

MOBILE LEARNING: AT THE TIPPING POINT

Dr. Teresa Franklin
 Professor, Instructional Technology
 Department of Educational Studies
 The Patton College of Education and Human Services
 Ohio University
 USA
 franklit@ohio.edu

ABSTRACT

Mobile technologies are interfacing with all aspects of our lives including Web 2.0 tools and applications, immersive virtual world environments, and online environments to present educational opportunities for 24/7 learning at the learner's discretion. Mobile devices are allowing educators to build new community learning ecosystems for and by today's students using smart phones, iPads, tablets, and iPod devices to stay connected. The use of simulations and virtual environments to build learning spaces that provide connections to students globally and how these 21st Century digital interfaces will challenge our educational institutions to create a more rigorous, immersive, and differentiated learning environments will be explored in an attempt to answer the question: Mobile learning, are we at the Tipping Point?

Keywords: mobile learning; tipping point, 24/7 learning; smart phones, cell phones, mobile devices, digital citizens

INTRODUCTION

Never before in the history of the planet have so many people – own their own – had the ability to find so much information about so many things and about so many people.

Thomas L. Friedman, The World is Flat, 2005, p. 178.

Second Life, Twitter, Facebook, Flickr, 'smart phones', robot pets, robot lovers, what do these have in common? Thirty years ago, none of us had heard of them! And thirty years ago, we were asking what will we use the computer for? Will it replace us? Now, thirty years later, technology promises to let us do anything from anywhere with anyone (Turkle, 2011, preface).

Now the question is what is it we don't use them for? We communicate, create, navigate and build a persona around who we are based on a technology provided to us through technology. Our digital technologies, like our buildings (Winston Churchill noted that our buildings shape us.) are shaping who we are and what we know and believe. Technology has become the architect of our lives (Turkle, 2011). We are technologically mobile with technologically mobile personas, which are not bound by time and place.

Before we start, let's establish some definitions so that when having this conversation, you and I are thinking about similar information.

Mobile learning – learning that happens anywhere, anytime.

Mobile devices – devices such as cell phones, smart phones, netbooks, laptops, tablets, iPods, iPads, e-readers such as the Kindle, Nook, etc., palms, Treo, and other devices that are typically lightweight, portable and connect to the internet.

Learners – all known people (not dependent on age, gender, race, ethnicity)

Social networks – “social structure made up of individuals (or organizations) called "nodes", which are tied (connected) by one or more specific types of interdependency, such as friendship, kinship, common interest, financial exchange, dislike, sexual relationships, or relationships of beliefs, knowledge or prestige” (Wikipedia, http://en.wikipedia.org/wiki/Social_network, 2011, para. 1).

Apps - also known as an **application** or an **"app"**, is computer software designed to help the user to perform singular or multiple related specific tasks. Examples include enterprise software, accounting software, office suites, graphics software and media players. Many application programs deal principally with documents” (Wikipedia, http://en.wikipedia.org/wiki/Application_software, 2011, para. 1).

Because the term *mobile technology* is broad in meaning, it useful to distinguish between different types of mobile devices. We used the term *highly mobile device* to refer to cell-phone sized devices that can fit in a pocket: feature phones (supporting cell and SMS service only), smartphones, and other devices like Flip cameras. *Very mobile devices* include slates, pads, and netbooks. Finally, the category *mobile device* refers to

larger devices such as laptops. While this might appear to be splitting hairs, the degree of a device's mobility determines the ways it is best used in learning: a smartphone is much more mobile than a laptop, and this high degree of mobility makes it indispensable in some contexts but a liability in others.

Why Does Mobile Matter?

Always on – always on you is the mantra for today's learner. "With more than 6 billion mobile subscribers worldwide, 85 billion text messages sent per month, mobile texting usage is up 450% over the last two years, it's clear that mobility will overtake the internet and television as the most ubiquitous form of communication" (Mobile Matters, 2011, para. 1). What does it mean to be mobile?

1. Like your car keys and your wallet, the mobile device is always with you including the ability to communicate in real-time, anywhere, anytime
2. There is an every present audience by the use of Twitter™ and Facebook™
3. Personalization is the name of the game – 'one size does not fit all'; direct and personal, takes little time to send a message or respond
4. User has the option to 'opt out' so it is permission-based
5. Messages on your cell phone tend to stay (stick) and can be forwarded to others at the chosen time and place
6. Interactive on a 1:1 basis with the user deciding who, when, where and why to communicate (Mobile Matters, 2011, para. 3)

Over the past year in particular, we have seen a huge increase in mobile learning – leveraging small, portable devices to facilitate anytime, anywhere, un-tethered learning. This has been fueled by the use of netbooks and laptops in our educational systems that have been used in our K-12 and higher education classrooms, the drop in price for netbooks making computers almost disposable and the added fact that people own smart phones! These lower price drivers in the smart phone industry have shaped a new paradigm of mobile computing.

What Is A Tipping Point?

The tipping point is an idea – it is the best way to understand the emergence of fashion trends, the ebb and flow of stardom, the rise of teenage smoking, and the emergence of the cell phone as the communication device of choice by most of the world. Being mobile is an *epidemic*, like ideas, products, messages and behaviors that spread just like viruses; mobile technologies appear and disappear daily from our lives.

Principles of Epidemics

When thinking about tipping points, there are several principles of how such an event occurs to keep in mind.

Principle 1: When a large number of people in a small number of situations start behaving differently, the behavior begins to spread to others. In other words, we become infected and it happens rapidly. Who remembers My Space? Now My Space has been replaced by Facebook (Gladwell, 2002). What about that flip phone? Now we all want an iPhone or Droid.

Principle 2: There are all kinds of things that are contagious, for example, yawning. Yawning is a powerful thought. As you read this and think about yawning – many of you will yawn. When someone sees you yawn, they often yawn too or if you see someone yawn, you may yawn. As humans, we are socialized to think about cause and effect. Just as in the yawning discussion, where we had some people yawn, the epidemic of being *mobile* is a geometric progression. There is no proportionality to this thing we are calling *mobile learning*, big changes can occur from small events (cell phone) and they happen rapidly (1.1 million cell users in 1998 – 85 billion cell users in 2011) (Gladwell, 2002).

"The idea of sudden change is at the center of the idea of the Tipping Point" (p. 12) and is one of the most difficult ideas for educators to grasp. The Tipping Point is the movement of critical mass to a point when everyone is involved. This actually happened with the cell phone in 1998; at that point the cell phone became a viable device for communication and everyone wanted one (Gladwell, 2002). We now have parents purchasing cell phones for their 6 year olds.

The educational paradigm, however, is one of *gradualist*. Educators are at heart *gradualist*. Educators like for progress to be steady; we want time to study the impact and examine outcomes. The world of the Tipping Point is a world "where the unexpected becomes expected, where radical change is more than possibility. It is – contrary to all our expectations – a certainty" (Gladwell, 2002, 13-14). As educators we are missing the Tipping Point of mobile learning.

The Horizon Report 2011 (<http://net.educause.edu/ir/library/pdf/HR2011.pdf>), presents further evidence that mobile learning is at the tipping point whether, as educators, we like it or not. Each year, the Horizon Report describes six areas of emerging technology that will have significant impact on higher education and creative expression over the next one to five years. The areas of emerging technology cited for 2011 are:

Time to adoption: One Year or Less

- Mobiles
- Electronic Books

Time to adoption: Two to Three Years

- Augmented Reality (*noted in 2010 to be seven years away*)
- Game-based Learning (*noted in 2010 to be seven years away*)

Time to adoption: Four to Five Years

- Gesture-based Computing
- Learning Analytics (Horizon Report, Educause 2011, <http://net.educause.edu/ir/library/pdf/HR2011.pdf>, p. 5-6).

As educators, we are in the midst of an epidemic, the tipping point has been reached and mobile is here!

The Complexity of Mobile Learning

Mobile learning brings a number of complexities to the educational arena. Today, we will examine three of these complexities: pedagogical; communication; and infrastructure. The first complexity is the **pedagogical** complexity of bringing mobile learning to the learner within a classroom or at a distance. Educators in general are somewhat resistant to the idea of an open system or world in which a student can *reach out and touch him/her* which is the direction that mobile learning and cell delivery of content takes the learner in a world in which 24/7 access makes locating experts, in this case faculty, for questions, discussion and collaboration an easy task. Our students can quickly through the use of their mobile device *fact check* a class lecture, *find people* who may know more about the topic than the faculty, *find people* who have completed the assignment last year and ask them for help – or *copy* intellectual property directly -- and *facebook* or *tweet* (becoming verbs) how bad/boring your class is – all while attending your lecture.

Are You a Mobile Educator?

- *(Do you let students use laptops during your class?)
- (Do you make student turn off cell phones when entering the class?)
- *(Do you let students use their cell phones to find information during class?)
- (Do your students facebooking during your class?)
- *(Are your students texting during your class?)

**Used in Poll Everywhere during presentation.*

The *Poll Everywhere* exercise provides a context for the second complexity, **communication**. Communication may be the most complex of all the issues surrounding mobile learning. Communication is the one area where learners are in control and are already ahead of educators in using mobile communication to connect, discuss, learn and identify others with the same ideas or divergent ideas.

Finally, there is the hardware and software **infrastructure** aspect of mobile devices many of which require constant upgrades. Ericsson, one of the leading manufacturers of mobile devices, states that by 2015, 80% of the world population will have access to the internet by a mobile device (Educause Review, 2011). Verizon, a leading phone and internet delivery company, suggests by 2015, all cell phones will be ‘smart phones’ with the capability to access the internet, download, upload and implement mobile apps for education, entertainment and social activities (M. Williams, Verizon, personal correspondence 2010).

Each of these complexities will now be examined through the lens of mobile delivery of content for teaching and learning.

Complexity #1: Pedagogy and Mobile Learning
How Does Learning Change?

Mobile technology in a learning environment does not change the essential aspects of how people learn. Learning does not occur passively and research shows that there is greater learning when students engage in active learning (as cited in McKinney, 2011; Meyers & Jones, 1993). Active learning involves students in talking and listening, reading, writing, and reflection all possible through the use of a mobile device. These devices are small, already owned by most university students and have more capabilities than clickers and easy to use on a desk in a classroom or outside the classroom.

But let's back up a second, we know that these devices are owned by many if not most of our university students but as educators, we need to realize they are becoming owned by learners of all ages. Parents are seeing these devices as ways to educate their children. We are becoming a world of *Free Agent Learners* (Speak Up 2010, p. 1) "who seek out online learning resources on their own, follow a passion for a topic and fully explore it on the web, self-remediate when necessary, and are tapping into the power of educational games inside and outside of school" (Speak Up 2010, 201, p. 1).

This is the present situation in the US for children with access to technology.

Device	K-2	Gr 3-5	Gr 6-8	Gr 9-12
Cell phone (without internet access)	21%	29%	51%	56%
Smart phone	16%	19%	34%	44%
Laptop	37%	42%	60%	67%
MP3	37%	55%	79%	85%
Tablet device (iPad)	10%	8%	13%	10%

Project Tomorrow, 2011, p. 5. Retrieved from http://www.tomorrow.org/speakup/pdfs/SU10_3EofEducation_Students.pdf

Cell phone purchases for those ages 6 and up increased 40% last year in the US and worldwide 32% (Speak Up 2010, 2011). Parents driving from work, school, and running errands are using the cell phone to entertain their children whether it is the parent's phone or child's phone. Children's mobile apps are being used on the cell to teach informally by parents. The iPad2 and other tablets are changing our focus in education due to its design and tactile experience they provides in the classroom. The larger size makes it easier to read than your phone. Computing is made easier to have discussions and collaborate and allows users to manipulate and 'own' the content created.

No learning does not change, what changes is the delivery of the learning. Which brings us to the new **3 E's for Education: Enabling, Engaging, and Empowering**, whereby learners through the use of mobile learning, blended learning, and e-textbooks in socially-based, un-tethered, and digitally rich learning are being educated without us as the *TEACHER*.

These 3 E's suggest that we as educators need to realize that learning must...

- Enable learners to reach their potential through increased access to educational resources and experts that extend learning beyond the capacities or limitations of their school or community.
- Engage learners in rich, compelling learning experiences that develop deeper knowledge and skill development especially in problem-solving, creativity and critical thinking skills so highly desired in the workplace.
- Empower learners to take responsibility for their own educational destinies and to explore knowledge with an unfettered curiosity, thus creating a new generation of lifelong learners (Speak Up 2010, 2011, p. 3).

In building mobile content, educators often create lessons that are little more than exercises in sitting, listening, and/or reading – just like the lecture class he/she used to teach. Learning requires intellectual engagement and interaction with the context of the learning outcomes. Mobile learning must provide the following if we are to enable, engage and empower our learners:

- **Individualized Experiences.** This not just about working alone, working in groups or working at one's own pace. Content must be designed to meet the needs of each student with the instruction he/she needs. Although this seems impossible for a large group, with careful thought individualized instruction can be adapted to individual needs by providing more practice for those needing it and allowing students to move on to the next stage of learning when he/she demonstrates mastery.
- **Free to make mistakes.** Most of us do not like to “look stupid” in front of our peers, the same happens with mobile learning. With mobile learning, the space for learning must be considered safe by students for making mistakes as every single interaction is judged, scored and reported by the device or website being used.
- **Continuous Access.** Most content is built in conjunction with the needs of particular group of students and disappears after the ‘class’ or learning episode. Often students need to return to this content to re-learn a particular skill or review information for knowledge building. Continuous access is needed to review, reference, and relearn as the needs of the student dictates (Edwards, 2011).
- **Transform and transcend the current learning model** through the use of Wifi and 3G/4G to do internet research (68%) un-tethered to the university network or physical space of school.
- **Communicate and collaborate** with peers, teachers and content experts (53% use text messaging for this)
- **Create and share documents** (video, podcasts, text files - 37%) and **record lectures or experiments to review later** (35%) (Speak Up 2010, 2011, p. 5).

How Are Learning Environments Changing Pedagogy?

Millennials are the first generation to have no understanding of the phone as being attached to the wall of their home. This group sees the phone as a mobile device sporting a camera, media player, and computer capability all to be held in the palm of their hand. Digital tools are seen a linked together, i.e., text messaging, music, games, photos and interactive tools have come together and are accessible on one device. This presents an interesting case in which there is an expectation of free information and the conflict of intellectual property rights.

This generation believes in social networks, collective intelligence, data and visual mash-ups, video on demand, diversity of collaboration and mobile broadband. Digitals think, work and communicate differently building relationships (sometimes very superficial relationships) around their social networks such as Twitter, Facebook, Second Life and LinkedIn (Franklin, 2010, p. 192).

Presently, 90% of the college population owns a mobile phone and see this phone as their single most important form of communication. They link learners in new ways to other learners and information. This constant access to information offers learners new ways to party, dream, play, and learn in ways never before visualized (Franklin, 2010, p. 192).

This always-on communication has led to a millennial language with 76% using instant messaging/text messaging and 15% logged on 24/7. President-elect Barack Obama's campaign immediately distinguished itself by sending out campaign messages, using Facebook to reach thousands of potential supporters through connecting Facebook ‘friends’ with the then candidate. The allowed the campaign to reach and target social networks targeting African-Americans, Asian, Latino, gay communities and faith-based communities. Each of the presidential campaigns used some sort of social networking on the major social networking environments: Twitter, Facebook, MySpace, Flickr, LinkedIn and Eons – for those not of the digital age (Franklin, 2010, p. 193). Taking a note from the social networking sites, people of the world are using Twitter and Facebook to stoke the fires of change and revolution.

[The above section, How Are Learning Environments Changing Pedagogy? is from an excerpt from Chapter 9 and provided here with permission from the author, Dr. Teresa Franklin, APA Reference/Citation: Franklin, T. (2011). Mobile school: Digital communities created by mobile learners, In Wan, G. & Gut, D. (EDS), Bringing Schools to the 21st Century, Norway: Springer Publishing.]

How do 21st Century Learning Skills go Mobile?

As educators, we like to have a ‘catchy name’ for everything -- case in point – 21st Century Skills. Haven't we always been teaching and at least attempting to teach the skills needed for the next century? The Partnership for 21st Century Learning states these skills are a “holistic view of 21st century teaching and learning that combines a discrete focus on 21st century student outcomes (a blending of specific skills, content knowledge, expertise and literacies) with innovative support systems to help students master the multi-dimensional abilities required of them in the 21st century. As educators, we have always tried to take a holistic view of teaching and learning and

prepare our students through a combination of skills, knowledge and dispositions. What is different is that now as educators we have competition in the form of devices that can deliver content quickly, access experts, and connect to anyone, anywhere. This adds to the complexity of what we are doing in the classroom. What the Partnership for 21st Century Learning does acknowledge that has not been acknowledged in the past is the there must be student outcomes and support structures in place for 21st Century learning to occur.

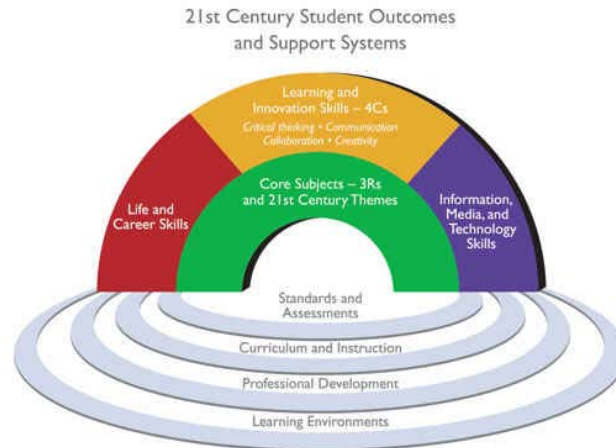


Figure 1: 21st Century Student Outcomes and Support Systems, The Partnership for 21st Century Learning, http://www.p21.org/index.php?option=com_content&task=view&id=254&Itemid=119, para. 1)

These outcomes noted in the arches and the support system that is below the arches in Figure 1 suggest that as educators, we must be very aware of the literacies and future implications of all technologies but especially mobile technologies. The Core subject areas and 21st Century themes (Global awareness, Financial, economic, business and entrepreneurial literacy, Civic literacy, Health literacy, and Environmental literacy) must be more fully realized in math, science, technology and engineering (STEM) to bring to fruition the learning and innovation skills, information media and technology skills and life and career skills each student will need to successfully participate and contribute to society in the future. The following links will navigate those interested in carefully examining the Partnership for 21st Century Learning and student outcomes:

1. **Core Subjects and 21st Century Themes**
2. **Learning and Innovation Skills**
 - Creativity and Innovation
 - Critical Thinking and Problem Solving
 - Communication and Collaboration
3. **Information, Media and Technology Skills**
 - Information Literacy
 - Media Literacy
 - ICT Literacy
4. **Life and Career Skills**

These links (URLS) provide a framework for educators as they move to create more engaging content, more mobile content, more communication and collaboration, more critical thinking and problem solving in the classroom.

How Does Virtual Immersive Learning Impact Pedagogy?

Second Life, a virtual world environment, goes even further in creating a social network which includes a game and fantasy world in which presence and communication is through an avatar acting as a persona of the individual. Second Life is a virtual 3-D software created by Philip Rosedale and now owned and operated by Linden Labs. It is probably more accurate to say that Second Life is 3-D online, digital work created and owned by the residents of the world. In Second Life, virtual property can be purchased, built, changed and 'lived' within this metaverse. It is the individual's virtual life (Rymaszewski, Wagner, Wallace, Winters, Ondrejka, Batstone-Cunningham, 2007).

In this virtual world, the residents are avatars representing the individual who creates the avatar and is participating in the online environment. As an online environment, the world is accessible to anyone connected to the internet. Residents of the world can make the rules, play games, roam the environment, fly, and interact with other avatars – only limited by the design of the virtual world. These 3-D virtual worlds are being explored for meetings, college instruction, simulations and games for middle school students and general social interaction opportunities for building collaborations. This is the new frontier for learners in which the workplace is mobile, virtual, social, and allows for the building of knowledge in cyberspace (Franklin, 2010, p. 196).

Many universities are experimenting with the use of virtual environments for teaching and learning and recruiting today's digital learner. From the recruiting aspect, several schools in the US are not using virtual campuses to invite future students to talk to advisors, meet the people in registration, and organize class schedules all within this virtual world (Hughes, Designing Digitally, <http://www.3dvirtualcampus.com/3dvctdemo/> March, 2011).

The Ohio University National Science Foundation project, Science and Technology Enrichment for Appalachian Middle Schoolers (STEAM) has created a number of virtually designed science lab simulations and games aimed toward teaching the 'difficult to teach and difficult to learn' concepts of middle school science. Middle school students visit the Science Teen Island in Second Life and 'play' games designed to teach standards-based science concepts. This virtual world can be accessed from the school, home and any other location with an internet connection. Within the GRID Lab at Ohio University, *serious gaming* is occurring through the development of a virtual world to train firefighters in the rescue of people in a fire and to identify the safety concerns of firefighters. (<http://vital.cs.ohiou.edu/>) (Franklin, 2010, p. 196).

Dartmouth University is in the process of creating a virtual world to train community emergency respond teams in which "volunteers learn how to cope with a range of emergencies by experiencing simulated, 3D disaster areas while engaging others – virtually – to deal with unfolding events" (Educause Learning Initiative, 2006, p. 1). Harvard University has created *River City* within the virtual environment of Active Worlds to help student in K-12 learn about the spread of disease while also learning the inquiry process of science. The University of British Columbia has developed a virtual world for archaeologists in which students can use contemporary techniques to re-create the structures of time (Educause Learning Initiative, 2006) (Franklin, 2010, p. 196).

And as a final example, you too can do your banking in a virtual world (<http://www.hypergridbusiness.com/2011/04/hp-rolls-out-virtual-banking-with-avayas-web-alive/>) or even build your own world (<http://www.dreamlandmetaverse.com/>). I remind you again, that the agile *Free Agent Learner* will be the one to capitalize on these types of open source, open and virtual worlds not only as learning spaces but for entrepreneurial endeavors as well.

Why is this significant? These virtual environments have the potential to foster constructivist learning in which learners take ownership for their own learning processes. Digital learners are already comfortable with gaming and mobile communications. Virtual worlds bring together learners and challenge them to collaborate in problem-solving activities without explicit learning objectives and assessment. For many learners the avatar-to-avatar experience may seem as real as a face-to-face conversation. Opportunities arise for meaningful engagement in learning across a broad spectrum of students around the world. A virtual world as an educational medium requires reflection on how education has been conducted in the past. The virtual world allows for more interaction and more engagement for some students (Franklin, 2010, p. 196).

Today's games are complex and require collaboration with others and are part of the modern world. Sixty-five percent of college students state they play online games on a regular basis. Games are very much a part of their mobile environment with games being played on laptops and smartphones all the while multitasking by visiting with friends, listening to music or completing assignments. Many are "immersive virtual worlds that are connected to a more complex external environment that involves communities of practice, the buying and selling of game items, blogs, and developer communities" (Oblinger, 2006, p. 1). These are very complex learning constructs. Games are often not looked upon favorably because the non-game player (the teacher in the classroom) has not had direct experience in the immersive virtual world. "It is important to emphasize that games and play may be effective learning environments, not because they are fun, but because they are immersive, require the player to make frequent, important decisions, have clear goals, adapt to each player individually, and involve a social network" (as cited in Oblinger, 2006, p. 2; Franklin, 2010, p. 197).

The increased gaming experiences of digital learners may prove to be a motivating factor in learning within virtual worlds. "Many kids can sit and play 'World of Warcraft' for hours, yet can't stop fidgeting during a 30-minute lesson. Interactive educational games...help kids become more engaged and persistent. They allow

students to say ‘what if’ and explore. They also allow one to make mistakes – an important part of learning” (as cited in Kerslake, 2008, p. 8; Franklin, 2010, p. 196).

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How Does Pedagogy Support Learners?

Every learner will need to be able to create and manage his/her progress in an age-appropriate personal learning plan that includes his/her goals for content knowledge and skill acquisition inside school (classes and class work) and outside school (after school, employment, extracurricular). Learners will need to become more self-directed in their learning to be successful in this new mobile environment as this mobility allows an individual to be agile in meeting demands in the learning and in the workplace. The jobs of the future will belong to the *Free Agent Learner* that has the ability to:

- *Learn how to learn* and self-monitor and improve his/her learning progress across all subjects;
- Be an active collaborator in the teaching and learning process (e.g., students act as co-creators of knowledge along with other students, teachers and education leaders); and
- Able to identify and complete meaningful capstone projects and other inquiry-based learning experiences that involve mentors and research (Speak Up, 2010).

Does the Pedagogy Impact Textbooks and Apps?

Educators love their textbooks and many teach directly from the textbook without any reflection upon how they might actively engage learners. Digital books or e-books change the way learners interact with books by adding a layer of hardware, the reading software, and ecosystem, such that the content can be tailored to the reader. This does “require that readers fundamentally change the way they interact with the book’s content” (Oblinger, 2011, para. 4). Which is the reader doing, reading causally or studying the materials in the text? This makes a great difference in how the reader approaches reading. Digital readers are lightweight, some are easily read outside in sunlight, and have the capability of bringing a larger audience to the learning environment as they can read the text to the less capable reader, less-sighted reader or a more auditory learner.

The faculty in educational institutions, as textbook authors, have a different perspective on the e-books than the administration and students. While as educators and technologists, we understand the move to digital books, we also see learning outcome issues. Moving to e-books allows the publisher to divide your book into sellable chapters such that the reader can purchase one chapter, 4 chapters or the entire book – which does not really make sense to educators. Doesn’t a student need the entire book to actually be able to understand and learn the content? Does this ability to single out chapters for purchase change how I write the content? Resistance to the publishing industry abounds in education. Publishers and in the United States, the government, is pushing for more affordable access to textbooks and the way to make them more affordable is to make them e-books.

What about Open Textbook Publishing? The open resources model is the result of several factors: 1) the high costs of textbooks, e-book readers coming down in price, 3) publishers moving to electronic media and finally, the need for up-to-date content that is of high quality. Faculty develop content to be distributed to their classrooms that is peer-reviewed by others in the field and placed in repositories that are open on the Web. At times, the faculty are compensated by departments, universities, foundations, etc., but the real belief of the individual is that content needs to be available to others. The copyright issues are solved by having the content placed under the Creative Commons license which allows the author to specify when, where and how the content may be used. This flexibility puts high-quality content in the hands of many learners. Another thought is that open texts will allow the learner to become a contributor or author to the text as well. This is a new collaborative model not seen in publishing before now. Faculty and learners can move beyond passive learners to designing content for courses and learning activities which are ‘just-in-time’ choosing from video, audio, text, webpages, articles found online and readings (Educause, 2011).

Once texts and most books are electronic, the next question becomes which e-reader? There is the Kindle, Nook, E-Fun Netbook-3, Cruz Digital Reader, the Kobo Digital Reader, Pandigital Reader, and the Sony Digital Reader, some with 3G capability others with just Wi-Fi. How do we decide which to use and none are cross-compatible unless in some cases you use PDFs as your document to read? And PDFs are not always formatted to fit the screen on some of these devices nor do they all allow for the reading of the text to a student that may be sight impaired – thus making the content available to a larger audience.

Publishers of e-books and cell delivery systems will need to come to a *standard* such that books can be transferred from one type of reader to another type of reader and also cell to cell without fees and additional costs once the book or chapters are purchased. We as technologists and educators must pressure publishers to come to this standard if we are to have a broad base of content and affordable content for ALL people. An interesting thought to the cross-compatible dilemma may be that many of these devices will disappear as cells and smaller tablets become more adept at accessing the web in a larger number of markets that are isolated and rural, thus, forcing e-books not aligned with a cell company out of business. It may actually be the cell phone companies that decide for us as educators the products we will use.

As researchers, it is up to us to examine open publishing and e-books, how we can use them in teaching and learning, and which provide best practices for learning. We do not want to allow business to make this decision for us. [*reminds me of what one of my professors, Dr. Mitias, from Egypt once said to me when I was a doctoral student – the keeper of the content, keeps control of the ideas and the people.*] I think as educators, we want to make sure the content is open and free for all people.

And, what about all those applications which we refer to as Apps? Small, agile programs known as apps are making an appearance on cell phones, tablets and some computers (in particular the Apple Macintosh commonly called the MAC). These applications are for all ages, and are pennies in price compared to many of the larger software applications we place on our computers. They are created by companies, university, middle and high school students, parents, businessmen, and programmers. Available especially for the Blackberry, Droid and iPhone, these little programs are having a major impact. Some are free, some cost as little as 99 cents and having higher costs, all are at your fingertips at iTunes or the Market Place to own in an instant.

These apps can teach you a language, math, find your location, help you find a location, find a friend, connect you to your social networks and bring your content from your Learning Management System such as Blackboard to your computer to complete your assignments. Powerful is the only word for these little apps. With only the imagination to limit the development of apps, there will be an ever increasing number of these for our learners. These apps allow our *Free Agent Learner* to by-pass us as educators and identify and learn content without us. The iTunes University has a wide variety of open content for anyone interested in almost anything. You can even learn how to build apps on iTunes University!

Does Mobile Learning Impact Digital Citizenship?

Increasingly, the web, news, newspapers and magazines are reporting misuse of digital content in the form of downloading music illegally, plagiarism, cheating using a cell phone on tests, YouTube videos of unauthorized recordings and cyberbullying of students through the use of email, social networking sites and text messaging. With the wide availability of the internet in many locations, devices that interface with the internet and a digital native population, a critical need appears for an understanding of what it means to be a *digital citizen*. According to Ribble, Bailey and Ross (2004a), digital citizenship can be defined as “the norms of behavior with regard to technology use” (p. 7) Franklin, 2011, p. 198).

If society is to continue the use of technology with an open platform for connectivity and collaboration, digital citizenship must be the ethical underpinning of our use of technology with digital natives. Six topics can be used to build a case for the need for digital citizenship in today’s mobile society. These six topics are:

1. Digital Access
2. Digital Communication
3. Digital Rights
4. Digital Security
5. Digital Commerce
6. Digital Safety
7. Digital Responsibility (as cited in Ribble & Bailey, 2004, p. 14-15b; Franklin, 2011, p. 198)

Digital Access. Equitable access in a digital society is necessary in order for human intellectual capacity and growth to occur. While digital inequity may occur due to socio-economic, personal decision, and/or social position, the responsibility for providing accessible internet connectivity rests with providing the resources needed to participate as a digital citizen. These resources include technology equipment such as cell phones, computers, and software and internet connectivity including low cost cell phone connectivity for formal and informal learning opportunities within a mobile society. The issue of economics is a critical one as many people are without adequate income to maintain mobile connectivity. Society must provide access. Without society’s pressure to provide adequate connectivity for all of its citizens, equitable opportunities for learning and

improving human capital do not exist for all citizens (as cited in Ribble & Bailey, 2004b; Franklin, 2011, p. 199).

Digital Communication. Discussions on the use of mobile technologies as a means of communication are long overdue. Teachers, parents, school administration and higher education communities have to date, danced around these discussions largely due to concerns over personal rights and ownership of mobile technologies. Little effort has been taken to establish a set of standards for communication etiquette within a digital society. When should the mobile phone be silenced, vibrated or ringing? When is the use of the mobile phone acceptable within the community? No one can say they have not been annoyed by the loud ringing of a cell phone or the unintentionally overheard conversation due to the cell phone user standing next to them in a store, classroom, or office. iPods with volume set on high are loudly played and can often provide a disturbing undercurrent of sound in a classroom. Game play in the classroom on cell phones and PDAs does not often provide the backdrop for learning in a classroom in which the teacher is presenting content. Finally, what form of communication is best presented by use of mobile technologies? In most personal conversations, face-to-face communication are often seen as the best way to convey the information while mobile technologies provide an efficient means for conveying basic information (Ribble & Bailey, 2004b). Helping digital natives to determine when, where, why and how in using cell phones for communication is needed in the development of digital citizens (Franklin, 2011, p. 199).

Digital Rights. Basic rights are expected by every citizen including digital citizens. In a digital community, the rights of free speech, private property and privacy when using technology must be maintained and supported. Local, state, regional and national governments must take the responsibility of helping educational institutions provide opportunities to learn how digital rights are violated or protected when using cell phones, PDAs and the internet (as cited in Ribble & Bailey, 2004b; Franklin, 2011, p. 199).

Digital Security. In the same way we protect our money by placing it in a bank or safety deposit box, digital natives must protect their mobile devices and the information found within those devices. The use of passwords when connecting to the internet, sharing information and accessing web-based sites must be protected. Virus protection and firewalls can provide needed 'machine-based' security but the need to remain vigilant in not sharing passwords and logins by mobile uses is paramount to maintaining a secure web presence for personal data. The need to backup secure information in the case of hackers is not unheard of in the mobile phone industry. Contact information from the contacts list of most mobile phones can provide a hacker with a wealth of information on addresses, phone numbers, and identities (as cited in Ribble & Bailey, 2004b; Franklin, 2011, p. 199).

Digital Commerce. Shop until you drop is no long the mantra -- but rather -- shop until you need to charge the phone, may be the more realistic mantra for the digital citizen. The buying and selling of goods on eBay®, purchased on Amazon® and electronic stores such as Apple® and Best Buy® are merely a button push away on mobile devices. While right versus wrong does not change in a mobile environment, decisions concerning whether an item can be purchase legally may bring about consequences for not doing so. The digital citizen must know and understand the implications of shopping online and privacy, identity theft and credit card protection strategies. Just because one is mobile does not mean that the purchaser's identity cannot be compromised (as cited in Ribble & Bailey, 2004b; Franklin, 2011, p. 200).

Digital Safety. Who thinks about the many ways in which one twists their body to hold the cell phone, drive and eat while in a car or at their desk at work? Increased use of mobile devices such as cell phones, laptops and iPods has caused many to worry about the electromagnetic waves and ergonomics of using such devices. While to date, no conclusions can be made on the electromagnetic impact of mobile devices, ergonomics research does provide several interesting concerns for the digital user. Users must be aware there are some inherent safety issues with mobile technology use including eye strain, repetitive stress syndrome and possible hearing impairment. And in turn, society must remain vigilant in researching these and other ergonomic issues surrounding digital devices and implementing needed changes for improved health (as cited in Ribble & Bailey, 2004b; Franklin, 2011, p. 200).

Digital Responsibility. Ethics remain a huge issue in the use of digital devices both inside school and outside school. As a digital community, society must work both within educational institutions and the workplace to demonstrate the ethical use of all forms of digital content, information, music, and data. Hacking into a computer system, which includes today's smartphones, stealing or sharing information which is private cannot be tolerated. Plagiarizing, distributing viruses, Trojan Horses, and other malicious software to mobile devices are unethical acts both in and out of school. Harassing other users through websites containing slanderous content,

email with threats and vulgar content are equally unethical and has both legal and personal consequences (as cited in Ribble & Bailey, 2004; Franklin, 2011, p. 200).

The 21st Century digital world requires that ethical and unethical behavior and appropriate use and inappropriate use of digital devices be at the forefront of education in this technological age. The leadership today may not be as technologically savvy as the digital natives that will lead in the future. This demands that dialogue concerning digital citizenship occur now if a productive citizenry is expected to participate in a global community. “The old adage seems quite appropriate when gauging the importance of digital citizenship education: ‘If not here (schools), where? If not now, when? If not you, who?’” (as cited in Ribble & Bailey, 2004b, p. 15; Franklin, 2011, p. 200).

[*The above section, How Does Mobile Learning Impact Digital Citizenship? is an excerpt provided from Chapter 9 and is provided here with permission from the author, Dr. Teresa Franklin, APA Reference/Citation: Franklin, T. (2011). Mobile school: Digital communities created by mobile learners, In Wan, G. & Gut, D. (EDS), Bringing Schools to the 21st Century, Norway: Springer Publishing.*]

Are You a Mobile Educator?

(Do you use an LMS like Blackboard, Moodle or Sakai?)

*(Do you have the ability to go to the site through a mobile app?)

*(Do you send coursework to your students through your cell?)

(Is your internet service on campus reliable?)

(Is your internet service on campus fast?)

**Used in Poll Everywhere during presentation.*

Complexity #2: Infrastructure and Mobile Learning

Access to the Internet is an on-going challenge – we have the devices and need the Web. Often University and PK-12 budgets are strained not just by the economy but the ever present need to implement a new technology or up-grade systems. Cross-compatibility continues to be an issue. Students arrive at the university with a wide variety of tools: iPhones, Droids, iPads, Zooms, Dells, Toshibas, Lenovo, HP, Kindles, Nooks, Xbox, PlayStations and many, many other items all requiring increasing bandwidth, electricity, and the staffing to help students when the devices do not work.

Students arrive with many levels of expertise in the use of technology. This puts an extra burden on faculty and staff at the institution in helping some students catch up in learning to use the technology while trying to keep other students from *hacking* the university’s systems. Internet security and on-site versus off-site access adds strain as educators try to go mobile with their learning. Learning management systems (LMS) like Blackboard, Moodle, Angel, Drupple, and Sakai can add to the stress on the bandwidth as e-learning and mobile applications (apps) are used by students to obtain content to meet course learning outcomes.

What is an institution to do when 3/4ths of all students on campus have mobile web-enabled devices or plan to purchase one as soon as they can afford the data plan? When does trying to control the devices used become a lost cause?

Key questions many institutions are asking themselves as mobile devices flood their institutions are: *How can we let go of the device and build for innovation and the contributions of the digital citizen? Can we innovate in the use of IT tools and the IT tools themselves?*

This leads the institution down a path in which the community becomes a source of identifying and creating apps of value to the community. This innovation test approach allows the community to determine the value of the mobile apps by the *vote* of use. Institutions are moving to the only stipulation in the use of mobile devices is that they be web-enabled. IT management is instead creating app mark-up code (<http://mwf.ucla.edu>) to basically sanitize all web pages, apps and content such that when the app comes to the mobile website, it is runs through the coding invoking CSS definitions and functions in which the app becomes appropriately presented on all devices. This allows for a “broad range and diversity of edge-layer services that can be deployed locally but presented institutionally” (Davis & Ricchio, 2011, para. 5). This frees the IT staff to create content and mobile apps to increase the learning environment on campus.

There some troubling infrastructure issues that relate to mobile learning that should be considered and are often not part of the ‘going mobile’ discussion. Few faculty and staff receive financial support for mobile communications needs with only 10% of the faculty and 25% of the staff provided with any support. Institutions are slow to use the “technology for official non-emergency communications” (Sheehan, 2009, p. 3). Only 1 in 7 text messages on campus by campus IT, faculty or administration are used to communicate with students or faculty (Sheehan, 2009). Finally, email volume continues to be a problem. With the ability to use your email services as a storage site for online assignments, student emails and administrative emails, faculty, staff and students are overusing the typical email system of most institutions. Limiting email space is not the solution! However, outsourcing to Google or Microsoft Live may be the storage space needed to not only support mobile learning but to maintain records for future decisions.

Are You a Mobile Educator?

(Do you have a Twitter account?)

*(Do you have a Facebook account?)

(How often do you log onto facebook?)

(Have you built a blog using WordPress for your students?)

(Have you built a Wikispaces for your students?)

(Have you used a discussion board with your students?)

(Have you built an online course?)

*(Did the building of your online course involve a team of educators in the process of building the course?)

(Does your online course use RSS feeds to send out reminders and information?)

**Used in Poll Everywhere during presentation.*

Complexity #3: Communication and Mobile Learning

In today’s world, mobile is necessary for content delivery opportunities. It should be readily apparent to the higher education and PK-12 education that mobile learning will be your greatest competitor for students. The quality of online courses, and especially of those attached to ‘brick and mortar’ schools is becoming in some instances of greater quality than the actual lecture/classroom presentation of the same material. A blasphemous statement, many educators would state [and many of you in the audience will note with anger my statement] but in the real picture of higher education and PK-12 education, online courses are being carefully designed typically by a team of content SMEs, instructional designers, multimedia specialists, and evaluators, are more regulated, are more open to scrutiny and have required on-going evaluation. This is not the case in most higher education classrooms and PK-12 classrooms. We as classroom-based educators go into our room, close the door and teach – no one would dare enter and appear to evaluate our teaching every class in the same manner in which an online course would be monitored and evaluated.

The two major problems with online learning are 1) students that are sometimes not mature and organized enough to work in an online environment and believe that working in an online environment is easier (which it is not) and 2) the fact that many in higher education think that creating an online course is easy and can be done alone, when in fact the instructional design approach (team approach) to online course building is what makes an online course superior. The marriage of online content and mobile devices presents a setting in which a PK-12 course, and a college or university can literally meet the learners where they are.

Mobile learning brings two communication issues to the forefront in our institutions: 1) the devices used (iPads, iPhone, iPod, Blackberry, Droid) and 2) the faculty/teacher-student interaction. Communication within a mobile learning environment may be as simple as email or as complex as blogging, receiving an RSS feed, creating a wiki for journaling, tweeting, using a social networking site or collaboration in a game environment.

Communication complexity exists because the device, the infrastructure, the support, and faculty development have to all coincide with the use of a mobile device. People and their habits add complexity. As educational technologist, technicians and online course designers, one must think about the skills that are needed to navigate these open spaces for communication (e.g., wikis, Facebook, blog, Twitter, Farmville) (Evans, 2011).

How will mobile content and information from your university and PK-12 school be managed? Here are some practical and phased approaches to mobile delivery.

1. Build your first mobile site as a foundation for more sites to come. Start by matching up what your learners want with content you already have.
2. Call you colleagues at other institutions and see what they are doing. It is OK not to know everything about how to do this. Higher education is more collaborative than industry and much more willing to share what is known about this process.
3. There is more than one way to deliver mobile. If you have a budget, hire a consultant. If you have a great design and technical team, there are some rock-solid open source tools for mobile. The enterprise system on your campus may also have mobile products.
4. Keep it simple! The mobile interface must be clean and practical – realize your learners are looking at other apps and sites so you need to be attractive too! Your audience is using fingers and thumbs – not a mouse – design accordingly
5. Use metrics/analytics to see what is going on with your mobile content.
6. What devices are being used? Droid (30%); iPhone (40%) and then others. Build the mobile site to use multiple iOS.
7. Use RSS feeds for news, blogs, and events to stay current.
8. Think about how an app can do this work once you have a mobile site built and have tested it for a year (Evans, 2011, p. 1-2).

Mobile delivery of content is just beginning and there are a small number of universities and colleges and even fewer PK-12 schools using this delivery. Mobile content delivery will be required for your institution to stay competitive. Institutions of higher education and eventually PK-12 have to establish a strategy *now* and make the necessary decisions to take advantage of this communications opportunity. The enrollments of your institution depend upon it.

The Role of the Educator in the Future

In many P-12 schools, filters are a limited barrier to using the Internet or technology in the classroom. Learners are using their mobile devices with and without teacher knowledge as creative and adventurous teachers bring mobile devices into the learning environment. Learners are comfortable with their own devices and have mastered their use as we educators continue to struggle in making them work ‘correctly’. Apps at the P-12 and university level can provide a level of accommodation to those needing more support and information on the activities on campus for those seeking to participate in events. According to the Speak Up survey, students are already using a variety of technologies as part of their school day or to complete their homework assignments. The use of mobile technology is a logical ‘next step’ for them (Speak Up, 2010).

We are in a world in which there can be a global educational exchange for exponential change in our educational systems. Educators must prepare their students for a unknown new environments upon graduation for P-12 or higher education. Our current educational system is obsolete and we as educators will become obsolete if we do not realize that we must embrace the changes that are upon us in how, where and why students learn.

Our mandate is to prepare students life in the workplace. The present brick and mortar school, textbooks, lectures, worksheets, high-stakes tests must shift to learning anywhere, anytime – whenever learning can occur best. “**How you do** your daily tasks as an educator is changing; **what you do** stays the same: help students learn relevant skills, knowledge and attitudes, behaviors they will need to be good and productive citizens” (Jukes, McCain, & Crockett, 2011, p. 21).

“Learners need encouragement and timely nonjudgmental feedback. They must be given opportunities to make mistakes, authentic audiences for presentations and a wide variety of contexts and audiences to demonstrate their learning. They need to be encouraged that for some problems – there is no one ‘right’ way and that exploration of the mobile devices, mobile environments and techniques will improve their learning and understanding of the world in which they live” (Jukes, McCain, & Crockett, 2011, p. 21).

What are the Faculty and Student Concerns in Developing Mobile Learning?

We are still in the early days of mobile learning and its application. Students can play a major role through the development of apps that become institutional resources and part of the institution’s infrastructure. Most of the time, students are pioneers in forcing us as educators to change. However, once the student work becomes part of the university infrastructure, the apps may be outsourced just like the university website and other centralized IT work of the university.

Mobile devices increase the opportunity for student/faculty interaction. Text messages, Skype calls and constant email can become a 24/7 event for the faculty member. The expectations of a mobile-based learning will have to be negotiated such that both faculty and student are not invading each other's social and private spaces and time. Cell phone use, laptop use, social networks in the classroom will also have to be negotiated. "Student empowerment is a faculty member's threat." (Mobile Learning, 2010, p. 5).

Mobile devices have the potential of increasing faculty workload. Mobile technology and learning adds a complex layer in which the faculty member has to juggle websites, content, design, implementation and execution of technologies and the cloud. How does my content look on a mobile device? The answer requires repackaging of content, time to prepare and staff support that is often not available.

While there is often resistance to mobile technologies from faculty, students are not necessarily ready to move forward either. Mobile technology may be in the hands of students but it is primarily used to listen to music. Older adults returning to school may have no understanding or expertise with the technology – much less mobile technology.

Finally, research by Dr. Sherry Turkle (2011) asks the following question: Why do we expect more from our technology than we do from people who are using the technology. Those who love the technology and are engaged with the technology and who study the technology must never forget that there is a human side to technology. Never forget that people are at the base of society and are who will maintain the humanity in how we teach, treat each other and live together as productive citizens of a global society.

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