

Instructional Design for Mobile Learning

Scott Simpson :: EDTEC 690 :: March, 2011

Introduction

mLearning, or Mobile Learning, refers to a collection of ideas and principles centered on the idea that a learner need not be at a desk, in a classroom to engage with educational content. mLearning addresses not only the development of content for 'mobile' devices, but also examines the way in which non-classroom educational materials are presented. Participants in mobile learning can range from nomads on the African steppes with transistor radios (Aderinoye, Ojokheta, and Olojede, 2007) to privileged adults with iPads at Starbucks. These extremes, and countless others in between, highlight the broad nature and wide appeal of mobile learning. However, we must take care to not over-generalize the overarching idea of mobile learning such that in the end, we create solutions and implementations that serve no one. Though many approaches to mobile learning seem to focus heavily on 'text messaging' as the one-size-fits-all solution to interaction at a distance, it is painfully clear that different populations of mobile learners need to be considered separately.

This review focuses on:

- Current designs for mLearning
- What the learners look like
- Using what we know to move forward.

Problems and Promises of Design for mLearning

Many of the 'mobile' affordances to instructional design seem deeply influenced by the old adage 'if all you have is a hammer, every problem looks like a nail'. In this case, most instructional designers come to the table with their e-Learning materials in hand and try to either shoehorn them into ever-smaller devices, or they face the daunting task of redeveloping how learners interact with content and evaluation.

Technologies such as integrated cameras, GPS, and always-on WiFi / 3G connectivity certainly allow a richer interaction with the learner's surroundings, but they do not by themselves comprise mLearning. They do, however, afford us new and interesting tools to consider while designing instructional experiences using mobile devices. Likewise, many considerations of 'mobile learning' confuse mobility with mobile phones and text-messaging, especially in Asia and the West. Countering this, a popular definition of mobile learning states simply that learning can be considered mobile if it is mobile in terms of space, in area of life, or with respect to time (Vavoula and Sharples, 2002). Mobile telephones can assist in this role, though they are neither necessary nor sufficient for this purpose. While surprisingly robust cellular networks exist in even remote parts of India, Africa, and elsewhere, the mobile telephones available in these areas are at best only useful for simple text or voice interactions. While we may think nothing of using a slick web-based math review module with animations and instant feedback on our iPhones or Android devices, this content is equally as inaccessible to truly remote learners as a course in mathematics on a university campus.

This is not, of course, to discount the benefits of literally billions of potential learners already having devices that can provide them content and collect responses, feedback, and data. Proponents of text-messaging-based learning argue that mobile learning should be designed to be accessible to the 'lowest common denominator' (Low and O'Connell, 2006) of devices—but this posits a single overarching architecture for instructional design that, as we have seen above, is not necessarily in the interest of the wide range of mobile learners whom we must consider.

Going Native (Digitally)

Mobile technology and collaborative engagement around technology are the rule rather than the exception for most learners born after 1982 or so (Prensky, 2001) and even for those learners born before 1982, use of technology outside of formalized work settings has become commonplace. Low and O'Connell (2006) suggest that the design of instruction for mobile devices should take into account factors that describe learner mobility, namely inter-learner communication, just-in-time access, and collaborative content. This focus on

the learner being mobile, rather than having a mobile phone, is reiterated by Xiao, Wang, Callaghan, Chen, and Zhao. Low and O'Connell highlight their objection to considering devices as more important than learners, and propose a design concept that is not device-centric. This idea is built upon the "four R's" outlined by Prensky (2001) for teaching his "digital natives": Record (collect and build new knowledge), Reinterpret (analyze existing knowledge and discover new knowledge), Recall (use existing information and knowledge), and Relate (integrate knowledge into the learner's social context). While these steps seem to have a lot of overlap, Low and O'Connell remind us that they are not to be considered 'in lockstep' but as different aspects to the knowledge-integration activity to which Digital Natives are accustomed.

Xiao, et al. cite a variation to Keller's ARCS model (Shih and Mills, 2007) which ties each of the steps to multimedia and mobile learning. This modified model "stands on social constructivism and advocates learning methods such as peer interaction, collaborative discussion, and digital story telling" (Xiao, et al. p.7) and makes use of the tools and methodologies Digital Natives are familiar with. Wang, et al. then further refine a Comprehensive mLearning Model (CMM) by discussing four fundamental aspects of design for mLearning: Location, Technology, Culture, and Satisfaction (LTCS).

Basham, Meyer, and Perry (2010) discuss the 'digital backpack' and its contents, comprised essentially of a MacBook Pro laptop with its standard suite of software, a video camera, and various task-specific tools determined by the instructor. Though perhaps a slightly misleading name (I began the article expecting to read about cloud computing and virtual workspaces), the idea of the digital backpack mirrors the tools available and familiar to the Digital Natives. At a time when even young children can create, edit, and upload to YouTube a video of something they find interesting, why are educators not only not taking advantage of such rich educational opportunities but, in some cases, actively blocking student access to collaborative and social sites?

A key theme in the exposition of the digital backpack was the idea of Design-Based Research. Basham, et al. went through three groups of students, refining the design of the

lesson after considering the feedback and performance of the groups. The first two groups strayed from the task for various reasons, and were unable to complete the assignment. The third group succeeded in completing the assignment, thanks to the revised resources, guidelines, and instructional design. Design-Based Research is a relatively new field, and it lends itself to the design of mobile and electronic learning both because eLearning/mLearning are somewhat easier to modify than traditional books, and because eLearning/mLearning allow nearly instantaneous result gathering and feedback from learners.

Siemens (2004) discusses an approach to knowledge creation (Connectivism) that fits nicely with the idea of social media creation, and extends the social constructivist attitude to include internet and new media resources. The Digital Natives will continue to live, work, learn, and create in a mobile, multi-tasking, networked world (Kineo and Ufi, 2009), so it is important that we incorporate and embrace this inevitability in our instructional design philosophies.

Use What We Know

A position paper from eLearning organizations Kineo and Ufi (2009) provides three useful frameworks relative to instructional design for mobile devices. First, they reiterate the definition of mobile learning as ubiquitous, bite sized, on demand, typically blended, and possibly collaborative. They discuss basic principles that apply to both eLearning and mobile learning: keep it short, keep it simple, apply a structure, use media judiciously (cf. Simpson, 2010), make access easy, and provide opportunities for collaboration. Further extending 'apply a structure', they pare down Gagné to six events of instruction: get attention, set the scene, present core content, provide practice/challenge, summarize key point, and call for action/signal support. While none of these principles should be alien to an instructional designer, the persistent theme in applying traditional instructional design principles to mobile learning is to not try to mimic the length or complexity of traditional instruction on mobile devices.

Different types of educational content clearly merit different delivery mechanisms. Lecture without much of a visual aspect is best suited to audio files that can be streamed or downloaded to devices, visual learning and process animation obviously require video (e.g. khanacademy.org, lynda.com), and still images (e.g. Art History slides) require a color screen, but perhaps not as powerful of a device behind the scenes (Simpson, 2010).

The constant improvement in capabilities of mobile devices allows designers to create ever-richer environments for learning on the go. However, the ubiquity of powerful, web-enabled devices raises the tantalizing possibility of creating a unified learning environment, suspended from the robust 'cloud' infrastructure that is quickly being adopted by corporations and governments worldwide. One very interesting aspect of a web-based unified learning platform is that it could immediately take advantage of principles with which web designers are very familiar: progressive enhancement and graceful degradation. What this means is that the same webpage can (and should) be designed such that if one aspect of its design is not available on a certain platform (i.e. video, images, or even the cascading stylesheets which craft the visual aspect of nearly every webpage), the text content is still displayed in a usable way. This 'graceful degradation' underlies much of the idea of 'accessibility' on webpages (for example, a text caption that says "a cat wearing a party hat" so web users with limited sight could still experience the idea of a picture they're unable to see). With this in mind, it would be very easy to craft content that looks stunning on an iPad or other tablet, but would be usable on an Android phone, an iPod touch, or a BlackBerry phone (here, we might lose some formatting, but the text would still be usable, and JavaScript fields and checkboxes would still be available to record answers). Even very old web browsers would be able to view and print this basic content, which would allow learners with a voice-only mobile phone to learn, and speak their answers back to a teacher. Theoretically, this content could even be automatically read over the phone to a learner, who could respond by pressing keys on the keypad. Such a design would require a dedicated investment in creating standardized learning modules to take advantage of its scalability, but there are already standards (such as SCORM) in place that begin to cast light on the potential of scalable unified learning platforms.

Conclusion

The literature reflects a solid foundation for designing instruction for mobile learning. The same core principles apply (such as the ARCS model and Gagné's events of instruction), and the same admonitions ring true (keep it clean and direct, no extraneous information or media). We are reminded to look not to old methods of presenting content, however, and are advised to embrace the tools and techniques that are so well known to today's Digital Natives. We have seen an example of a successful application of Design-Based Research in developing instruction using these technologies. Furthermore, we already have many of the principles and tools at hand to build scalable instruction that encourages both participation and feedback that helps us design iteratively.

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