I am very excited about the changes we are likely to see in the next few decades. I've been advocating for and working toward changes in teaching and learning for four decades, and I know how stable education is, but I am convinced that a "perfect storm" of forces both within and outside education are about to accelerate the evolution of learning and learning design, increasing the demand for well-prepared learning designers, learning-related tool builders, and learning-related researchers.

I am an optimist, but I am also a systems thinker. My work and the work of our colleagues in educational change and systems theory has taught me that in social systems, change happens only when the motivation to change overpowers the resistance to change. That's pretty basic, but it gets more useful when we unpack "motivation to change" and "resistance to change." Motivation to change seems to be powered by three primary factors: 1) a vision of what could be; 2) dissatisfaction with what is, and 3) evident, achievable next steps that can be taken to begin the transformation. These factors have been proposed as existing in a multiplicative relationship (motivation = vision * dissatisfaction * next steps), because they seem to fuel each other and because if any of these factor are missing (represented by a zero) the motivation factor might as well be zero because change will not happen (Peck & Carr, 1997).

Resistance to change can also be analyzed. Common components of the resistance generally include:

- fear (of failure and of the unknown)
- tradition (which often results in ossified patterns of behavior and practices based on history rather than logic), and
- tradition-related blindness, which prevents players in the system from seeing, let alone challenging, the impediments the system has imposed.

Our educational systems are actually a lot more complex than that, but that introduction should serve as an adequate foundation from which to explain why I am so optimistic about our shared future.

The predictions I share in this article are based on trajectories I see in teaching and learning today, as well as trends in life outside schools. These trends help to establish a vision of what can be, fuel dissatisfaction with what is, and demonstrate that there are next steps we can take, today. Innovative programs are emerging that should demonstrate these advances, which should decrease fear and invite people to challenge some of the traditions that currently impede progress. As numerous new models emerge, they will be created, monitored, and enhanced, by learning designers. We will need many more learning designers, and many more academic programs to prepare them. It might surprise you that I see most of these benefits to be derived from changes in higher education rather than in K-12 education or the corporate or military sectors, but it probably won't surprise you to learn that I see changes in all sectors radiating to influence the others.

In the past people have predicted great changes in education based on the emergence of individual technologies (radio, film, video, microcomputers, etc.), and they were wrong. Education didn't change much. This time it appears to be different, because it's not a single innovation, but a "symphony" or "perfect storm", technologies, and economic and social forces that, in combination, promise important progress. Here are some of the forces that I see working to tip the scale in favor of motivation to change by building new visions of what might be and building dissatisfaction with what is.

Trends enhancing visions of what can be

Technology ubiquity – According to a Pew Research Center report, as of May 2013, 70% of American adults have a high-speed broadband connec-

tion at home and 46% of Americans have both a home broadband connection and a smartphone (Zickuhr & Smith, 2013). As, technology access is expanding in other parts of the world, enabling more and more people to participate in the technology-fueled expansion of learning opportunities listed below. This adds incentives for colleges and universities to use emerging technologies to increase access to, improve the quality of, allow more choice in, and improve the efficiency of students' educational experiences. As more and more institutions expand their offerings, the quality will need to increase to remain competitive – and the use of more and better learning designers is perhaps the best way to ensure quality.

The growth and validation of online learning – Seventy percent of the Chief Learning Officers in higher education institutions now consider offering online courses "critical to their long-term strategy" (Allen & Seaman, 2013). In 2013, 6.7 million students took at least one online course, and 32% of all students are taking at least one course online (Allen & Seaman, 2013). The annual increase from 2012 to 2013 was 9.3 percent. When these numbers are combined with the mounting evidence that the quality of online learning is as good as or better than face-to-face learning (U.S. Department of Education, 2010), it's easy to see why institutions are now embracing online learning and why leaders are increasingly defending the quality of learning online (Allen & Seaman, 2013). And guess what? Many of these institutions are hiring learning designers to create online courses.

Open Educational Resources – According to the SURF Open Educational Resources Special Interest Group (2013), "OER have moved from phase A (pioneers) to phase B (early adopters); in doing so, they have opened up a whole new range of possibilities for new applications and uses." There is more and more interest in OERs, and more and more funding lining up to support their development and delivery. For example, the Khan Academy recently received a $2.2 million grant (on top of its Gates Foundation and Bank of America funding) to develop a focus on the Common Core math standards, adding new content, diagnostic tools, and tools to track and document learning (Robelen, 2013). The development of high quality OERs is also likely to produce demand for learning designers, as the scale on which they will be deployed justifies investing in the knowledge and skill that trained designers bring to the table.

Flipped Classrooms – In "Flipped Classrooms," Lectures and content acquisition are "sent home" while the teachers use class time to help learners use their new knowledge and develop skills. Because most teachers generally design their own take-home content or use OERs, the growth in this practice isn't directly resulting in more demand for learning designers. By validating that capable students can acquire content independent of their teachers and can develop the self-regulation needed to handle online learning, the flipped classroom model is indirectly contributing to new models of education (like MOOCs, online learning, and competency-based learning) that will increase demand for learning designers and learning-related researchers.

Massive Open Online Courses (MOOCs) – Despite the unjustified bad press MOOCs are receiving for their high so called "dropout rates," the thousands of learners who are completing MOOCs and parts of MOOCs, are demonstrating the viability of online learning, and at the same time, are creating the demand for new tools that enable peer collaboration, peer support, and peer assessment. These tools (which will be developed by the students in the Masters level learning design programs M. David Merrill envisions (Merrill, 2013)), will make MOOCs an increasingly effective learning environment and will encourage the development of additional high-quality MOOCs. The arrival of MOOCs has been a feast for educational researchers and "big data" or "data analytics" emerge as a new set of opportunities to study learning at scale. While the development of MOOCs might seem like a step that will decrease, rather than increase, the need for designers, I see it differently (as will become clear in the following predictions).

Renewed Interest in Competency-based Learning (CBL) – As success with MOOCs, OERs and flipped classrooms expands, and the time required for paid staff to deliver content is reduced, competency-based learning will become the norm. Although CBL is not a new concept, it has never been mainstream in public education. In a competency-based educational model learners are allowed multiple attempts to master content without penalty, as opposed to competing with others for bell curve-based grades. CBL is gaining momentum with educational policy makers and it will ultimately replace today's systems in which time is held constant and achievement is allowed to vary. In fact, the US Department of Education has a web page describing CBL and listing universities and school districts using the method (U.S. Department of Education, n.d.). In March of 2013 the department sent a "Dear Colleague letter" providing "guidance to institutions that wish to have direct assessment (competency-based) programs considered for title IV, Higher Education Act (HEA) program eligibility" (so that students loans can be used to pay for these programs, rather than credit-hour based seat time) (Bergeron, 2013).

Although it is not a new idea, CBL has been identified as a "Big Idea for 2014" (Selingo, 2013) because of its potential to make education both more efficient and more effective. As we move toward CBL, a more labor intensive enterprise as they require good assessments, which take time and expertise. I believe we will relegate the acquisition of knowledge- and comprehension-level learning outcomes to MOOCs, OERs, and perhaps other emerging formats. If learners can learn it on their own or with peer support they will, and at no cost (other than the time they must invest to review the work of others, as repayment of the "debt" they encumbered as other peers review their workpriortomastery).

Teachers and professors will not be replaced, but will be "re-placed" -- moved to a new place/role where they are devoted to developing higher-order skills and abilities. Delivering on the promise of actually developing higher-order skills in learners, rather than simply "grading" assignments as a measure of leaning, will require new understanding of what works best for different types of learners (research), new approaches and tools to promote learning (design and development), and better assessments, all of which will increase demand for professionals in our field.

Digital Badges – Pay attention to digital badges! Much more than a "gold star," "sticker," or a prize that could be misused to create extrinsic motivation, this little innovation has the potential to "reinvent the report card"(Peck, 2013) and "disrupt the diploma" (Hoffman, 2013; Maeda, 2013). Digital badges are "clickable" graphics that contain metadata that can reveal information about the individual or organization that issued the badge, the criteria met to earn the badge, the tool(s) used to assess the evidence, and the evidence of learning itself. Digital badges will encourage a new granularity in content development and transparency in communicating the learning outcomes covered and the assessment processes employed, and this will serve as a motivator to improve quality and to promote congruence between the learning outcomes, the learning resources provided, and the assessments. The use of digital badges will initiate changes that can ripple through the teaching and learning process, improving the information learners have about learning options, the precision of learning outcomes, the approaches used to promote learning, the ways learning is assessed, and ultimately the effectiveness of the learning opportunity that the badges represent. An unanticipated consequence might be the progressively diminished importance of "courses" and a challenge to the notion of "the credit hour," a 108-year-old construct that causes learning opportunities to be aggregated into large clusters despite the fact that many learners may have already mastered much of what a course contains and that others may encounter content for which they lack the prerequisite skills or knowledge. This new level of granularity and transparency badges usher in will allow learners to make better decisions about which learning opportunities to choose, and will cause institutions to do a better job of writing learning outcomes, assessing them well, and providing resources and opportunities for all learners to meet all learning outcomes. The granularity of digital badges will also serve lifelong learners and working professionals well, by offering them opportunities to update skills and knowledge in bundles that don't take a semester to complete. The value that badges bring to the providers of learning will necessitate the redesign of many learning activities and assessments, which will result in rewarding work for learning researchers and the developers of learning resources and assessments.

Calls for the expansion of Prior Learning Assessment – Many people have acquired knowledge and skills that are included in college-level courses, from a variety of sources. They should not be forced to sit through classes they don't need. They should instead be able to earn credits by demonstrating what they know and can do, by taking examinations and/or by submitting portfolios. This is often called, "Prior Learning Assessment" (PLA), and it is often confused with "credit for work experience" and awarding "transfer credits." These concepts are different, in that the "A" in PLA represents the requirement to assess capabilities before granting credit, while granting credit for work experience awards a number of credits without evidence of performance other than years of success on the job. When transfer credits are accepted, courses from one institution are considered "equivalent" to courses from another institution, but no new assessments are administered. There is a clamoring for expansions of PLA and a broader acceptance of transfer credits. Most universities limit the number of credits they will allow a student to transfer in to generally about 10% of a degree. But, as Laitinen (2012) points out, "[because] only about 41 percent of graduates attend a single college, 59 percent attend two or more, and 24 of those attend three or more, non-transfer of credits exacts huge costs from students and likely reduces their chance of completing a degree" (p. 7). Universities can, and will, charge a fee for these exams and portfolio reviews, and this can be a source of revenue while still reducing cost and the barriers to completing a degree, thereby increasing enrollments in universities moving in this direction. As designers redesign courses to incorporate competency-based learning and digital badges, the same high quality learning outcomes and assessments they developed will enable sound PLA, and the overhead to grant credits through PLA will be reduced.

Adaptive learning systems and data analytics – The idea of allowing different learners different paths through a body of content based on their prior knowledge, facility with different concepts, and other factors is not new to learning designers. As long as computers have been used as tools in education we have been designing computer-based learning that branched based on learner responses. But now, with more sophisticated data systems, more capable computers, and more knowledgeable learning designers, "adaptive learning systems" are emerging that will produce recommended pathways through content based on more complete profiles related to the learner's knowledge base, difficulties and preferences. As Anya Kamanetz (2013) puts it, "adaptive learning will help each user find the exact right piece of content needed, in the exact right format, at the exact right time, based on previous patterns of use." Tools like Knewton and SmartSparrow promise to use data accumulated as students move through a degree program to an extent not imaginable in the early days of computer-based learning. As Kamenetz and Knewton CEO Jose Ferreira describe it:

> "As a student reads the text or watches the video and answers

the questions, Knewton's system is "reading" the student as well—timing every second on task, tabulating every keystroke, and constructing a profile of learning style: hesitant or confident? Guessing blindly or taking her time? Based on the student's answers, and what she did before getting the answer, "we can tell you to the percentile, for each concept: how fast they learned it, how well they know it, how long they'll retain it, and how likely they are to learn other similar concepts that well," says Ferreira. "I can tell you that to a degree that most people don't think is possible. It sounds like space talk." By watching as a student interacts with it, the platform extrapolates, for example, "If you learn concept No. 513 best in the morning between 8:20 and 9:35 with 80 percent text and 20 percent rich media and no more than 32 minutes at a time, well, then the odds are you're going to learn every one of 12 highly correlated concepts best that same way." (Kamanetz ,2013)

Adaptive learning systems offer a new set of opportunities– even careers – for learning researchers, and learning designers–

All of the trends listed above produce good work for increasing numbers of learning designers, and they enhance our ability to envision better ways of educating people. The new visions of what education might become are increasingly compelling, and in combination with the growing dissatisfaction described below, they tip the scales in favor of change, despite education's very stable track record.

Trends increasing dissatisfaction

"The Cost Disease" – Education suffers from what Bowen (2012) has termed "the cost disease." As Bowen describes it, "The basic idea is simple: in labor-intensive industries such as the performing arts and education, there is less opportunity than in other sectors to increase productivity by, for example, substituting capital for labor. Yet markets dictate that, over time, wages for comparably qualified individuals have to increase at roughly the same rate in all industries. As a result, unit labor costs must be expected to rise faster in the performing arts and education than in the economy overall" (p. 3-4). As this premise would predict, especially when paired with consistent declines in state government funding, the cost of education has continued to rise at well beyond the cost of living. In fact, according to The Economist ("Not what it," 2012), the cost of a college education has risen by almost five times the rate of inflation since 1983. As a result, college is not affordable to many and US student loan debt now exceeds credit card debt (Pilon, 2012).

Technologies, which have reduced costs in other sectors, may have enhanced quality, but have not yet been widely used to reduce cost or increase efficiency in education (Bowen, 2012). As Collins and Halverson (2009) put it, "The organizational structure of schooling has developed three strategies for addressing innovative technologies without influencing the traditions of teaching and learning: condemning, co-opting, and marginalizing" (p 36). This tendency to marginalize technologies in the teaching and learning aspects of higher education (while taking great advantage of what technology offers us as researchers) is another source of dissatisfaction. According to Bowen (2012), "we need to improve productivity in two ways: (1) through determined efforts to reduce costs— that is, we need to focus more energy on lowering the denominator of the productivity ratio; and (2) through new ways of increasing the student-learning component of the numerator of the ratio, principally by raising completion rates and lowering time-to-degree." Bowen believes that innovative uses of technologies can allow us to do both.

Dissatisfaction with the higher education's product – Before the turn of the century there were numerous calls for reform in the US K-12 education sector, but the US higher education system was considered to be among the very best in the world. However, employers increasingly express dissatisfaction with college graduates and the processes we use to prepare them. According to a recent Gallup poll, "14 percent of Americans -- and only 11 percent of business leaders -- strongly agree that graduates have the necessary skills and competencies to succeed in the workplace" (Alssid, 2014). However, another recent survey, conducted by Inside Higher Ed in conjunction with Gallup, showed that 96% of university academic officers believe that they are effectively preparing students for success in the workplace. Big disconnect! The value of college degrees is being questioned and failure to respond to criticisms will provide fuel for the digital badging movement and other alternative forms of certification.

The decreasing cost to value ratio – As costs rise and college degrees become more common and less likely to guarantee a good job, people are increasingly questioning the value of the degree. According to a recent article in The Economist, "… there is growing anxiety in America about higher education. A degree has always been considered the key to a good job. But rising fees and increasing student debt, combined with shrinking financial and educational returns, are undermining at least the perception that university is a good investment" ("Not what it," 2012). Because there is a significant pool of people with college degrees who can't find work that actually requires the knowledge and skills they were to have developed through their degree programs, many employers have added a bachelor's degree to the list of basic requirements for many jobs, not because someone would not be capable of performing the job without the degree, but because it serves as a simple screening device. As costs increase and the degree ceases to

be the guarantee of a good job that it once was, dissatisfaction increases.

Online Shopping / Mass Customization – Outside education, changes in how we operate in day-to-day life are also changing our expectations and will be decreasing our satisfaction with traditional educational systems, the last "one-size-fits-all" enterprise in a "have it your way" world. When we shop online we have very detailed information about the products we are considering, no matter how trivial the purchase. Detailed descriptions, images and/or videos, customer ratings, prices and data on availability. When it comes to buying learning resources, the landscape is much more barren, especially when it comes to degrees and courses, the most expensive and largest commitments of all. I suspect that we will soon demand better information as we make decisions about when and where to engage in education and better documentation of what we have learned. Imagine an Amazon.com- or iTunes-style learning exchange, where comprehensive information is available, including comments from others who have used the services as well as the employers who have hired them. Now look at a course catalog or website for a university. See the difference? Now imagine a transcript that is a series of digital badges, each of which serves as a mini portfolio displaying the skills and knowledge you have acquired and applied as you earned them. And, imagine that everything you studied was relevant, and something that you didn't already know. I don't think you'll need to imagine it for long.

In the sections above, I proposed that important changes are brewing, that those changes imply a promising future for learning and for learning designers and those who prepare them. I reported that my confidence comes from a variety of different forces I see enhancing our vision of what can be, increasing our dissatisfaction with what is. In closing I'll list a few models upon which my optimism is based – programs we might want to understand and emulate or by which we might at least be inspired to take next steps.

Models that invite emulation

Several new approaches to higher education are worthy of watching, as they test new technologies and shifting boundaries.

Western Governors' University – a competency-based program that costs much less than other universities and has been growing at approximately 30% per year for the past decade (Gravois, 2011)

Rio Salado University – serves over 41,000 learners online via a personalized learning approach that allows anyone to start a class any week of the year, receive support 24/7, and uses impressive learning analytics to track the progress of individual learners and the quality of courses. (Grush, 2011)

Southern New Hampshire University – struggled to enroll 2,000 students five years ago, that now, with a new focus on degree completion and competency-based learning it has grown to 34,000 online students (Khan, 2014)

Northern Arizona University's "Personalized Learning Degrees" – three competency-based bachelor's degrees allow learners to progress at their own pace paying a flat rate fee of $2,500 for six months, during which they can complete as many multidisciplinary lessons as they like. These multidisciplinary lessons map back into a traditional transcript. (Gordon, 2013)

University of Wisconsin's "Flex Option Degrees" – a nice blend of prior learning assessment and competency-based learning with a degree completion emphasis, this program currently offers five bachelor's degrees for a fee of $2,250 each three months (complete as many competencies as you like) or $900 for a single skill area. (Leber, 2013)

Conclusion

One Future of Our Field

When I look across these trends and emerging tools I am very optimistic. I see a renaissance for education, and promising times for learning researchers, learning designers, and those who prepare them well. I predict that the next two decades will bring:

More and better learning experiences to more and more learners, many of which will be available at not cost and in many languages

More Competency-based approaches to learning through which all can be successful

Digital badging that improves communication about learning as well as the quality of what we teach and how we assess it

More and better synchronous learning at a distance targeted at higher order outcomes and available through technologies like Adobe Connect, Google Hangouts, and the one that comes after that and the one that comes after that…

More and better Open Educational Resources and Massive Open Online Courses, increasingly developed by teams including trained learning designers

New tools to help peers support each other during learning and assess each other's progress in contexts where paying a professional for assessments is not possible

Growth in "Adaptive Learning Systems" that will be based on much richer and more long-term representations of individual learners

Increased use of data and "learning analytics" to understand the progress of individual learners and the quality of instructional materials and assessments

"Knowmads" – learners who roam the learning landscape gathering badges representing a new level of granular knowledge and skills as well other badges representing the ability to synthesize the smaller chunks and apply them as needed in the world outside of school

The end of "grades" used to represent learning

The eventual fading and disappearance of the "diploma."

More prominent roles for human advisors and human resource professionals who know how to navigate the new information about learning opportunities and how to harvest the information in digital badges to identify and recruit well-prepare employees

"Learning recommendation engines" that inform learners of good next steps and "updates" that become available to badges they have earned, and, because of increased efficiency, reduced cost, and expanding digital access…

More learners in both formal and informal settings.

But there is a downside. Well, sort of. There will be a terrible shortage of well prepared learning system designers, assessment developers, and learning researchers. No… Hey wait, that's a good thing for our profession, right?

"The future's so bright, I gotta wear shades."

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