

Connections: Social and mobile tools for enhancing learning

Abstract

A learner who is connected to other learners, experts and information services can tap into a widened pool of resources that can vastly enhance their capabilities and understanding. The use of social software (Web 2.0) and digital mobile tools are two of the latest trends in new teaching and learning practice that enable this connectedness and have demonstrably positive effects on learning.

However, dialogues with educators who are not yet experimenting with mobile learning (m-learning) indicates that one of the predominant barriers to educators taking up m-learning is a lack of understanding about where to start in a relatively new frontier of education. This article provides an introduction to m-learning as a method for facilitating social, connected learning practices, provides guidance for educators who would like to try out m-learning strategies and looks to the future of socially and informationally connected m-learning.

Digital Mobility and Socially Constructed Learning

The potential of digital mobile devices such as Personal Digital Assistants (PDAs), mobile phones and portable media players to achieve a large scale impact on learning has been well documented by a number of researchers ([Roschelle](#) 2003; [Naismith et al.](#) 2004; [Oloruntoba](#) 2006). Digital mobile devices provide improved opportunities for portability, social interaction, contextualisation of learning, connectivity and individuality (personalisation) ([Klopfer et al.](#) 2002, cited [Naismith et al.](#) 2004).

Expanding on early work illustrating the potential of digital mobile learning, recent investigations have increasingly stressed the importance of documenting the relationships between pedagogy and technology – the application of the digital mobile learning space to the frameworks, practices and principles of postmodern teaching and learning ([Sharples et al.](#) 2005; [Jacobs & Polson](#) 2006; [Torrise-Steele](#) 2006; [Cobcroft et al.](#) 2006).

However, the rapid advances in mobile technology and a corresponding increase in the number and variety of digital mobile devices has resulted in a divergence of digital mobile platforms, opportunities, and applications for mobile learning ([Frohberg](#) 2006). Writing an article about mobile learning is becoming increasingly like trying to write a summary of classroom learning. Therefore, in this article, the broad notion of mobile learning or even digital mobile learning is abandoned in favour of a more focused investigation on just one facet of an increasingly detailed and diverse area of knowledge. This article will explore the role of some digital mobile learning tools and their relationship with the postmodern pedagogies of socially constructed learning. It will include an investigation of a number of web-based social software tools that integrate with digital mobile devices and can facilitate the delivery of social, interactive, digital mobile learning.

Social Learning: An Aspect of Digital Mobile Learning

Digital mobile learning activity, as a whole, may be described using four broad categories:

1. a learner may create or capture (record) their own data
2. access (recall) resources
3. use a digital device to process learning stimuli (reinterpret), or
4. communicate (relate) with peers, mentors or in other learning relationships ([Low & O'Connell](#) 2006).

Activities within the first three of these categories (record, recall and reinterpret) tend to support constructivist, instructivist, and cognitivist learning theories respectively and may be

performed locally (e.g. a learner accessing or saving a file to the storage memory on their mobile phone) or remotely (e.g. a learner accessing a resource on the Internet).

Activities that fall within the fourth category (relate), involving communications and sharing of information between the learner and their peers, mentors and teachers, are almost always remotely connected tasks. This remote connectivity to social networks, communities of practice or other learning groups/networks presents opportunities for m-learning to fully embrace the pedagogical principles and practices of postmodern learning theory – by supporting the interpersonal learning relationships underpinning the educational theories of social constructivism and connectivism.

Social constructivism (Vygotsky 1978) and connectivism ([Siemens 2004](#)) both emphasise the importance of the social context in the construction of learning and the connectedness of learners ([Low & O'Connell 2006](#)). Mobile technologies are increasingly integrated with the social needs of consumers ([Ragus 2006](#)), and correspondingly, digital mobile learning approaches increasingly support the principles of social interaction in learning, and '...a learner centred philosophy that allows for a high degree of learner control and the individual construction of learning pathways' ([Torrissi-Steele 2006:3](#)).

M-learning spaces are well suited to supporting principles of constructivist philosophies. Mobile devices support a variety of personalised experiences. The mobility attribute enables learners to explore knowledge and situations in their own way, in a variety of places and often outside the time constraints of traditional classroom based teaching. Mobile devices also increase motivation, provide for interactive learning, facilitate control of the learning process and emphasise its relationship with the real world (Zurita & Nussbaum 2004). ([Torrissi-Steele 2006:3](#))

This is a sentiment reflected by others engaged in the exploration of opportunities for social learning through mobile devices.

[I]n offering flexibility, ubiquity of access to information, and motivating increased engagement, mobile technologies and infrastructure facilitate this revolution of 'always-on learning, accessible to the masses, but tailored to the individual' (Thomas, 2005, p. 5). Pervasive learning facilitated by mobile technologies offers flexibility to learners in terms of community, autonomy, locationality and relationality (Thomas, 2005, p. 2). ([Cobcroft et al. 2006:5](#))

Many of the communicative aspects of digital mobile learning are readily apparent, for example, the voice, text and media facilities available on most mobile phones. However, in addition to these well established methods, there are a number of new, emerging and innovative ways in which interpersonal communications may be established between mobile students and their distributed and situated learning communities. We now turn to explore some of the latest web-based tools which facilitate communication and sharing between learners.

Social Web Tools for Digital Mobile Learners

The 'Social Web' or 'Web 2.0' refers to a philosophy of web development, rather than (as a version number might imply) a change of technology. Web 2.0 sites are designed to be sources of content and functionality – '...facilitating the sharing, exchange and discovery of information, and the construction of networks of information and people' (L. [Low](#), 2006a pers. comm., 5 June). Basically, social web sites provide high levels of user interactivity, allowing users to contribute, create and modify content themselves and discover new and related content through informal (and more formal) relationships with other users – a social online setting. The new Web 2.0 tools represent an increase in opportunities for learners to collaborate and initiate the creation of learning content, and a shift of emphasis in web use from publishing to participation (Brown 2006).

Images from Mobile to Flickr

Many of these web sites either support integration with, or are completely designed for, integration with mobile devices – particularly mobile phones. For example, a well-known Web 2.0 tool, [Flickr](#), provides a site for users to upload photographs. Many users are not aware, however, that photos can be uploaded directly from mobile phones to Flickr, complete with text annotations and even geospatial data, identifying the exact location at which the image was taken. This geospatial data can be used by the learner – or other learners – using a PDA, GPS-enabled device, or computer, to access images relating to particular locations and contexts. Peers, mentors, teachers and professionals in an area of learning can create informal 'groups' in Flickr, and can add comments to each others entries to support and guide the construction of knowledge.

Moblogging/Vlogging/Audio blogging

Flickr is not the only way for learners to use mobile devices to share images socially. The practice of 'moblogging' involves the mobile posting of images from camera phones to online journals or web logs (blogs) ([Wikipedia](#) n.d.a). The reverse-chronological order of entries posted to blogs makes them an ideal way for learners to capture and share an ongoing learning process, or a number of related images based around a common theme. One example shared with me by a teacher at my institute involved getting marketing students to take photos of advertising which used different devices to attract our attention and be retained in our memories, for example, humour, fear or statistics. The students then saved these examples to their own moblogs so they could be shared with other members of the class.

There are two main approaches to setting up a moblog. There are a number of dedicated sites that offer built-in functionality for uploading images from mobile phones (e.g. <http://moblog.co.uk>); or alternatively, a large number of social software sites enable users to integrate accounts across sites – for example, one can post a photo in Flickr and have it automatically entered in a user's blog, hosted elsewhere.

The benefit of the former approach is simplicity – a single account provides a learner with the platform they need to remotely post images to their moblog. The second approach, however, permits the integration of other online web tools to enhance a learner's blog. For example, in addition to services which accept uploaded images from mobile phones, some sites (such as [FileMobile](#)) also accept uploaded audio and video content, and can automatically forward the media to a learner's blog for public viewing (practices termed podcasting and vlogging, respectively). The use of video or audio presents different opportunities to those provided by uploading still images. For example, an audio recording of a client interview or live assessment could be uploaded and shared. Indeed, the audio might be downloaded by other learners to play on their computers, mp3 players, PDAs or mobile phones, in another manifestation of digital mobile learning.

In any case, blogging tools (whether they incorporate video, audio or images) present an excellent social setting for learning through their ease-of-use, informal style, commenting facilities, and built in functionalities which automatically link blog entries with other blog entries on the web that refer to a particular post ('trackback') ([Duffy & Bruns](#) 2006).

RSS as 'Digital Social Glue'

'Really Simple Syndication' or RSS is a methodology employed by a number of social software sites to aggregate content from many web-based information sources into a single place, or repurpose that content ([Wikipedia](#) n.d.b). From a learners' points of view, this can be used in two ways – to aggregate and cross-reference their own sites, and as a conduit for accessing the latest updates issued by their peers, teachers and learning resources (e.g. from a blog). In these respects, RSS acts like a kind of 'digital glue' that can stick learners'

online learning experiences together; and can also act as a 'social glue' that keeps learners and teachers actively in touch with each other. Because RSS standards are relatively well established now, RSS 'feeds' are widely deployed and supported, and can even be directly read on mobile devices such as mobile phones and PDAs.

While most applications of RSS are in the syndication of website content to other websites, RSS can also be used as a transformative medium. The [Talkr](#) site, for example, is able to take an RSS file, and generate an equivalent, spoken mp3 file using a text-to-speech generator. This can then be re-broadcast as a 'podcast' file – accessible by other learners who may prefer to access the blog content as an audio download which they can listen to on their mp3 players, mobile phones or PDAs. A similar transformation of content can be achieved using [XFruits](#) – a Web 2.0 site which turns an RSS feed into a downloadable PDF file – a more suitable content type for offline viewing using a PDA or Sony E-Book Reader.

Recording and Sharing Documents and Meetings

PDF is a useful and portable digital format for sharing and storing digital images and documents. A number of Web 2.0 applications allow learners to take advantage of the wide acceptance and use of PDF files by converting paper documents and even whiteboard diagrams into PDF files for sharing and storing. For example, a free web-based service called [ScanR](#) allows a learner to use their mobile phone camera to take a photo of a printed document or whiteboard drawing, and email it from their mobile to the ScanR service. The image is processed by ScanR – a printed text document is turned back into a selectable/editable text PDF file, while whiteboard images are made clearer – and emailed back to the user for instant sharing.

Another useful site, [iPod-Notes](#), turns web sites and text files into simple e-books that can be read on fifth-generation iPods - which can also display photographs and play videos and audio files.

Winksite: Create your own Mobile Website

One of the most powerful and easy-to-use of these free Web 2.0 tools for mobiles is [Winksite](#). Users on Winksite can create advanced mobile web sites which can be accessed by students with PDAs and even mobile phones. Using Winksite is easy – just a matter of turning options on and off and adding minimal information when necessary. Although the tools are designed for mobile deployment, all of the learning resources created in Winksite can also be conveniently accessed using an Internet-connected computer.

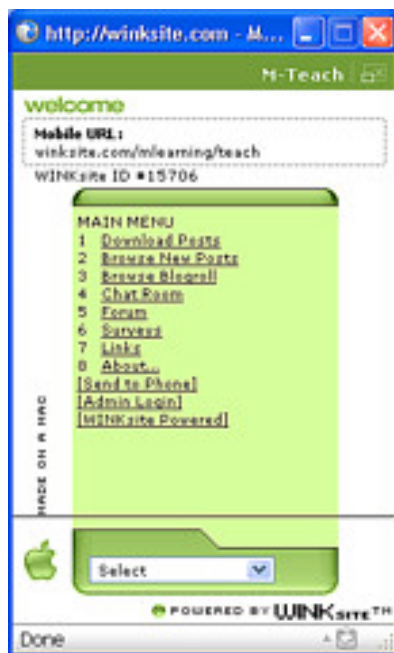


Figure 1: The M-Learning Winksite

Examples of the tools available in Winksite include: the ability to both undertake and view the results of surveys; asynchronous mobile discussion boards; synchronous mobile chat; syndication of RSS feeds; public blog and a calendar tool for notification of dates. A teacher can also create a Winksite containing text-based content pages to make them available for access via a mobile phone. You can access the Winksite I created on the topic of m-learning using a mobile phone with a web browser, PDA, or your desktop computer at <http://winksite.com/mlearning/teach> (You must have pop-ups enabled as the 'preview' launches in a pop-up window).

Local Digital Resource Sharing

Mobile learning need not equate with learning at a distance. Mobile learning is, after all, about the mobility of the learner, not the technology (Sharples et al. 2005), and mobile learners need not operate in isolation. Imagine a group of learners participating in a field trip to a nursery. They can, as a group, use a range of digital mobile devices to supplement their discovery of new information relating to the context and content they encounter; and in addition, they can utilise digital devices to help them communicate and share information with each other.

One of the perceived limitations of mobile technology is textual input - it's quite difficult to use small keypads on mobile phones to copy information into a digital device (W3C 2006). One technology that can assist face-to-face, mobile, digital information sharing is 2D Barcodes. These are printed symbols, like traditional 'zebra stripe' barcodes, that (instead of being read by a laser scanner, as at a supermarket checkout) can be read using a digital camera.



Figure 2: Mobile phone 2D Barcode reader reading from screen

With suitable digital cameras built into the majority of mobile phones sold today - some 70% ([In-Stat](#) 2006), a number of software developers have created software that can be easily installed on mobile phones and PDAs, enabling them to read these barcodes ([Kaywa](#) 2006; [R. Peloschek](#) 2006 pers. comm., 18 September; [L. Low](#) 2006b pers.comm., 20 June). In addition, the software installed on mobile phones and PDAs can also generate barcodes, enabling mobile learners to convert information to a barcode on their mobile device and share it instantly with other learners on the spot. Each barcode can store over 4,000 alphanumeric characters ([Wikipedia](#) n.d.c) (a full A4 page of typed text in Microsoft Word) making them a potential method for quickly sharing digital data among a group of learners without any cost.



Figure 3: Face-to-face information sharing with 2D Barcodes (QR Code)

Files and documents can also be shared locally using Bluetooth wireless technology; however, because connections must be established one at a time, this is a slower process for sharing information with a group of learners.

A Social, Digital, Mobile Learning Ecology

The ability of learners to upload information to web-based tools, interact with the tools using mobile internet, integrate web 2.0 services and share mobile learning resources using digital mobile devices can facilitate the construction of a 'mobile, social ecology' surrounding a mobile learner. This mobile, connected 'network' can support the learner's preferred learning styles, sources and settings, and parallels the way in which knowledge today is 'distributed across networks of individuals, not held in the mind of one' ([Siemens](#) 2006:4). Figure 4 below provides a visual view of some of the possible relationships in a social, mobile, learning system, which can, of course, be even further expanded from the model provided.

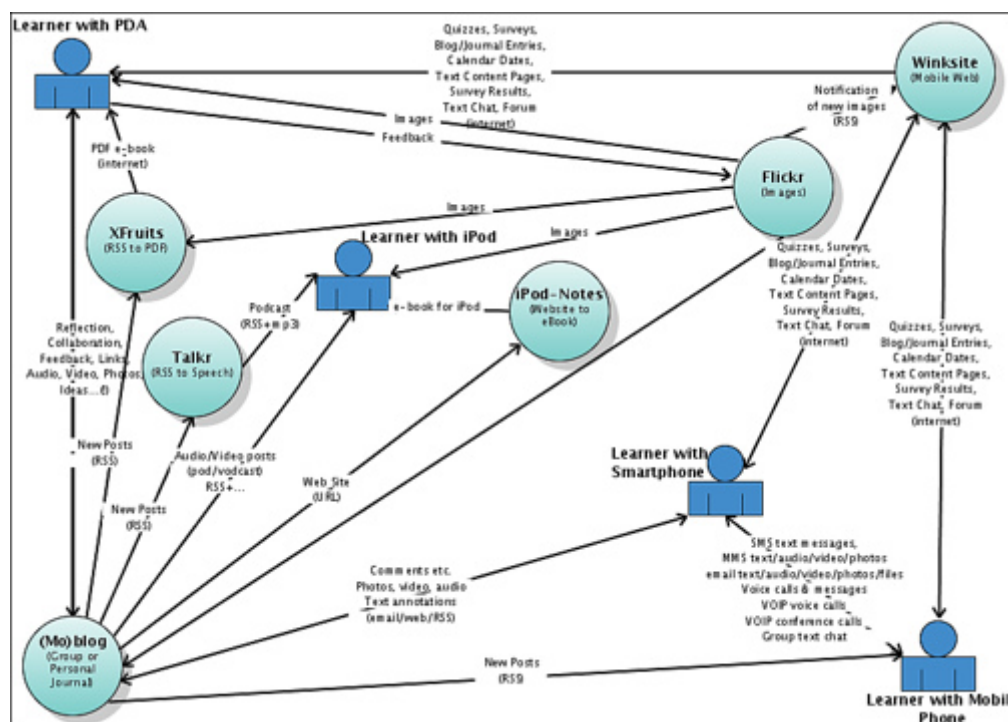


Figure 4: Network diagram of a social, digital, mobile learning ecology

When visualised in this way, the role of social web tools as nodes of content and functionality becomes readily apparent. The learning process is one of creating networks among these nodes externally - discovering and relating resources - and mirrors the internal (neural) process of linking information to form knowledge.

Learning networks can then be perceived as structures that we create in order to stay current and continually acquire, experience, create and connect new knowledge (external). And learning networks can be perceived as structures that exist within our minds (internal) in connecting and creating patterns of understanding. (Siemens 2006:5)

The social, connected networks enabled by digital mobile learning present learners with an opportunity to create a persistent, mobile external network that can be accessed at any time to contribute to the development of their internal network - and particularly at times when their context or situation provides an opportunity to link physical locations or operant conditions with their existing internal and external networks of knowledge.

Conclusion

Many people express concerns about the high cost of engaging in m-learning. The issues I'm most commonly asked about are generally associated with the cost of hardware (e.g. mobile phone handset, or PDA), software, or connectivity (e.g. SMS messages, mobile web data costs, etc.).

The online social software tools explored in this article share two common properties. Firstly, they are all completely free of charge to use. Second, they are all set up on the web to facilitate digital m-learning, and/or can be accessed using a relatively inexpensive, ordinary mobile phone. Current Australian telecommunications industry statistics are that [over 8 million mobile phone handsets were sold in Australia in 2005](#) (AMTA 2006), [98% of Australia's population has mobile phone coverage](#) (AMTA 2006), and [around 20 million Australians \(95%\) own a mobile phone](#) (PBC 2006), with penetration among young people even higher. This combination means that there are no software costs and minimal hardware costs to inhibit the use of these approaches.

The cost of using digital mobile learning is actually incredibly [cheap](#) compared with analogue equivalents. Not only do modern mobile phones converge devices that would have cost hundreds or thousands of dollars to purchase separately in the past (e.g. camera, video camera), but digital imaging saves tens or hundreds of dollars in consumables (e.g. film and printing). Identically with cabled equivalents, the cost of mobile connectivity is also quite quickly falling, as faster technologies and increased competition and consumption continue to affect the market.

Simultaneously, the capabilities of mobile devices are rapidly increasing. Samsung have developed [mobile phones with 10GB hard drives](#) and [10 Megapixel camera phones](#); and Steve Jobs, CEO of Apple, makers of the iPod, recently speculated that 2007 would be '...one of the most exciting new product years' ([P. Boutin](#), 2006, pers. comm., 12 September) for Apple. The pace of development in mobile technology and web-based tools continues to accelerate and this should continue to bring better, cheaper, faster opportunities for mobile learners well into the foreseeable future.

The challenge for educators and e-learning developers is to engage with the strengths of mobile digital devices and design mobile learning opportunities that properly utilise the power, convenience, contextualisation, situation, portability, communications, connectivity and personalisation that these platforms offer.

Useful Links

Filemobile <http://www.filemobile.com>

Flickr <http://www.flickr.com>

iPod Notes <http://www.ipod-notes.com>

Kaywa Reader <http://reader.kaywa.com>

Moblog.UK <http://www.moblog.co.uk>

The Mobile Learning Edublog <http://mlearning.edublogs.org>

Talkr <http://www.talkr.com>

Winksite <http://www.winksite.com>

XFruits <http://www.xfruits.com>

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