Trends in eLearning: Fostering 21st Century Skills

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Preface

In order to compete in a global economy and to deal with the complex problems of today's world, many leaders have argued the need for the fostering of 21st Century Skills. A 21st Century individual is innovative, collaborative and creative. These traits, plus media and technology skills and life and career skills are necessary to thrive in the ever-changing world (Partnership for 21st Century Skills, 2010). In order to foster these skills, many organizations have turned to eLearning as a viable option to foster and develop these skills.

eLearning is attractive and practical as it can meet the needs of larger and more diverse audiences through the use of available media and technology. With the growing implementation of eLearning have come a series of trends. Some of the significant emerging trends that we will examine are open educational resources, blended learning, 2.0 collaboration at work, form-based instructional templates, and convergence.

[The reference to 21st century learning skills is okay – if you use it in the paper. I didn't see it used.]

Open Educational Resources

What is it?

Marshall Smith and Cathy Casserly describe the Open Educational Resources (OCR) movement as, "the simple and powerful idea that the world's knowledge is a public good and that technology in general, and the World Wide Web in particular, provide an extraordinary opportunity for everyone to share, use, and reuse that knowledge" (Casserly & Smith, 2006, p. 2). The shared resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials or techniques used to support access to knowledge or that have an impact on teaching, learning and research. In short, the goal of the movement is to use technology to encourage the free flow of education and make it easier for

people to share and build upon the work of others with the desired end product being a collaborative, innovative and diverse online learning community (Casserly & Smith, 2006).

How does it work?

OER provides and promotes learning content, tools for the creation and delivery and use of open content and resources to help with the facilitation and implementation of open content/publishing (Atkins, Brown, & Hammond, 2007). OpenCourseWare (OCW) refers to course materials created by universities and shared across the Internet. The provided materials are free, openly licensed, comprehensive courses that "often include course planning materials and evaluation tools as well as thematic content," (OpenCourseWare Consortium, 2010). One of the trailblazers in OCW was MIT. In 2002, MIT began to publish lecture notes, reading lists, course assignments, syllabi, study materials, problems sets and exams, illustrations and simulations, and streaming videos of in-class lectures (Casserly & Smith, 2006, p. 4). Since then, universities such as Berkeley, Notre Dame, Michigan, Tufts and Yale have also developed OCW content. These institutions host their courseware on their own servers. OCW that includes all of their content in house are referred to as repositories (Casserly & Smith, 2006).

A significant problem with repositories is it can be difficult to find high-quality or relevant content quickly. Repositories can also be limited in that they often offer a narrower scope of material and are sometimes more difficult to maintain and update because the material has to be hosted and maintained. Additionally, some repositories are not extensively vetted or reviewed by peers or professionals outside of the provider of the material. While this is still a challenge, several aggregation website have come to fruition. These sites or portals do not house materials, but point to a variety of OCW sites or materials (many of which have been peer-reviewed). Portals provide a major advantage in that they provide the convenience of a search engine with the advantage of quality assurance and peer review. MERLOT (http://www.merlot.org/merlot/index.htm), OER Commons (http://www.oercommons.org/) and the OCW Consortium (http://ocwconsortium.org/) are popular portals (Casserly, & Smith, 2006).

How can it be used for teaching and learning?

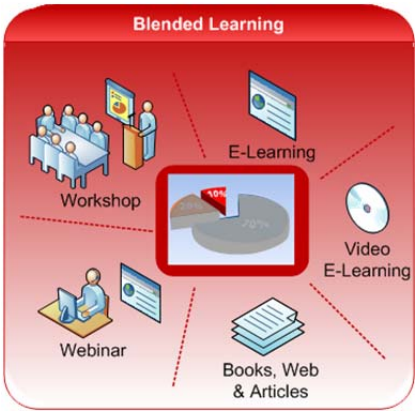
On the surface, OCW offers a litany of possibilities and applications for teaching and education. It opens the possibility of ivy-league quality curriculum to anyone with a computer and Internet connection. Additionally, it provides an open forum for individuals across the world to collaborate, innovate and learn from each other's experiences and knowledge. It encourages the publishing and sharing of content. While this does foster many of the 21st Century skills

that schools and employers desire, it will only be as successful as the planning, design and implementation behind it. Moreover, as stated by a major opponent in online education, Professor Monte Johnson of University of California San Diego, "In reality a privileged few will continue to enjoy the personal and economic benefits of face-to-face instruction at schools like Stanford, UC Berkeley, and M.I.T. The less fortunate citizens of our state will make do with downsized and underfunded campuses or settle for inferior and dehumanizing "virtual" alternatives" (Kamenetz, 2010). In the end, many students that are accessing online-only courses are doing so because they have to work or do not have access to other educational opportunities or have very few-resources. So, unless people pay attention to both quality and equality, OCW cannot be the sea change that many hope it will be (Kamenetz, 2010).

Blended Learning

What is it?

Simply put, blended learning (sometimes called "hybrid learning") refers to a mixing of different learning environments. This generally includes some sort of combination of face-to-face classroom instruction with online learning or technology –based instruction. Effective blending learning, "combines the effectiveness and socialization opportunities of the classroom with the technologically enhanced active learning possibilities of the online environment" (Dziuban, Hartman, & Moskal, 2004).



How does it work?

According to the North American Council for Online Learning (NACOL), "Blended learning, combining the best elements of online and face-to-face education, is likely to emerge as the predominant teaching model of the future" (Watson, 2008). If implemented properly, blended learning can be a trend that can be a game changer, but like all of the trends outlined in this paper, it is important that it is implemented properly. The most importantly, in order for blended learning to be successful; it needs to be approached as, "a fundamental redesign of the instructional model with increased interaction and assessment" (Watson, 2008). In cannot be looked at as only replacing face-to-face content with some online content.

In actuality, blended learning should include more interaction between all of the stakeholders in the learning community. Although there are some disagreements as to how much time is dedicated to each aspect of a blended course, all blended courses contain a combination of face-to-face, online activities and non-web based learning. The online portion of the course is used to enhance the face-to-face portion of the course and extend learning outside of the classroom. Lecture time in the face-to-face course is reduced and replaced with engaging online activities. In theory, everyone becomes active in the learning process through class discussions (asynchronous, synchronous and face-to-face), reflection, and the innovate use of information

and communications technology. Additionally, formative and summative assessments are integrated directly into the courseware and learners can be given the opportunity to develop their own assessments. (Watson, 2008).

How can it be used for teaching and learning?

Blended learning can be used in a multitude of ways. For traditional learning, it can add another dimension to the course. First and foremost, learning can continue outside the physical classroom walls of a brink and mortar classroom. Learning can easily be personalized through reflection and instruction can be differentiated across a diverse group of learners. Additionally, through the use of web technology, blended learning can help both the students and instructors increase their information and technology literacy. Moreover, blended learning can serve as a sort of initial foray into the tech world for non-digital natives or reluctant instructors. They would allow instructors a first step into an online environment while being able to maintain the comfort of traditional face-to-face learning (Dziuban, Hartman, & Moskal, 2004).

From an institutional sense, blended learning can also help improve facility use and lower administrative costs. Physical classrooms can be used more efficiently by combining low to medium enrollment sections of courses into larger courses that meet less frequently. The online component could provide application and personalization of content. Additionally, on-campus traffic and needed parking could decrease (Watson, 2008).

Finally, for schools that are completely online, a blended model can help address a couple of the common shortcomings of online learning. Many students and instructors in purely online courses complain of social isolation and have a difficult time staying engaged. Providing a face-to-face component adds a social component and thereby has shown to decrease attrition and "failure to launch" rates (Dziuban, Hartman, & Moskal, 2004).

2.0 collaboration at work

What is it?

2.0 collaboration at work refers to leveraging emergent Web 2.0 social software platforms to enable collaboration within companies and/or between companies and their partners or customers across the boundaries of space, time, and organization. *(This is in alignment with Andrew McAfee's definition of Enterprise 2.0. Andrew is a principal research scientist at the Center for Digital Business in the MIT Sloan School of Management.)* These 2.0 tools include social networks, wikis, instant messaging, social bookmarking, RSS feeds, blogs, and micro-blogging.

Our business world is more complex than it has ever been – work teams are spread across the globe, and projects require instant access to the latest information, and teams need to be able to interact with and contribute to the information in ways we have never done before. Henrik Gustafsson and Oscar Berg from Acando Consulting define the collaboration challenge as "enabling a dispersed team to coordinate its actions to achieve a shared goal" (Acando Consulting, 2008).

How does it work?

In a Web 1.0 model, a developer or webmaster posts content on a website and surfers come to that site to consume the information. This is a "one to many" model, and is an effective way for one author to share content.

In a Web 2.0 model, communities of contributors and online social networks post new content, comment on content, correct and update content.

Metadata and filters allow employees to quickly access relevant information:

- Comments
- Social bookmarks
- Shares (e.g., Facebook, Twitter)
- Favorites
- Downloads/Uploads
- Visits & views
- Embedded content
- Taxonomies
- Tags
- Users

Not all companies have embraced 2.0 tools; in fact, many companies are actively restricting access to such tools citing network security or workforce productivity concerns. Tony Karrer (2010) points out that the tools we use in life have leapfrogged over the ones we use at work. He illustrates the risk as follows:

"When a 12-year-old can gather information faster, process it more efficiently, reference more diverse professionals, and get volunteer guidance from better sources than you can at work, how can you pretend to be competitive?

"When the personal tools in your mobile phone are more empowering than what your company provides or approves for your projects, how can you be saved from devastating market forces?

"You can't."

For this reason, Tony predicts that as companies continue to restrict access to 2.0 tools at work, employees will find ways to install the software in violation of company policies, or will turn to their own laptops or mobile devices to work around the bureaucratic barriers. He calls this effort "hacking work."

How can it be used for teaching and learning?

We have already discussed how Web 2.0 tools are being blended with traditional formal learning. 2.0 collaboration at work is specifically focused on actively contributing to, interacting with, and using 2.0 tools to create rich knowledge communities at work, largely replacing the need for formal learning. As Sharon Boller (2010) points out, "remembering is way less important than it used to be - now finding stuff is most important."

2.0 collaboration at work can support teaching and learning as follows:

- Reduce the need to create, deliver, and attend formal training.
    - Eliminate “lag time” (the time required to build and deliver formal training) by providing more immediate access to the most current content and the subject matter experts who developed it.
    - Allow the community to engage with the content, asking questions and providing insights to build and adapt best practices.
- Provide an active narrative of your work.
    - Post online project plans and support documentation on a sharing tool such as SharePoint.
    - Create daily blogs to document your challenges and accomplishments, as well as sharing your learnings.
    - Solicit help from peers within your company or within your field to solve current challenges.
- Point to related work and engage in conversation, critique, and debate.
- Vote, “Like” (Facebook), etc. to indicate approval or opinion.
    - Reach community consensus and bring good ideas to the forefront of the search engines.
    - Gain valuable insight from customers and target customers during the development of your product.

Development through templates - Better, faster, & cheaper

What is it?

A user with almost zero programming experience can produce engaging and consistent e-Learning content by selecting the desired layout or interaction template, filling out a set of fields (module title, page title, screen text, prompt, question stem, responses, feedback, etc.), then clicking a button to generate a page, lesson, or course.

Most Learning Content Management Systems (LCMS) have the same capability, but high costs make them prohibitive to individual developers and small companies – 10 years ago, LCMS’s ranged in price from $150K to $1.9 million (Shepherd, 2002). Now, templates and template-driven tools such as Articulate are available for under $1,000. E-Learning templates range from basic PowerPoint layout masters but also include high-end production Flash versions of popular game shows, mimicking Jeopardy!, Who Wants to Be a Millionaire, $100,000 Pyramid, Beat the Clock, Wheel of Fortune, etc. and board games.

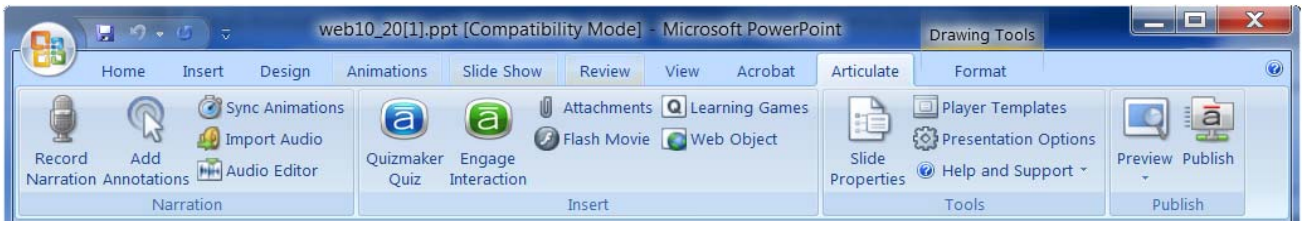
Note: Creators change just enough detail about the games to avoid copyright and trademark infringement.

One company providing such templates is William Horton Consulting, Inc. Horton lists the following advantages to using their more than 65 templates ($55 for the whole set), which include page templates for registration, technical support, glossary, policy, objectives, etc.:

- Let designers focus their creativity on unique content and interactivity, not on building the structure and handling administrative details.
- Reduce the time, effort, and cost required to get a course up and running.
- Deploy a course without requiring a learning management system.
- Customize or edit pages using any HTML editor such as Dreamweaver or FrontPage.
- Ensure visual and navigational consistency.

How does it work?

The detailed procedures will differ according to the templates you purchase. Articulate, for example, is a PowerPoint add-on. After installing Articulate, PowerPoint will have additional toolbars to enable inserting Quizmaker Quiz items or non-scored Engage Interactions, Learning Games, or pages based on other Player Templates.



Stand-alone templates will have the learner either fill-out fields or replace placeholder content in an HTML editor or in Flash movies themselves.

Whichever method you use, the process of creating the pages, lessons, and courses is much easier than programming from scratch, and results in a product that looks like it was built by a high-end design team.

How can it be used for teaching and learning?

This new generation of templates and template based tools is the secret to achieving the Holy Grail of e-Learning courseware development - better, cheaper, and faster. The implications of

these tools in teaching and learning are obvious – putting the development of e-Learning courseware into the hands of non-programmers. Examples include:

- Instructional Design teams can hire designers with strong writing skills without requiring programming and interface design specialists.
- Small teams can rapidly develop a surprisingly large amount of courseware and maintain high production quality and engagement. Remember though:
    - Templates only reduce development and production efforts; they do not replace analysis efforts.
    - Templates do not ensure good design. Templates and treatments will still need to be appropriate to the content being delivered.
- SMEs can be trained to create and maintain courseware directly.
    - The *risk* is that easy development by non-designers almost always results in poor design. To mitigate this risk, SMEs should receive basic training in course development and ongoing coaching and support.

Convergence (of Social Communication Tools)

With the convergence of 3G threaded discussions (mobile learning), education social software, and micro blogging "learners have increased educational opportunities due to the internet's affordance of connectivity" (Siemen & Tittenberger, 2009). The emerging mobile technologies provide a vehicle for evolving threaded discussion to a third generation (3G) that better emulates face-to-face discussions by *delivering the discourse, in device-scaled form, to the participants in real time wherever they are* (as cited in Shen, Wang, & Pan, 2008).

Mobile Learning

What is it?

Mobile learning focuses on the learner interacting with portable technologies where the learner is mobile and the learning and activities occur in real time. The 3G threaded discussions is a system broadcast that affords synchronicity immediately to the learner unless the learner chooses not to participate.

A couple examples of mobile technologies are:

Kindle is an eBook device that can hold up to 1500 books. The device allows a person to bookmark and highlight areas of interest. The Kindle also allows one to take notes by selecting text or book mark a section. The newer vision allows one to add visual feedback whenever you take a note. It has an in-line dictionary at the touch of the finger. Kindle also has a website for its subscribers to view other subscribers and the most popular highlights of books.

IPad is a tablet for audio and visual media such as books, periodicals, movies, music, and games, as well as web content. It has a multi-touch system that makes it easy to use. The devise assists in contextual learning and promotes engaging students in real-life applications. It is learning on-the-go. The tablet will support e-textbooks, mobile apps, web-based and offline, web productivity, and content creation and communication options.

How does it work?

A broadcast (video, audio, lecture notes, or discussion question) is transmitted out over a GPRS network and is synthesized to mobile technology and then played back in real time.

How can it be used in teaching and learning?

Threaded discussions are a good tool for collaborative learning since they facilitate interaction and reflection between students and students and students and teachers. The instructor may send a video, audio, lecture notes, or discussions to the learner to the learners mobile technology device wherever/whenever. Shen, Wang, and Pan (2008) suggest threaded discussions provide learners the opportunity to collaborate with other students and teachers freely and timely. "Discussion threads let students accompany and help each other as they maneuver through the learning ecosystem, actively engaging with the resources to solve a problem or gather information" (Hill and Roldan, 2005, p. 58). [How do mobile discussions differ from desktop- or laptop-based discussions? Describe the micro-blogging or tweeting versions of discussions that are facilitated by mobile technologies. Or say "see below" for more discussion on mobile learning.]

Social Software

What is it?

Social Software is a set of network tools that allows for support sharing, collaborating, and socializing. It allows learners to "meet, work together, share insights and ideas, and artifacts, thus affording learners' the opportunity to meet each other and forge learning relationships (Anderson, Poelhuber, & McKerlich, 2010).

How does it work?

You as a learner join a social software website such as Facebook. You provide profile information and an image of yourself. You have the option to provide as much profile information as you want with your friends and family and have the ability to manage your site. You then search the database for friends, family, or individuals with similar interests and invite them to be your friend. The site allows you to write messages, embed video and audio files as well as play games.

How can it be used in Teaching and Learning?

In the past decade, there has been a growing interest in software to incorporate it into distance education and eLearning. eLearning and distance education often lack the connectivist pedagogy in the design of courses. Research into the connectivist learning pedagogy "found that access to peer work and peer relations improved the perception of social presence and the students' motivation (as cited in Anderson, Poelhuber, & McKerlich, 2010).

Micro blogging

What is it?

Micro blogging is a brief immediate message, video, or audio post (Twitter) which can be written or received over a variety of communication devices such as cell phones.

How does it work?

A learner joins a social network website such as Twitter. They write short messages or embed videos or audio files on the website to be viewed by friends and followers throughout the world. The learner interacts and shares experiences, information, and socializes with friends and followers. Micro blogs can be written and read by different mobile technologies.

How can it be used in teaching and learning?

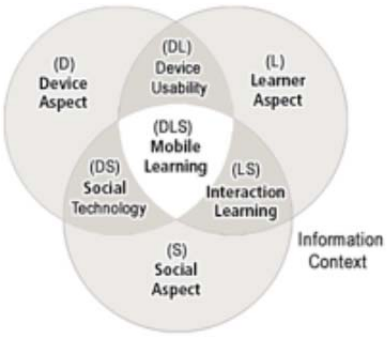
It is often used in the workforce to streamline the information flow within an organization. President Obama used micro blogging during his campaign and many news affiliates also use micro blogging to present news, sports, and weather.

In higher education, many professors use micro blogging to build networks, establish networks of sources, and make connections in the professional world (Miners, 2009). Micro blogging allows for the interaction between students and interaction between students and teachers and the "opportunity to be part of someone else's thinking process by reading, commenting, discussing or simply enhancing it" (Ebner, Lienhardt, Rohs, & Meyer, p. 99).

Learners use micro blogs to share information, seek information, and develop friendship-wide relationships. Ebner and Schiefner (2008) state that "the use of micro blogging for fast exchange between people with similar interests is highly valuable" (as cited in Ebner, et al, 2010, p. 93). [Describe how micro blogging is particularly well suited to mobile technologies – see above.]

Technology in practice: m-Learning

The aforementioned trends and theories require proper integration or implementation in order to be widely accepted as a viable option for effective training/education. One of the most promising and best examples of the integration of technology and eLearning is m-Learning. m-Learning (another term for mobile learning) has the potential to excite both skeptics and believers. [This makes me wonder whether you should remove the Mobile Learning section above. I'd probably recommend it; otherwise the structure of the paper is confusiong.]



Mobile learning evolved roughly 10 years ago, after the introduction of elearning. It is defined as "any educational provision where the sole or dominant technologies are handheld or palmtop devices" (Traxler, 2005), "any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of learning opportunities offered by mobile technologies" (as cited in Traxler, 2005), or "the provision of education and training on PDAs/palmtops/handhelds, smartphones and mobile phones" (as cited Traxler, 2005). For the purpose of this paper, we will use MoLNet's definition of mobile learning: "exploitation of ubiquitous handheld hardware, wireless networking, and mobile telephones to enhance and extend the reach of teaching and learning" (as cited in Traxler, 2005).

Implications for Programs

As stated in our previous research, distance learning not only allows learners to access education "anytime" and "anywhere," but it also enhances and enriches the activity of learning. Mobile learning has lifted distance learning to a new level and has brought distance learning to those in geographical dispersed areas and has reached across not only spatial and geographical distance but social, economic, and culture distance. "Educational reformers suggest that the advent of new technologies will radically transform what people learn, how they learn, and where they learn" (Warschauer, 2007), mobile learning provides learners with "any time", "everywhere" access to education.

[I'm particularly interested in when and where to deploy m-learning. For eample, some countries have many more cellphones with texting than computers. In these phone-dependent cultures, m-learning makes good sense. Where else? Where would you choose to use m-

Learning versus other delivery forms? What kinds of tasks/populations work best – versus NOT work or m-Learning? It seems, for example, that field work or travel-based work is well suited.]

[Also: somewhere it may be good to talk about interface – voice recognition systems are becoming more sophisticated, and the alphanumeric entry required now may be replaced by voice-based systems.]

Koole, McQuilkin, and Ally (2010) suggest "through mobile-accessible systems, learners can gain more freedom to study according to their own needs and preferences." Although mobile learning enhances the educational experience, is available "anytime" and "everywhere", and provides motivation to young learners, it also has drawbacks. Mobile technology has limited input and output capabilities, limited memory, small screens, is prone to frequent interruptions, and is highly-context depended (as cited in Koole, et al, 2010, p. 61).

"Dewey claimed that it is a great waste for students to be unable to apply in daily life what [they are] doing in school"(as cited in Hung Lai, Chi Yang, Ching Chen, Wen Ho, & San Liang, 2009). "Elearning expands education outside the classroom and mobile learning takes what we already know to the next level" (Hlodan, 2010, p. 682).

Mobile learning best enhances learning through teacher support and through interactivity, on-demand learning, and preparatory activities. As mobile networks evolve with value-added features such as video, voice narration, interactivity, and discussions units, etc., mobile learning "extends the flexibility of learning from anytime/anyplace to anywhere" (Motiwalla 2005, p. 596)

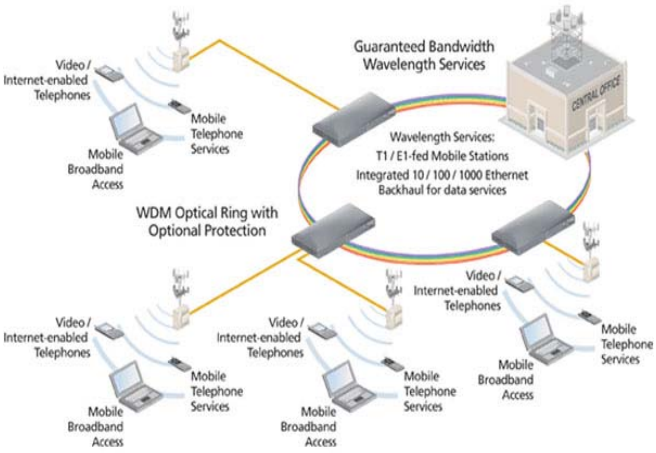
Mobile learning also allows for collaborative interaction and learning opportunities for geographically dispersed persons. It expands the opportunity to those who may not normally have access to education. Mobile technology is more affordable than desktops or laptops and most young adults already have some kind of mobile devices. The mobile devices can captain visualizations and retain information for future access, from that learning environment. With the guidance of instruction, learners can be led to comprehend what they see and then write about their observations. And learners can synthesize and reflect on the knowledge they have retained (Hung Lai et al, 2009). [This paragraph was too un-critical, just claiming a bunch of things without evidence.]

As we have pointed out, e-Learning integrates the latest available technologies with established and emerging learning theory to deliver learning across multiple contexts, including distance learning. Mobile learning is a definitive example of this integration. By combining the

technology of mobile devices (iPhone, Android, and Blackberry smartphones, tablet PCs, netbooks, etc.), high speed wireless data, and sound learning theory, mobile learning is getting very close being able to meet the “anytime/anywhere” promise of distance education.

Implications for Professional Roles

Two challenges presented by the mobile platform on e-learning personnel are screen size and the complex spider web of technological variances in the mobile device arena. In this section we outline how professional roles are changed when instruction is designed and delivered for mobile learning platforms.



The Graphic Designer

In general, m-Learning requires a heavier investment in graphic representation and visual design. This may be somewhat ironic, because when it comes to screen size, one cannot simply re-leverage screens designed for a 19 inch monitor onto a 2 inch x 4 inch screen. But because of these constraints, interface design is impacted, scrolling rules are challenged, and hotspot navigation is limited. All of this requires careful design, often a re-design from traditional computer interfaces.

The Instructional Designer

Curricula modularity is critical, incorporation of Apps and Web 2.0 strategies are instantly available, and engagement is jeopardized by the competing use of the delivery device. [Make each one of these points a separate sentence – make sure your audience understands each point.]

[I would add concerns specific to m-Learning, such as:

- m-Learning commitment. Project managers need to analyze their overall training needs and determine promising candidates for m-Learning delivery. Access to training/performance support in the field, on demand would take priority.
- Audience analysis. Does your audience already have mobile devices? If so, common or compatible platform? Androids are growing in force because of their common open-source platform – these considerations enter into m-Learning design.
- Design issues. Careful and thorough design should go into early m-Learning projects, to assure positive reception in the field…

These concerns do not substantially change the ID role, but they do remind us that design is a critical function to the success of m-Learning, perhaps even more so than traditional Web-based delivery…]

The IT Specialist

Perhaps the most challenged role in m-Learning is the technologist. There are already several mobile platforms, and none share the same standards (e.g., iPad and iPhone do not support Flash, an App developed for Android will not run on an Apple product) and "high speed" is not descriptive enough a division of bandwidth (Wi-Fi can support full screen video, while 3G networks require downloading the video file separately). [Not sure about "challenging" – the IT person may not be the one challenged! I'm not sure I would include this one – work it into the discussion above, as I have suggested. Your choice – but a point to emphasize here is the constantly evolving platforms and tech specs – hard to design around.]

Skills Required for a Career in m-Learning

In a wide review of m-Learning development jobs using such tools as Monster.com, CareerBuilders, and the ASTD Job Bank, it is immediately obvious the job titles are similar to those required to build e-Learning. The following list are compiled from these job boards, showing how m-Learning jobs reflect e-Learning positions to some extent, but also differ somewhat in their emphasis.

Instructional Designer

- Screen design – able to translate to the challenges of the small screen
- Create an engaging and instructionally rich mobile learning environment
- Determine implications and challenges of a fully mobile learning environment and develop instructional, assessment, and feedback strategies to maximize the effectiveness of the mobile learning environment
- Blend learning approaches to develop and deliver multi-media training programs on a mobile device.

- Adhere to stringent technical standards and limitations imposed by the target mobile device(s)

Technologist

- Gather (and/or help define) technical requirements from clients, analyze the feasibility, time frame etc., and freeze the technical requirements
- Define the limitations imposed by telephony issues according to the selected mobile learning devices (connectivity, limitations of Wi-Fi vs. 3G & 4G)
- Record, edit, and compress audio/video in accordance with platform requirements
- Keep updated and explore new trends in technology which will help in increased productivity and continue to support client base
- Knowledgeable of current and emerging mobile device platforms
- Design and implement a mobile learning infrastructure
- Support Programmer & Graphic Artist in the following formats:
    - On-Device Videos - MP4, M4V, WMV, 3GP, SWF
    - Web Videos - FLV
    - Audio Podcasts - MP3, WMA, WAV
    - Voice-Based CellCasts - WAV, GSM
    - Animated Slide Presentations - PPT, PPTX
    - Mobile Web Pages/Courses - HTML, TXT
    - Adobe Files - PDF
    - Mobile Assessments - XML, HTML
    - Messaging/Notifications - SMS, EMAIL
- Provide customer service and tech supports to end users of the mobile devices

Programmer

- Develop in Flash CS3/Flash CS4 and ActionScript 2.0 or 3.0
- Develop in HTML, CSS, PHP, mySQL, and java script
- Up to date on HTML 5 (future)
- Integrate mobile learning data with various LMS platforms and standards (SCORM, AICC)
- App design and development a plus (J2ME, Android, Windows Mobile, iPhone/iPad)

Graphic Artist / Visual Designer

- Design user interfaces for mobile learning environment (including App interface design)
- Develop in Adobe Photoshop, Adobe Illustrator, Flash, and Flash equivalent

One additional observation from our jobs review: additional roles are needed to provide a wide range of m-Learning products, including Technical Project Manager, Sales/Marketers,

Vocal/Video Talent. These roles seem to be basically the same in the m-Learning arena as in the e-Learning arena.

Concluding thoughts

eLearning continues to evolve with advances and changes in technology. While eLearning alone cannot completely replace traditional education and training, it does have the potential to be a game-changer in the world of education and training. eLearning can increase access to education and instruction while facilitating efficiency and flexibility. However, all of these great trends, ideas and advances in the emerging field of eLearning will be moot if proper consideration is not given to its careful development, integration and implementation. In short, any great idea requires proper planning and implementation. In the world of instructional design, "good design is still good design" and no technology or popular fad/trend can mask bad design. If implemented with good design and proper planning, the various emerging trends and technology can facilitate a sea change in the world of education and training. [Work in reference to 21st century learning skills – or remove that from the intro section.]

References

[Titles of everything except journals should not be capitalized. Change throughout if you can.]

Acando Consulting (2007). Web 2.0 at work: Simple and social collaboration between coworkers. Retrieved from http://www.slideshare.net/marknadsstod/web-20-at-work-simple-and-social-collaboration-between-coworkers-presentation

Acando Consulting (2008). Web enterprise 2.0: Efficient collaboration and knowledge exchange. Retrieved from http://www.slideshare.net/marknadsstod/enterprise-20-efficient-collaboration-and-knowledge-exchange-slideshare

Anderson, T., Poelhuber, B., and McKerlich, R. (2010). Self-paced Learners Meet Social Software: An Exploration of Learner's Attitudes, Expectations and Experience. *Online Journal of Distance Learning Administration.* Fall 2010. Volume VIII, number III. Retrieved from internet on September 7, 2010.

Atkins, D. E., Brown, J. S. and Hammond, A. L. (2007). A Review of the Open Educational Resources (OER) movement: Achievement, challenges, and new opportunities. Retrieved from http://www.oerderves.org/wp-content/uploads/2007/03/a-review-of-the-open-educational-resources-oer-movement_final.pdf

Boller, S. (2010). Training trends 2010: What's happening and so what? Retrieved from http://www.bottomlineperformance.com/lolblog/?p=1384. Bottom-Line Performance Blog.

Casserly, C., and Smith, M. (2006). The promise of open educational resources. Change: The Magazine of Higher Learning, 38(5), 8-17.

de-Marcos, L., Hilera, J., Barchino, R., Jiménez, L., Martínez, J., Gutiérrez, J., . . . Otón, S. (2010). An experiment for improving students' performance in secondary and tertiary education by means of m-learning auto-assessment. *Computers & Education.* Vol. 55 p. 1069–1079.

Ebner, M., Lienhardt, C., Rohs, M., Meyer, I. Microblogs in higher education – A chance to facilitate informal and process-oriented learning? *Computers & Education. 2010. Vol.* 55, p. 92–100

Hill, T. R. and Roldan, M. (2005). Toward third generation threaded discussions for mobile learning: opportunities and challenges for ubiquitous collaborative environments. *Information Systems Frontiers. 2005. Vol.* 7:1, 55–70.

Hlodan, O. (2010). Mobile learning anytime, anywhere. *Bioscience*. Vol. 60, Issue 9. p. 682.

Hung Lai, C., Chi Yang, J., Ching Chen, F., Wen Ho, C., and San Liang, J. (2010). Mobile technology supported experiential learning. *International Journal of Instructional Media*. Vol. 36(1).

Kamenetz, A. (2010, May 10). Online education and the laying on of hands. *The Huffington Post*, Retrieved from http://www.huffingtonpost.com/anya-kamenetz/online-education-and-the_b_580769.html

Karrer, T. (2010). Top 10 eLearning predictions for 2010: eLearning technology. Retrieved from http://elearningtech.blogspot.com/2010/01/top-10-elearning-predictions-for-2010.html Tony Karrer's eLearning Blog.

Koole, M., McQuilkin, J., and Ally, M. (2010). Mobile learning in distance education: utility or futility? *Journal of Distance Education.* Vol. 24, No. 2, p. 59-82.

McAfee, A. (2010). Do's and don'ts for your work's social platforms. Retrieved from http://blogs.hbr.org/hbr/mcafee/2010/09/dos-and-donts-for-your-works-s.html. Harvard Business Review Blogs.

Miners, Z. (2009). Twitter goes to college. *U.S. News & World Report*. Sep 2009. Vol. 146, Issue 8, p. 56-57.

Motiwalla, Luvai F. (2007). Mobile learning: a framework and evaluation. C*omputers & Education*. Vol. 49, Issue 3. p. 581-596.

Shen, R., Wang, M., and Pan, X. (2008) Increasing interactivity in blended classrooms through a cutting-edge mobile learning system. *British Journal of Educational Technology*. Vol 39, No 6., p. 1073–1086

Shepherd, C. (2002). Making the case for content. Retrieved from http://www.fastrak-consulting.co.uk/tactix/Features/lcms.htm

Siemens, G., and Tittenberger, P. (2009). *Handbook of emerging technologies for learning.* Retrieved from http://umanitoba.ca/learning_technologies/cetl/HETL.pdf

Traxler, J. (2010). Distance education and mobile learning: catching up, taking stock. *Distance Education.* Vol. 31, No. 2, p. 129-138.

Uzunboylu, H., Cavus, N., and Ercag, E. (2009). Using mobile learning to increase environmental awareness. *Computers & Education*. Vol. 52, Issue 2, p. 381-389.

Warchauer, M. (2007). The paradoxical future of digital learning. *Science & Business.* Received: 27 September 2006 / Accepted: 10 January 2007 / Published online: 13 March 2007.

Watson, J. (2008). Blending learning: the convergence of online and face-to-face education. Promising Practices in Online Learning, Retrieved from http://www.inacol.org/research/promisingpractices/NACOL_PP-BlendedLearning-lr.pdf

William Horton Consulting. Horton e-learning templates. Retrieved October 2, 2010 from http://www.horton.com/htmltemplates.aspx