

Mlearning: A future of learning

Abstract

Technology trends over the last decade have pushed the boundaries of societal mobility. People are more connected than ever before and there is an ever increasing attraction to portable technologies. Technology is in constant evolution and change which is driven by the wants and desires of today's community who are attracted by its capabilities, uniqueness and convenience.

The first part of this article looks at the last decade of mobile technology and learning to the present day, the current technological trends impacting on today's society and hints at possible future directions. The article goes on to detail current issues associated with the uptake of mobile learning and suggests that there is a need for a planned and structured system that incorporates this technology into the day to day operations of learning organisations, from administration to learning delivery and from staff to learners.

It also examines a range of new technologies and innovations that will have exciting impacts on the way in which people receive and interact with information: all up providing new thought for learning delivery.

Introduction

The last decade has brought the first wave of the truly mobile generation, one built around mobile phones, Short Messaging Service (SMS) and portable electronic assistants, but now there is strong evidence to suggest that there is an even bigger wave to come driven by the increasing worldwide technological trend towards mobility and technology integration. This is evident through the plans and strategic directions of many of the major players in this field as well as the plethora of mobile technology types and commercial i-products that are becoming 'mobile ready'.

Towards the end of the 90s the potential of mobile technologies for learning became apparent and with the arrival of the new millennium a more mature face of mobile learning began to develop. Early articles discussed the potential of m-learning, as it became known, for 'lifelong learning' and emphasised the suitability of m-learning for '...situated, contextual and collaborative learning experiences' (Sharples et al. 2000:3). Mobile learning suited the flexible learning paradigm of anywhere, anytime and supported the learning fraternity's need to shift focus from a traditional didactic approach to learning delivery to that of supporting learning however, whenever and wherever the learner may choose. The high portability, user centred design, acceptable durability and potential network capability of the mobile equipment of the new millennium, meant that it had potential to fulfil the needs of emerging learning trends and in many cases could do this in a far more cost effective way than had ever been possible before. The age of m-learning had really begun.

In the face of all of this the international m-learning establishment needed to focus on collaborative international outlets for information sharing and the European Workshop on Mobile and Contextual Learning at the University of Birmingham, United Kingdom (UK), later known as Mlearn 2002, was initiated. Bringing together a small number of people from around Europe, it was the beginning of what has in later years become a highly regarded international m-learning event.

The development of networks and international collaborative associations has spawned many new opportunities for research and development in the fields of m-learning. The biggest issue with much of the research to date is that only a very small proportion gets an opportunity to be implemented in mainstream educational delivery. Keegan, at Mlearn

2005, noted that '...the trouble with projects is that they tend to collapse and disappear when the project funding is discontinued', adding that '...it is now time for mobile learning to emerge from its project status and enter into mainstream education and training' (D. Keegan 2005, pers. comm., keynote, 27 October). Keegan is one of a number of well respected international experts that feels that there needs to be more of an emphasis, by the technology manufacturers, on targeting education as part of their innovation and development,.

The urgent need for mobile learning is to emerge from its fragile project status and convince the telecommunications operators that it represents a viable and valuable revenue stream (D. Keegan 2005, keynote, 27 October).

Another reason for the lack of uptake of m-learning in the mainstream is that although many of the worldwide projects produce outstanding results and in turn initiate further work and development, very little research has gone in to the development of any sort of whole of organisation implementation. What is needed is a structured framework that allows groups and organisations to easily initiate, develop and implement mobility within their existing structures and management hierarchies. This type of framework would have integration at its core allowing for the incorporation of mobile initiatives in a manner that becomes ubiquitous to the overall workings of the organisation. Currently we have a situation where there is enough evidence of product to begin individual forms of m-learning but very little is available as a structured process for integration as a whole. For many organisations still grappling with ongoing national change in the Australian training sector, including training package implementation, workplace learning and the ongoing administrative demands on delivery staff, it seems unlikely that they can take on emerging areas such as m-learning in any effective way, without definitive work and support. Additionally there is little understanding by many organisations of the best use of this technology to deliver and support learning. Facer et al. (2005) for example, state that '...although several initiatives are being implemented throughout the U.K., an underlying rationale for the use of these devices in education has yet to be articulated' (2005:2).

Facer et al. (2005), citing Ito (2005) raise concerns about the potential issues associated with existing conservative 'social and hierarchical' structures (methodologies/philosophies) in educational organisations, noting this can lead to situations where the technology is not used in open and 'naturalistic' ways. Learners are taught to use technologies in the 'school way' and if this '...remains unchanged, then the technology is likely to prove ineffective as a teaching and learning tool' (Facer et al. 2005:2).

Informative articles by Wagner (2005), Peters (2005) together with that by Facer *et al* (2005) provide an excellent introduction to mobile learning, its justification and potential impact. The aim of this article, however, is to acknowledge the rapidly changing face of mobile technology, its impact on the community and learning and to identify future directions that will be essential to the advancement of mobile learning within organisations.

Society and mobile technology: trends and directions?

China is often presented as an example of how fast mobile technologies are being accepted into mainstream society. Current statistics (Baijia 2006) indicate that the Chinese are purchasing mobile technologies at a rate well in excess of 100 million units per year. The figures also suggest that multimedia functionality such as Mobile Messaging Service (MMS) is becoming very important for social communications. In

2005 the Chinese went 'snap happy' using mobile phone cameras for Moblogging (see Useful Links herein for details), with an estimated 15 million bloggers throughout the country (Di 2006).

In Saudi Arabia due to the established Wahhabi religious faction and its strict segregation requirements, eating establishments go out of their way to create environments that prevent male and female guests from seeing or contacting each other. This makes socialisation for the young men and women particularly difficult using conventional means. Although most own 'state of the art' mobile phones, they prefer not to use the government controlled phone lines to casually communicate with the opposite sex, choosing, instead, to use the non regulated Bluetooth wireless communications. Users undertake a Bluetooth search of the immediate environment to see who might be available to talk, picking up on a 'contact' that attracts their attention (Abu-Nasr 2005).

2005 was a transition year for technologies, with influential organisations like Microsoft® launching a range of new concepts including its new Windows XP Media Centre Edition™ 2005, the system that pundits say promises to revolutionise the way in which consumers manage and use home information and communication technology (ICT). Marketed as an all in one entertainment system, it is certainly the first commercially viable attempt at a fully integrated ICT hub for the home. Media Centre Edition™ 2005 allows the user to store and manage a multitude of photo, music and video files, providing easy retrieval and customised playback. It also provides live and recorded television, movies and fully functional personal computer (PC) capabilities, all manipulated via one handheld controller. The system also boasts an interface that allows data to be easily 'synched' to and from a mobile device, allowing portable use beyond the fixed set up.

2005 also saw Microsoft® founder Bill Gates launch the new Windows® Mobile 5.0 operating system for Pocket PC and smart phones as part of Microsoft®'s vision for the future of consumer technology. The operating system is regarded, by mobile enthusiasts and programmers alike, as a substantial advance in mobile operating systems, with many forecasting a consequent boom in product development for mobile devices. Gates announced '...Windows® Mobile 5.0 enables our industry partners to develop exciting new hardware designs and solutions that will revolutionize how customers use mobile devices' (Microsoft®, citing Gates, 2005:para.3). Around the same time, a big step in portable gaming and entertainment, the Sony Play Station Portable, was released. Companies such as Toshiba and LG also released their first generation of Portable Media Centres (PMCs) which are essentially a mobile equivalent of the Media Centre PC.

There is an increased desire in the mobile community Internet access via mobile devices. The Spb Pocket PC Survey (2005) shows that 85% of users rate Internet access on a mobile device as very desirable and connect at least several times a day. In one recent British project, students Googled answers to questions via the Internet on their mobile devices; this immediate access and instant response was very attractive to them (Wishart et al 2005). Another aspect of Internet usage, in which there is a huge movement towards mobile applications, is the development of personalised weblogs (online and editable journals) and wikis with over 60 million Blog's and personalised Wiki's worldwide in 2005 (Riley 2005).

Global Positioning Satellite service (GPS) has entered society in a big way, with many new cars shipping with GPS based mobile navigators as standard accessories. Early indications are that the portable devices are becoming popular with travellers, bush walkers and others wishing to engage with this unique technology in the field. The potential of this technology for interpretation resources and contextualised and situated

learning has been known for a number of years (Ragus 2004) and its importance in these areas has been recognised with a number of significant Australian State players including government bodies, looking to incorporate GPS based initiatives into their organisational planning for 2006. There will also be some significant products launched in 2006 which will have educational focus such as Virtual Tour™ (See Useful Links for details).

Technological and organisational limitations

The incredibly fast rate of mobile technology development has its benefits and drawbacks. In some of the 'high end' models the benefits include wonderful gadgetry that can do almost everything except tie your shoelaces, which is great for the 'techno tarts' of the business world, but are they functional from an educational perspective? Most of the currently available mobile devices have been developed for the business market and more often than not have functionality not required by the learning sector. Their set up can be difficult and sometimes very time consuming for novices, with a teacher commenting... 'by the time I've connected it up, I can find something else to use (Facer et al. 2005:4).

Simple interface development, which allows users to get to what they need within one or two taps of the stylus, is needed. To date, the very popular Palm operating system has been the only product that worked on this basis. The simple and straight forward interface has been very popular in mainstream education, particularly in the United States, with many educational software applications being developed. The Pocket PC is only just starting to make an impact on this popularity. Older editions of the Microsoft® mobile operating system have not been so straight forward and this has led to a number of examples of third party quick launch software being developed, some of which is available as open source or freeware (See Useful Links for details of CLaunch 2004).

Microsoft®'s new Mobile 5.0 operating platform provides access to files through the 'today screen' via a quick launch area, and although this is a good first step, there is still work to do if it is to satisfy the education market.

In many cases there is very little information available to learning organisations on the most suitable mobile technologies for their needs. Most have to rely on information gleaned from research articles and practical projects put together by the 'trail blazers', however due to the small scale and specific (limited) requirements of these initiatives, they do not necessarily provide satisfactory answers for all situations. With the vast array of device types and the seemingly regular superseding of models, there is considerable confusion among learning practitioners and organisational management wishing to make purchases. For example, in 2005 Hewlett Packard Australia introduced a new range of models in its iPAQ range. Within a year many in that selection had been updated to support the release of the new Microsoft® operating system. With this degree of change it is not difficult to see why organisations are reluctant to move into this area. Many organisations are now adopting a 'wait and see' approach, waiting for some form of stabilisation. Unfortunately this conservatism is likely to severely delay uptake of, and therefore progress in, this emerging field of learning.

If major mobile hardware and software developers continue to develop their product to target markets other than learning, we will still be discussing the 'pros and cons' of mobile learning well into the future. Consequent fragmented use in learning organisations by isolated proactive areas will limit m-learning's exposure and developments. Is it up to the technology firms to present the learning sector with the

product or should the learning sector become more proactive and begin to lobby for what it needs?

Cooperatives, communities of practice and networks focusing on emerging technologies and learning need more encouragement and active participation across Australia. They are an essential repository for expert knowledge, assistance and communications and from this type of association comes progress, usually at a greater speed than what can be achieved by a single body. Organisations need to be aware that participation and involvement does not mean they lose their market share or give up their potentially wonderful intellectual property. In a well structured environment it is often a win: win situation.

For uninformed information technology (IT) purchasing managers the seemingly esoteric nature of the mobile device and the perceived lack of any real evidence for their practical application in a learning context, can bring about complications in communications with the teaching and learning team hit by 'techno fever'. These teams wish to purchase the technology to 'begin some flexible delivery' but it's often experimental and unproven, within their context, making it very difficult for them to argue their cases. In some situations, if a proposal is agreed upon, it can end up as a purchase of many differing devices, some with opposing operating systems and functionality. Ultimately this can set up a poor environment for the initiation of any viable or practical trials and waste money, because as knowledge grows, some devices deemed inappropriate are retired, as they become obsolete to the evolving situation.

Ensuring technology access for teaching staff has been a priority with many educational organisations around Australia over the last few years. While the dissemination of technology, such as desktop and laptop computers, to staff, is to be applauded, these programs often lack any structured professional development (PD) to back up what are, essentially, hardware roll outs. Although National and State funding exists, it is too sparsely available and due to requirements placed on its distribution, does not necessarily make it through to all the staff it should. It is very important that some form of substantive and practical PD should be directly tied to any hardware based integration.

When this situation is applied to mobile technology integration we often have a greater problem. Not only do staffs have limited opportunities to upgrade their skills, due to a lack of funds, but who is actually clued up enough to run the PD? After their difficulties in obtaining the equipment in the first place those entering the domains of the mobile technologies now encounter a situation where they are often required to train themselves, which in many cases leads to only a partial understanding of the capabilities and functionality of the equipment. This, in turn, limits how they use the technology and in some cases leads to a gradual drop in enthusiasm for what they see as the benefits of this technology to their practice.

Technology impacts, are we informed?

Hirsch (2005) believes that the education sector needs to put more effort into understanding the technological 'tools' that the current population is accessing in day to day life. He looks at current world wide trends in technologies and ponders why these developments are happening at all and why is it that the large companies that dominate this sector spend billions on these types of innovations.

Why did Texas Instruments announce the production of new chips that provide high definition television on cell phones? Why does Europe already have wireless video services that allow you to watch TV via your cell phone even as

you travel? Why do students in Japan demonstrate that they can thumb keyboard at rates approaching a traditional keyboard user? ...

...Why does a software application like CoffeeCup Wireless Web Builder exist to create web screens that operate in a cell phone size? Why does a website catering to cell phone users like WINKsite exist and continue to grow exponentially? Why have Nintendo and Sony introduced new game systems that have built-in ethernet wireless capability and Internet browsers, along with touch screens and USB ports? (Hirsch 2006:para.6-7)

There is no doubt that the learning sector has to ask are we informed? Why procrastinate with numerous articles that often repeatedly focus on what is m-learning, is it really happening and is it of any benefit? We need to move on and start to produce complete working models for organisations, staff and learners. These models should allow for automated, systematic solutions for day to day operations and delivery, from automated mobile data recording, such as roll and enrolment, through to resource and learning pathways. The greater plan would blend fixed technology infrastructure with that of the flexible mobile spectrum, connected through affiliated telecommunication infrastructure and wireless networks.

We need to incorporate the technology as a ubiquitous component of day to day learning. Whenever the learner needs to use the technology as part of their learning they should be able to access it. Currently we have fixed technological infrastructure, such as regulated computer labs, where access for learners is limited and 'just in time' learning essentially can't take place.

This type of environment tends to turn technology use into an event rather than treat technology as a tool to be used as necessary. Having technology in the classroom, ready to use at a moment's notice, makes it possible to move beyond learning about technology and get to learning with technology (Hirsch 2006:para.13).

There needs to be a better understanding, particularly within traditional learning delivery areas, that this technology is here to assist in, and be part of, a range of flexible delivery options. It is not necessarily here to take away from the traditional pedagogic methods, but can be a valuable and engaging addition. The United Kingdom (UK) Department for Education in its 2005 strategy for ICT delivery in learning (Dfes 2005) states:

19. We do not argue for a complete switch to new technology. Traditional pedagogy and e-learning can and should complement each other. The new technologies are capable of creating real energy and excitement for all age groups. Used well, they should motivate, personalise, and stretch (2005:6).

It is difficult to respond confidently, when asked to provide practical examples of how mobile technologies are being used in education and learning as part of 'real' programs as distinct from in projects or trials. Some seem to view the latter as having little consequence. To a certain extent that is understandable, as there is nothing like the real thing. But when we look at practical examples, there are some wonderful uses in the Kindergarten to Year 12 (K-12) sector around the world (Intel Education 2005) (See Useful Links for details). However examples are not as easily found in the Vocational and Technical Education (VTE) sector and in particular in workplace delivery. This is by no means a reason to suggest that there is no place for m-learning in this area; in fact many would argue that the VTE area has greater potential for m-learning than K-12 application. The situation is simply that due to the early stage of this type of delivery, there is just not enough demonstrated work coming through and being exposed. In many

circumstances this situation leads to a 'Catch 22' where the lack of examples brings about reluctance to move ahead and a lack of any move, brings with it a lack of examples. Hence it is not surprising to hear managers of learning institutes say they will move once they see that industry is engaging this technology for learning.

The learning

SMS, blogs, wikis, live messenger services such as MSN Messenger™, mobile multimedia posting, as in moblogging and image viewers like Flickr™ are some of the many communications environments that have grown enormously over the last few years. Users become involved in experimenting, collaborating with others and using new techniques and methods. The learning takes place through this communication, collaboration and experimentation and in turn they develop new ways of using these environments to best assist themselves and others.

Sharples et al. (2005) describe learning as a 'labile process' constantly open to change and adaptation, 'mediated' by knowledge and technology in supportive teacher, learner and peer relationships.

The mediation can be analysed from a technological perspective of human-computer interaction, physical context and digital communication, and from a human perspective of social conventions, community, conversation and division of labour. These two perspectives interact to promote a co-evolution of learning and technology (Sharples et al. 2005:8)

The essence of this emphasises m-learning as part of a 'task model' (Taylor et al. 2005) and is based on two domains, technology and the human/social. The authors state that the two domains affect each other, therefore if one changes it will have impacts on the other.

The worldwide move towards wireless networks will have a substantial impact in the way in which we use mobile devices for learning, with communications and collaborative associations playing an ever increasing role in the way learning is enacted. Access through what is referred to as 'micro mobile' networks, those within campuses and organisations, will dominate, allowing learners to be 'accessible' whenever they wish to be. Learning in this situation does not have to be connected at all times, as is the case with a number of standard e-learning concepts. Learning materials can be incorporated as accessible chunks, with resources interchanged with existing management systems via networks. World Wide Web accessibility will be essential to these 'micro mobile' networks and more web centred learning will open up collaborative networks from a local to a truly international level.

In regard to the future of learning resources, Reynolds (2005) states that there is '...an increased need for standards-based, portable content that can be reused in multiple environments and for different pedagogical purposes' (2005:para.4). He emphasises the need for publishers to focus on 'granular' and highly 'portable' content that can be used and repurposed easily and suggests that '...publishers can succeed by building teaching templates or "how-to" models that can be reused in multiple platforms' (2005:para.4). Additionally he argues that current Learning Management Systems are still not meeting the varied needs of educators and that portable learning environments, those contained on mobile devices, could '...address these limitations by distributing part of the learning load to the users personal machine' (2005:para.4).

Innovations that will make an impact

Portable Personal Learning Environments (PPLEs)

Portable Personal Learning Environments (PPLEs) are environments made up of one or more portable applications that can be loaded onto a number of varying mobile devices for example, from memory sticks and to personal digital assistants (PDA) and mobile phones. The concept comes from current research that works on the premise that standard college based Virtual Learning Systems (VLEs) are not providing learners with what they need. The current VLEs do not allow for easy customisation or contextualisation for learners. It is argued that if a learner moves to another training organisation with a different VLE, he/she will need to adapt to another new system, in turn delaying their actual subject learning (Liber 2005). Liber (2005) states that with Personal Learning Environments, '...[i]nstitutions would still provide content via repositories, undertake assessment and so on, but learners would interact with these using their personal systems (Personal Learning Environment), comprising their preferred tools and ways of working (2005:2).

Although there are still issues associated with this type of system on a mobile device, including compatibility with the operating system and encryption, the primary aim would be to have a completely secure mobile system that could run remotely from a centralised, standard VLE. This system would be made up of tools, resources and activities that the learners would be comfortable with, accessed through a simple user interface.

Hypothetically speaking, the benefit of systems such as these is that they could be preloaded onto an array of standard memory card devices and configured to run on specific machines. Once the memory card is loaded to a device, the interface becomes available through the front screen of the device. All activities for a specified length of time could be incorporated onto the memory card and the activities and assessments completed by the learner, returned to the card. Cards can then be interchanged with the educational institutes or card information exchanged via remote or standard synching procedures.

Currently PLE's are only just emerging and there is still a lot of work to be done. However, there are a couple of interesting examples available worldwide including the 'Interactive Logbook' from the Centre for Educational Technology in Birmingham (Corlett et al. 2005).

Radio Frequency Identification Tags (RFIDs)

Smart tags such as Radio Frequency Identification tags (RFIDs) (See Useful Links for details) have the potential to revolutionise the way trainers deliver both workplace and college based learning. The technology is based on small microchip embedded tags, some as small as a few millimetres in width, that can hold electronic information. This information can then be recalled through a prepared reading device such as a mobile phone, a Pocket PC or PDAs. The process works by the transmission of information via radio waves from the reader to the tag and back again, this receiving and transmitting of information made possible through miniature embedded antennae in the tags.

The tags and reading devices can be used in a number of ways to provide a means of information storage and dissemination with up to 1 megabyte (MB) of storage available on some tags. The tags themselves are relatively inexpensive and can be easily be mass produced depending on their type and use (Ragus 2005).

Major manufacturers, including Nokia, Phillips and Sony, have been focusing their attention on the development of RFID based mobile technology, with Nokia releasing a series of RFID enabled mobile phones with in built read and write capabilities. This essentially means that the information can be both written to the tag using the mobile phone and then read back from it. It is estimated that half of the world's phones will be RFID enabled by 2009 (RFID Journal 2005).

Innovative methods for using RFIDs in learning include unique, 'just in time' learning for individuals in bite sized chunks of stand-alone information, like text and voice files, which can be incorporated into smart tags and then attached onto inanimate objects such as machinery, first aid kits, tools, etc. This concept would essentially bring the equipment to life with the equipment 'talking' to the learner through the learner's tag reader device (phone, PDA) and providing him/her with the information he/she needs, perhaps to undertake an equipment start up safety check or to provide advice on using a roller bandage for a spider bite. There are numerous possibilities (Ragus 2005).

The infrastructure required for these systems is relatively cost effective and standard information formats such as text can be easily updated and contextualised by staff with minimal experience. More complex systems that incorporate voice or other multimedia formats are in development and it is envisaged that we will see results of these by the end of 2006.

Global Positioning Service (GPS)

As mentioned earlier GPS products have made rapid inroads into society over the last few years. With improvements in technology and the miniaturisation of components, we now have GPS devices that can fit in our hand, that only one year earlier required bulky apparatus carried in a backpack. Their accuracy and coverage have also improved significantly now having a pick up range within only a few meters and engagement even within some internal environments; aspects not possible only a few months earlier.

Their use for situated learning and interpretive resources has been suggested for a number of years but there has been very little product specific for this purpose. In 2005 the Context Aware Educational Resource System (CAERUS) project, for outdoor tourist sites and educational centres, based at the University of Birmingham, developed a prototype of a GPS interpretive resource for use in the University Botanical Garden. It proved popular and development is continuing (Naismith et al. 2005).

The 'Virtual Tour'TM (See Useful links for details) is a new product developed by Daniel Dacey of New England Computer Solutions here in Australia. It aims to provide a user friendly interface that allows trainers to develop their own virtual tours based around any outdoor location. Information such as voice, video or other multimedia products can be incorporated and it also has a database functionality giving it the ability to store an enormous range of tours and data. The product is to be used in conjunction with field study (for example in science, armed forces, fishing industry, mining or tourism contexts) and allows the user to engage in a range of activities in actual situations. Learners can be individually tracked and assessment activities can also be completed through the device.

This product promises to revolutionise the way in which we deliver learning in the field and will provide numerous options for trainers to develop engaging, interactive and informative learning.

SMS Casting Service

During the Mlearn 2005 conference in South Africa, Alan Munro, South African director of fifth digit mobile concepts presented a paper on mobile language application for the delivery of language courses through a mobile phone. The concept has its base in new SMS technologies that allow written content to be delivered to mobile phones via an SMS portal. He feels this system provides a new and very flexible approach to the delivery of this type of learning, stating that '...what makes this product unique is that it allows the learner to decide when and how frequently they receive the lessons' (A. Munro, 2005, pers. comm., poster, 26 October). The organisation is also working with some innovative podcasting technologies and the use of podcasts through Mp3 enabled phones.

An innovative company here in Australia with an incredibly similar name to the above is Fifth Finger. They have launched a product called air-cast™ Self Serve and although it has been aimed at the business sector it certainly has lots of potential for the education market. They describe the self serve part of this product as '...a web interface which clients use to instantaneously create and launch a range of SMS services based upon a predefined set of business rules' (Fifth Finger 2006:para.2).

The interface is straight forward to set up and has a set of options that allows the user to develop a complete SMS portal that can, with some lateral thinking, be set up as a student survey tool, formative assessment area, student knowledge trail and lots more. It essentially works on the basis that the information the learner requires is added by the trainer to an SMS generating database via their desktop computer. This information can then be accessed through most mobile phones by way of a trigger code sent to an assigned phone number. Issues with this system are still primarily associated with the cost of the calls and who pays. Access to the web interface is costed by the company as a monthly fee.

The other interest for many of the innovators in these technologies is the enormous future potential of the 3G platform and its possibilities for the multimedia arena, in particular the transmission of television and video through mobile phones. Known as the mobile broadcasting revolution this is an area that the learning sector needs to keep a close eye on.

Gaming

Numerous initiatives both in Australia and internationally have demonstrated the fundamental benefits of learning through gaming. A number of these initiatives have spawned the development of products that allow gaming resources to be delivered through mobile devices. One of the most captivating of these products was recently presented at Mlearn 2005 by Geoff Stead, director of Tribal-CTAD in the UK, an education and empowerment company. Known as MobiBuild™, it is only available as a beta release and is currently being tested around the world including by a team headed by Caryl Oliver at William Angliss Institute of Technical and Further Education (TAFE) in Victoria, Australia. The product provides a straight forward interface for the development of learning resources that can then be used on mobile devices and is certainly an excellent taste of what is to come. Further detail on this will be available later in 2006.

Gaming has the potential to add significantly to the mobile delivery mix, as it provides an actively engaging and interactive experience for the learner. It also takes advantage of the ever developing market of mobile gaming machines such as the Sony Playstation Portable™ and the new generation mobile phone platforms. This concept opens up

opportunities to engage learners in a way that traditional approaches can't. Some interesting observations from the gamer generation indicate that, when gaming, gamers are always the stars of their games, they are always aware that there is a solution to their game and that failure is a part of finding success (Trendwatching.com 2005).

Mobile administration and documentation systems

Paperwork (traditional hardcopy), is one of societies biggest issues. It's bulky, difficult to transport in quantity, easily damaged or lost and has environmental impacts, but it is a fact of life and society is based around it. In educational circles paperwork is an essential part of most activities from enrolment and sign up processes to final results and certification. Educators spend much of their time actually managing paperwork.

When the electronic age dawned, we were promised of the so called 'paperless' office. It never came and realistically it's still a long way off. However with today's mobile technology we are just that one step closer to that 'holy grail'. With this technology we have the capacity to carry around a virtual library of electronic documentation in our pockets at an affordable rate. Have you come across the delivery man that uses a PDA instead of a delivery book? It can seem strange signing a PDA screen but it is an indicator of how far we have come. In this case the delivery man's PDA data is downloaded regularly through remote synching and the information is then sent through to the organisations management system. We are now running these systems, why are we not doing the same in the learning sector?

The potential to do so is with us and is now being used by a handful of progressive schools in the US. They run mobile programs using software known as PAAM™ which is produced by GoKnow® educational software, the system allows the student to access resources and then send completed material, assessments etc back to a server where the teacher can then access it for evaluation. See Useful Links for details.

New and exciting products are becoming available on a regular basis. One such advance is a recent Australian Flexible Learning Framework, New Practices Project that has developed the world's first QTImPlayer - the only mobile accessible player of QTI compliant documentation. The QTI or Question and Testing Interoperability is an international standard in keeping with the range of IT standards such as IMS and SCORM. Products produced to this standard can be used on any other QTI standard compliant system. The QTImPlayer is also capable of being introduced to any IMS standard system. The QTI system, as designed for the project, allows for the rendering on mobile devices of QTI text based assessments. The development was trialled for the mobile device using Microsoft® Windows® Mobile™. Assessments for learning, including performance, maintenance, checklists, can be completed on the mobile device by an assessor or learner and results (in this case the QTI data package) saved to the device, all within a secure access shell. After the success of the trials the lead research organisation, the Institute for Working Futures, has finalised a Redoit™ solution that not only converts or writes QTI 2.0 assessments, but can also enable the assessments to be imported into learning assets, that can saved as SCORM 2004 packages, while at the same time ensuring the assessment can still be rendered on a mobile device. The future development of this system is to ensure the 'data package' can be synched, through any network, back to a central management system or database (Bowles et al. 2005).

Conclusion

Stead from Tribal-CTAD stated that '...the question is no longer whether m-learning works, but rather how best to fit it into your blend' (Stead 2005:1).

We need to focus on initiating programs that incorporate mobile technologies into the mainstream of educational delivery. The technology is available and in great demand by current generations. In the world today it is obvious that the technology and human social domains are affected by each other. In the context of learning and technology it is often said that there is too much emphasis on the technology and not enough about the learning. Of course there is an obvious requirement to ensure that the learning needs are addressed, but at the same time we should not dismiss the potentials of the technology just because it is new and perhaps unproven for learning. We have a large part of society that thrives in the social benefits of technology every day, yet in the field of learning we are still grappling with the basics of technology for learning delivery. Are we still trying to 'educate' our learners based on old methods of delivery that are uncomfortably repackaged and delivered using the 'most trendy' technology of the day?

Technology is in constant evolution and change being driven by the wants and desires of today's community, which is attracted by its capabilities, uniqueness and convenience. Its designs are directed to the taste and individualism of the generations' increasingly egocentric lifestyles. This period could be described as a conveyor of constant development and technological adaptation and we as learning practitioners have an opportunity to be part of it and not just watch it from the sidelines, waiting until it's the 'right time' or when it 'matures'. When will that be? Good teaching practice is creative and provides energy, excitement, inspiration and enjoyment; ingredients that are essential for learning to happen. The adaptation of society's well used and attractive technology to a learning context has enormous potential for the quality learning practitioner's kit of creative practice. However to make this happen we need a planned and structured system that incorporates this technology into the day to day operations of learning organisations, from administration to learning delivery and from staff to the learners.

I have already mentioned the need for resource development for mobile devices and in particular the need for instructor or subject expert led product. Therefore, processes are needed that allow users to quickly produce or contextualise resources in a simple, quick and cost effective way. Templates and construction wizards are probably the best options for this, where the user can add details in a step by step process; ending up with a final product relatively quickly. Additionally there is room to explore existing programs within organisations and their standard computer operating systems, such as creative applications of Microsoft® PowerPoint™ and Word™.

The engaging concept of digital stories (Jay 2005) has proven to be a very effective resource development initiative. In Australia there has been some excellent work undertaken using simple and straight forward software such as Microsoft® Photostory™. The digital stories provide learning resources in an engaging and entertaining manner and they can be easily transferred to play on a Pocket PC.

Product innovators are now aiming their development towards software that is more intuitive and straight forward to use and over the next few years there will be a strong push towards product that is mobile compliant and/or provides mobile compatibility..

If we reflect upon the changing nature of learning delivery particularly in the VTE sector, there is an increasing need for more creative and flexible delivery mediums. We need to be proactive in these activities and move on from debate into action. M-learning certainly has the potential to provide solutions to some of our current delivery dilemmas but it has also provided us with the opportunity to reassess what is meant by, and wanted from, learning in the modern age and how this impacts on the way in which learning is delivered to future generations.

Useful Links

CLaunch, <http://pachome1.pacific.net.sg/~welic/claunch.html>

Fifth Digit Language Podcasts <http://www.5thdigit.net/index.html>

Fifth Finger <http://www.5thfinger.com/corporate2/default.asp>

GoKnow Educational software <http://goknow.com/>

Handheld Computers in Education

<http://magazines.fasfind.com/wwwtools/m/2737.cfm?x=0&rid=2737>

Intel Education <http://www.intel.com/education/sections/section1/index.htm>

Mlearn 2002 <http://www.eee.bham.ac.uk/mlearn/>

Moblogging <http://en.wikipedia.org/wiki/Moblogging>

TrendWatching <http://www.trendwatching.com/>

Tribal-CTAD <http://www.ctad.co.uk/index.html>

New England Computer Solutions <http://www.necs.info>

[Radio Frequency Identification \(RFID\) tags](http://en.wikipedia.org/wiki/RFID) <http://en.wikipedia.org/wiki/RFID>

RFID Journal <http://www.rfidjournal.com/>

Virtual Tour™ <http://www.necs.info>

Wikipedia <http://en.wikipedia.org/wiki/>

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