# Mobile Learning infoKit

The Mobile Learning infoKit is a developing resource from JISC infoNet launched at ALT-C 2011 alongside the new JISC publication Emerging Practice in a Digital Age. Augmenting the Emerging Practice guide, this infoKit is a practical guide for educational institutions planning to implement a mobile learning initiatiative.

At launch, the Mobile Learning infoKit comprises a wiki-based resource collating information and guidance from JISC and other sources. It will develop to include a section on future trends, incorporate additional examples, and be made available in a variety of formats.

**http://mobilelearninginfokit.pbworks.com**

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This Mobile Learning infoKit was also informed in a significant way from the insights gleaned from interviewees for the JISC Mobile and Wireless Technologies Review[1].

[1] http://mobilereview.jiscpress.org/

# Introduction

*Image CC BY-SA brunkfordbraun*

## Overview

John Dewey, writing in the early years of the twentieth century, may not have foreseen the proliferation of 21st century 'mobile devices' but, in the quotation to the right, he does point out something that remains relevant: that mobile learning involves change, initiative and adaptability.

> *"A society which is mobile, which is full of channels for the distribution of a change occurring anywhere, must see to it that its members are educated to personal initiative and adaptability."*
>
> ***JOHN DEWEY (1916)***

Mobile learning involves *change* in the sense that the ability to communicate with tutors and peers, as well as access learning resources, changes what is possible in education. It takes initiative for leaders to create a vision to sustain that change and, finally, mobile learning requires *adaptability* by members of staff to carry out the change.

This infoKit is a practical guide to thinking through the issues relating to institutional adoption of mobile learning. It follows a JISC Mobile and Wireless Technologies Review[2] which delves deeper into the theory behind mobile learning and the wider context. One of the biggest take-aways from that review is that mobile learning is still in its infancy and that mobile learning, as explained in What is mobile learning? is about the mobility of the *learner* rather than the device.

[2] http://mobilereview.jiscpress.org/

As with other forms of Technology-Enhanced Learning (TEL) it is possible for mobile learning to be used in a small-scale and ad-hoc manner. Such approaches are rarely sustainable or, ultimately, satisfactory without wider buy-in from across an institution. Successful mobile learning initiatives are change management programmes that involve Strategy, a focus on Pedagogy, and a rigorous Implementation plan.

Whilst there are many approaches an institution can take when it comes to mobile learning, from administrative functionality through to rich learning and teaching experiences, one key factor to take into consideration is the learner. The importance of context cannot be overstated when it comes to mobile learning. Talking to and gaining feedback from learners allows institutions to plan accordingly for the contexts within which learners operate. The Snapshots section gives examples of institutions and organisations that have done just this.

## What is mobile learning?

Mobile learning can be many things to different groups of people. Superficially, it appears from the outside to be learning via mobile devices such as smartphones, MP3 players, laptops and tablets. Certainly, these are important in enabling mobile learning.

But mobile learning is more than just using a mobile device to access content and communicate with others - it is about the mobility of the *learner*. According to Mike Sharples, a leading authority in the field, mobile learning can be defined as, “the processes (both personal and public) of coming to know through exploration and conversation across multiple contexts amongst people and interactive technologies” (Sharples, M., et al, 2007)

The key word here is **context**. Mobile learning allows for a contextualisation of learning that is impossible with desk-bound computing. A more workmanlike definition of mobile learning was given by MoLeNET[3], a 3-year programme of capital funding for Further Education institutions running from 2007 until 2010. Mobile learning, they reasoned, involves the "exploitation of ubiquitous handheld hardware, wireless networking and mobile telephony to facilitate, support, enhance and extend the reach of teaching and learning.”

> *“Early definitions of [mobile learning], which focused predominantly on the attributes of mobile technology, have given way to more sophisticated conceptualisations suggesting that mobility is the central issue (Winters, 2006). This denotes not just physical mobility but the opportunity to overcome physical constraints by having access to people and digital learning resources, regardless of place and time.”*
>
> *KUKULSKA-HULME (2010)*

Despite over ten years of work in the field of mobile learning the body of research available upon which to draw is relatively small. This is for two reasons. First, the rapid evolution of mobile devices has caused problems for meaningful longitudinal work. Often, by the time institutionally-purchased devices begin to gain traction they can be shunned for being out-of-date. Second, cultural issues in key settings have prevented the use of mobile devices in educational institutions and healthcare. Seen as disruptive, distracting or causing privacy issues, management policy in many such settings has been one of blanket bans.

[3] http://www.molenet.org.uk/

As you shall see through exploring this infoKit, mobile learning is more than the sum of its parts. It is, to a great extent, a ‘trojan horse’ and a vehicle for exploring the changing nature of learning in a connected age. Because of the large-scale funding, Further Education institutions who participated (or learned from the outputs of) the MoLeNET programme are, perhaps, better-positioned than many schools, Higher Education institutions, and other providers as regards mobile learning. Just as with any meaningful intervention or technology-enhanced learning initiative, there are no shortcuts. What this infoKit provides are some useful pointers and steps to consider along with some ‘snapshots’ of how other institutions have previously trod a similar path.

## References

Kukulska-Hulme, A. (2010) Mobile learning as a catalyst for change (Open Learning, Vol.25, No.3, November 2010, 181-185)

Sharples, M., et al. (2007) ‘Mobile Learning: Small devices, Big issues’ (in Sharples, M., et al. (eds.) Technology-Enhanced Learning, 2009, Part IV)

# Why mobile learning?

Mobile learning is more than simply learning via mobile devices (see What is mobile learning?). Planned and implemented properly, mobile learning initiatives allow for educational institutions to reflect upon the nature of their provision for learners. Although the technology involved in mobile learning can be attractive to staff and students there are also tangible and strategic benefits that mobile learning can bring.

> *Mobile devices give us a unique opportunity to have learners embedded in a realistic context at the same time as having access to supporting tools.*
>
> *FUTURELAB (2004)*

## Institutional goals

Mobile learning aligns well with many goals of educational institutions, including:

1. Curriculum redesign
2. Personalisation of learning
3. Student satisfaction*
4. Digital literacies
5. Reducing costs (doing more with less)
6. Graduate attributes and employability
7. Enhancing assessment and feedback
8. Widening participation
9. Improving student engagement and retention
10. Energy efficiency

* *This is especially the case in relation to the National Student Survey.*

Many of those interviewed as part of the research for this infoKit commented upon how relatively simple uses of mobile technologies can help in reducing frustration and in student retention. Examples include SMS messages sent to inform students of cancelled or rearranged lectures, and keeping in touch with learners at risk of falling behind with (and therefore dropping out from) their studies.

## Tangible benefits of mobile learning

*This one-page JISC resource[4] looks at links between the benefits of mobile learning and your context.*

There are many tacit benefits of mobile learning but those that can be measured and made tangible include the following.

- Personal, private and familiar (reduce perceived barriers to learning)
- Pervasive and ubiquitous
- Fit into the lives of learners (allow for productive 'dead' time - e.g. when travelling or queuing)
- Portable - allow anywhere, anytime learning
- Immediacy of communication (including speech and data-sharing)
- Allows access to learning by those in dispersed communities and isolated situations
- Contextualisation through location-aware features such as GPS.
- Allows data to be recorded and learning processes captured wherever they happen.
- Access to mentors, tutors and others learners on-the-move.
- Perceived as an acceptable way for learners to receive reminders and chasers - and to manage their time
- Bite-sized e-learning resources can be delivered to learners (especially useful for basic skills or work-based learning)
- Abstract (representational) and concrete (environmentally-situated) knowledge can be integrated.
- Peer-to-peer networks make learning more student-centred.
- Promotes active learning
- Enable new learning environments
- Increases accessibility for learners with special educational needs
- Encourages reflection in close proximity to the learning event
- Reduces technical barriers to e-learning

[4] http://bit.ly/oSowK3

## Wider context

> *"Looking at mobile learning in a wider context, we have to recognize that mobile, personal, and wireless devices are now radically transforming societal notions of discourse and knowledge, and are responsible for new forms of art, employment, language, commerce, deprivation, and crime, as well as learning."*
>
> ***TRAXLER (2007)***

Educational institutions both drive societal change and have to respond to it. According to GSMA (2011) a survey by Blackboard found that "virtually all students own a mobile phone and a third have [a] smartphone." Indeed, GSMA cites data from Ofcom showing that "99% of people aged between 15 and 24 have a mobile phone, the highest penetration rate for any age group." Whilst before the year 2000 ownership was restricted to the privileged few, it has become increasingly socially problematic and disabling not to own and use a mobile phone. This transformation of "societal notions of discourse and knowledge" (Traxler, 2007) is the context which educational institutions must both understand and operate within to remain relevant.

As is explained throughout this infoKit, mobile learning can be a 'trojan horse' for wider institutional changes. Considering the extent to which learning can be made more social through the use of mobile devices, for example, may force teaching staff to reflect upon the methods of assessment they use on a course. Similarly, if 'content' can be delivered in a personal way to mobile devices, educators may deem discussion, debate and practical 'hands-on' activities a better use of face-to-face contact time. As this diagram[5] from Upside Learning shows, mobile learning can be used both for content delivery and as a performance support system.

A final point to consider is the ease with which mobile devices allow for the creation of user-generated content. Coupled with the rise of social networks and location-aware services, mobile learners can engage with the content and skills they are expected to learn in more ways than ever before.

## References

Futurelab (2004) Mobile Technologies and Learning report[6]

GSMA (2011) Mobile Education in the United Kingdom[7]

Traxler, J. (2007) 'Current State of Mobile Learning' (in Ally, M. (2010) *Mobile Learning: Transforming the Delivery of Education and Training,* Edmonton: AU Press)

[5] http://www.upsidelearning.com/blog/index.php/2010/11/01/mobile-learning-solutions-infographic/

[6] http://archive.futurelab.org.uk/resources/publications-reports-articles/literature-reviews/Literature-Review203

[7] http://www.gsmaembeddedmobile.com/mobile-education

## Mobile learning myths

There are a number of myths surrounding mobile learning. Some have a basis in fact but most demonstrate a fear of the known. Here are 10 myths about mobile learning that can be dismissed with an explanation as to why such statements are false:

1. Mobile devices have screens too small to allow for learning

   Whilst mobile *phones* do not have screens as large as desktop computers, 'mobile devices' also include laptops and devices such as e-book readers. These screens are certainly large enough. Mobile devices with smaller screens are often used in different ways from more fixed technologies and are heavily context-aware. Touchscreens, for example, can allow for text input in non-traditional ways and users can also use video, audio and GPS to input data.

2. There are no consistent standards for mobile learning

   At the turn of the century and for a few years afterward, SCORM was seen as the de facto standard for e-learning products. With the development of HTML5, CSS3 and other frameworks, along with the various app stores (iOS, Android, BlackBerry), however, existing content is becoming a lot more mobile-friendly.

3. Mobile devices are unsuitable for learning as they are a distraction

   Distraction is nothing new to learning, with the scenery beyond the classroom window being a perennial source of fascination to students. The *Oxford English Dictionary* defines 'distraction' as "the drawing away (of the mind or thoughts) from one point or course to another; diversion of the mind or attention." Whilst it is true that mobile devices with notification features turned on can be detrimental to sustained concentration, the fault lies not in the mobile device but in its *use*. The appropriate use of technology in a given context is a socially-negotiated process.

   Of course, the best way to avoid distraction of any sort is to, as one MoLeNET project report[8] stated, "give the learners something interesting to do in the first place."

4. Mobile learning is *just* 'learning on the move'

   Mobile learning may be about the mobility of the learner, but this is to do with moving across contexts rather than accessing content whilst being on the move. This could be in a context that suits the individual learner, for example on public transport, waiting in a queue, or sitting in a favourite chair at home. Alternatively, it could be in a context more suitable and appropriate for learning. For example, Arboriculture students at Myerscough College use digital cameras up in the tree-tops to explain where they would cut diseased or damaged limbs. This could be carried out in real-time by using their mobile phones for formative assessment meaning they would not repeatedly have to descend and ascend to check with lecturers.

[8] http://www.molenet.org.uk/mobilearinprac/myths/

5. Students with disabilities cannot use mobile devices for learning

   It's a little-known fact that Apple's iOS phones and tablets have some of the most consistent, rigorous accessibility features ever seen on a mobile device. In fact, if an app does not meet core accessibility guidelines, it is not approved for entry into the iOS store. (see Accessibility section for further discussion). Although this is less true of other app stores, the ability for learners to personalise their device, to have it *constantly* set up for their use, removes a barrier to learning. Far from providing a hindrance, therefore, mobile learning is a great boon to students with disabilities. See the Accessibility section for further details.

6. Mobile learning means content delivered in bite-sized chunks

   Bite-sized chunks may seem like the best way to deliver 'content'. This, however, is a 'transmission' approach to mobile learning where an instructor has some knowledge to impart and delivers it, via a mobile device, to a learner. A more holistic approach is to engage the learner in creating user-generated content and engaging through audio, video and other features of mobile devices in the learning experience.

7. Young people already know how to use mobile devices for learning

   As the 2008 JISC 'Google Generation' report[9] demonstrated, the use of mobile devices by young people for social activities does not mean they know how to use them for learning. Educators should be aware of, and continue to experiment with, new ways of using mobile (and other) technologies for learning within their discipline.

8. Mobile devices cannot be relied upon for learning as they are likely to be lost, broken or stolen

   Mobile devices tend to be both expensive for their size (and therefore desirable to thieves) as well as being easy to lose or damage. The MoLeNET programme, however, found that of 10,000 handheld devices purchased across various projects, less than two percent were damaged, lost or stolen. Just as it can be a good idea to have spare versions of older technologies such as pens and books, so it is sensible to have spare mobile devices in the case of various eventualities.

9. Content on mobile devices cannot be as secure as on desktop computers.

   Whilst mobile devices are more likely to be lost or stolen than desktop computers they often have additional security features. For example, Apple iOS devices and BlackBerries can be set to require a PIN to use whilst Android devices can be unlocked by drawing a shape on the screen. In addition, individual apps have various security features and separate pincodes, with a certain number of incorrect entries trigging data deletion. Finally, software such as Prey[10] allows for the tracking of mobile devices should they be lost or stolen.

[9] http://www.jisc.ac.uk/news/stories/2008/01/googlegen.aspx

[10] http://preyproject.com/

### 10. Mobile learning is an expensive option

This is a common criticism of mobile learning initiatives and is often raised in relation to 'digital divide' issues. The latter is the idea that there is a widening gap between those who can afford technology and those who cannot with the former group profiting from greater access to resources and information at the expense of the latter.

Mobile devices cost less today than they ever have done, with basic mobile phones being available behind the counter at petrol stations and 'smartphones' given away free on cheap monthly contracts. The cost to the learner can be defrayed by the provision of wireless networks, 'loanership' schemes and employing a multi-pronged strategy (see University of Bradford snapshot)

## References


- ASSETT[11]
- E-Moderation Station[12]
- Learning Solutions Magazine[13]
- MoLeNET[14]
- Pacific Blue[15]
- The Mobile Learner[16]
- Upside Learning[17]


[11] http://assett.colorado.edu/post/1425

[12] http://www.emoderationskills.com/?p=565

[13] http://www.learningsolutionsmag.com/articles/471/top-myths-amp-misconceptions-of-mobile-learning

[14] http://www.molenet.org.uk/mobilearinprac/myths/

[15] http://info.pacificblue.co.uk/mobile-learning-myths-and-misconceptions/

[16] http://themobilelearner.wordpress.com/2009/08/07/addressing-some-critiques-of-mobile-learning/

[17] http://themobilelearner.wordpress.com/2009/08/07/addressing-some-critiques-of-mobile-learning/

# Strategy

*Image CC BY-NC Curnen*

## Overview

In this section you will find information and guidance on how to get started with the big picture of mobile learning. Without an overall vision for what mobile learning is able to achieve in your particular context it is doomed to failure. Along with the 'snapshot' case studies (see sidebar) this section consider what learners are increasingly coming to expect in terms of their ability to use mobile devices for anytime, anywhere learning. It is not enough to simply engage and cater for learners, however, as staff must also be on board with initiatives. Cultural considerations are important for any change management project and particularly when technology is involved that is more often used for social reasons. Finally, whilst the novelty factor may enable an organisation to gain some initial traction, it is important that mobile learning initiatives are sustainable.

This infoKit can, of course, be accessed in any order. Moving from the overall vision, putting learners at the centre, through to cultural considerations and then to sustainability, enables potential barriers ("That will never work here") to be put to one side in the first instance for some blue-skies thinking. There is more on overcoming barriers and finding enablers in the Implementation section. As is mentioned through this infoKit, mobile learning can serve as a 'trojan horse' for wider changes and re-focusing within an institution.

## Quick Wins

Mobile learning, as we saw in What is mobile learning? is a concept that depends heavily upon context. It is a flexible term used to cover a spectrum of approaches that help learners in a variety of ways. One way to consider this is diagrammatically:


Most large-scale mobile learning initiatives and implementations lean (understandably) towards the left-hand side of this spectrum. They focus on getting key pieces of information to staff and students in timely and contextually-useful ways. Examples of these include informing learners that a lecture has been postponed or cancelled, or that library books are due back soon.

At the other end of the spectrum are rich teaching and learning experiences. This includes engaging in activities that were previously either impossible or very difficult and time-consuming to undertake. Visualising an ancient building at an archaeological site through Augmented Reality would be an example of this: without mobile technologies this would not be possible in real-time.

The majority of 'quick wins' for mobile learning lie at the left-hand side of this spectrum. They often include either slight tweaks or modifications of existing content or turning on tools that are available through institutionally-purchased e-learning solutions.

Five quick wins for mobile learning are set out below. These are approaches that can be implemented quickly in ways that, to use Agile project management terminology, are high in Business Value and low in Complexity.

## 5 quick wins to kickstart institution-led mobile learning initiatives

### 1. Add a mobile stylesheet to your website

Through the use of media queries in an alternative, mobile-friendly stylesheet, an existing website can be made to render more effectively on mobile devices. A presentation by Meagan Fisher from 2009 entitled Designing Mobile Interfaces[18] does a good job of explaining the options in an entertaining way.

### 2. Provide a mobile-friendly front end to an existing RSS feed

RSS feeds are generated by most content management systems (CMS), blogs and wikis. They allow for content to be syndicated to places other than the existing website.

[18] http://owltastic.com/extras/designing-mobile-interfaces.html

An example of this would be university press releases.

Although some mobile devices can make sense of these RSS feeds, some need a helping hand. There are several ways to do this.

- The easiest way is to run the RSS feed through Google's free Feedburner[19] service. After some straightforward configuration, this provides a mobile-friendly front end for your RSS feeds.
- Some CMS have add-ons that allow RSS feeds to be displayed in ways that can be read by mobile devices. There are too many CMS to list the options for each but, if this solution is lacking, Tiny Tiny RSS[20] is a free mobile-friendly RSS feed reader that could be used for this purpose.
- Although it is moving away from 'quick win' territory, developing a 'hybrid app' is an increasingly-popular approach. The idea is that the application, available through (for example) the Apple, Android and BlackBerry app store, is a 'shell' for updates provided from your website. A good example of this is JISC Regional Support Centre South East's app[21], available in the Apple iOS app store. It provides news, events, funding details, and other information in a visually-engaging manner.

### 3. Set up social media accounts to broadcast relevant news and updates

According to Facebook's official statistics[22], those users of the social networking site who access it on a mobile device are "twice as active on Facebook than non-mobile users". Moreover, Facebook accounts for more than 50% of the online time spent[23] by UK users when using their mobile devices.

Facebook[24], along with other social networks such as Twitter[25] and Google+[26] have extremely

> *"The number of Smartphones amongst our students has gone up to around 20% but it would still be hard to convince a lecturer to spend time on such a small portion. Luckily for us our main learning platforms, Blackboard, QuestionMark Perception and PebblePad have all released mobile apps / mobile friendly web versions / APIs... So [soon] pretty much any elearning a lecturer does will be available on both Computer and Mobile without any extra effort on the lecturers part. Whilst it may not represent my ideal bite size nugget format, I do think it's a major win."*
>
> ***JOHN FAIRHALL, UNIVERSITY OF BRADFORD***

[19] http://feedburner.google.com

[20] http://tt-rss.org/redmine/wiki/tt-rss/MobileVersion

[21] http://itunes.apple.com/gb/app/jisc-rsc-south-east/id393850285?mt=8

[22] http://www.facebook.com/press/info.php?statistics

[23] http://www.clickymedia.co.uk/2011/03/uk-facebook-statistics-for-march-2011/

[24] http://www.facebook.com

[25] http://www.twitter.com

[26] http://plus.google.com

mobile-friendly websites and apps. For important news and announcements it can be a good idea to go to where people already are. Sending an RSS feed to a range of social networks can lead to very quick wins: learners see them as they often spend much of their time in these environments, and the cost to the institution is effectively zero.

4. Turn on the mobile version of your Learning Platform, VLE or e-Portfolio solution

   Many, if not most, providers of Virtual Learning Environments and e-Portfolios have developed a mobile version of their offerings. According to the 2010 UCISA Survey[27] of Technology Enhanced Learning for Higher Education in the UK, apart from those solutions developed in-house, the most popular Learning Platforms are Moodle[28], Blackboard[29] and Microsoft Sharepoint[30]. These all have mobile-friendly apps or versions of their online solutions that are tailored to mobile devices.

5. Invest in secure SMS text messaging services

   JANET txt[31], along with competing services, allow for secure institutional SMS text messaging to learners. This can be done on a granular basis, as opt-in (recommended) or opt-out, and provides flexible options for integrating with existing provision. As SMS is guaranteed to work on any type of mobile phone - 'smartphone' or otherwise - it can be a good place to start with a mobile learning initiative.

## Learner Expectations

The current Higher Education landscape is more complex than ever before. With the 2012 reforms introducing new fee structures and increased marketisation, students are very much in the driving seat. As a result, Higher Education institutions - as well as Further Education colleges that teach HE in FE - find themselves in a position where they need to respond to student demands in unprecedented new ways.

Students are likely to make their voice and demands heard in a range of ways. The uncritical use of technology in the curriculum, for example, is not something that students are prepared to tolerate. As the 2010 NUS/HSBC Student Experience Report[32]

> *"New generations of young people who have grown up with digital technology have high expectations of anytime, anywhere learning, but many learners do not have a clear understanding of how courses could or should use technology to support learning. They are still very much reliant on lecturers for guidance."*
>
> ***JISC LEARNER EXPERIENCES OF E-LEARNING, GUIDE 2***

[27] http://www.ucisa.ac.uk/en/groups/ssg/surveys.aspx

[28] http://moodle.org/

[29] http://www.blackboard.com/

[30] http://sharepoint.microsoft.com/en-us/Pages/default.aspx

[31] http://www.ja.net/services/janet-txt.html

[32] http://www.nusconnect.org.uk/news/article/6010/1438/

found, *"using IT for studies more frequently does not necessarily lead to an increase in student satisfaction."* Indeed, research by the NUS found that *"the percentage of students who feel that ICT usage has enhanced their experience of studying has actually decreased, from 46% in 2009 to 42% in 2010."*

Much of students' dissatisfaction with technology in education has, perhaps, to do with the disconnect between their institutional and non-institutional experiences of IT. Most institutional use of IT is driven by impersonal VLE and e-Portfolio systems; as the 2010 UCISA Survey of Technology-Enhanced Learning[33] demonstrates, academic departments are developing their own learning platforms in tandem to them. The most popular response for why this is happening? *"A case has been made for the departmental VLE based on pedagogical reasons."*

Mobile learning allows for ubiquitous, personalised and social learning experiences. Deployed in consultation with learners it allows for a more nuanced approach to students' technology-mediated interactions. Given their familiarity with the device they use for other purposes, students are also less likely to find such interactions frustrating. This all, however, depends upon a planned, coherent and holistic approach to deployment.

As the JISC Google Generation project[34] discovered, young people may be adept users of technology for social interaction, but not necessarily for learning. As a result, the JISC Learner Experiences of e-learning[35] report made several recommendations:

> *"I think the learners themselves still aren't clued up to the potential of mobile learning so in surveys where we asked them they only really responded with access to the VLE."*
>
> ***JOHN FAIRHALL, UNIVERSITY OF BRADFORD***

- Provide clear explanations of technologies learners are expected to use (support available and educational benefits)
- Ensure essential course information and learning resources are available via the VLE (expected by learners as a minimum)
- Offer 'tasters' of potentially innovative learning activities that learners can try online
- Explore what colleagues are doing to ensure a level of consistency for learners in their experience of technology
- Treat new technologies as an opportunity to share skills (some learners may be highly proficient while others are unsure)
- Recognise that how the use of technology is explained to learners is of critical importance

[33] http://www.ucisa.ac.uk/groups/ssg/surveys.aspx

[34] http://www.jisc.ac.uk/news/stories/2008/01/googlegen.aspx

[35] http://www.jisc.ac.uk/learnerexperience

This advice is particularly applicable to mobile learning where peer learning through the technology that students already have available can make a significant difference to their educational experience.

Even when rolling out parts of the overall mobile learning experience that are more administration-focused it is important to nevertheless place pedagogy at the heart of change management initiatives. There are certain things that students expect despite their initial unfamiliarity with how mobile devices can help in their learning:

1. To be able to use their own devices with corporately-owned IT infrastructure.
2. For technology not to be used as a crutch for poor learning and teaching experiences.
3. Unhampered digital communication with their peers, tutors and administrators.

> *"From our research...what students say they would value most is a 'one stop shop' where they can get instant access to reliable and up to date information about the teaching and administration that matters to them. This might include lecture times and rooms, assignment deadlines, course notes, lecture slides and recordings, and overdue library books."*
>
> ***MIKE SHARPLES, THE OPEN UNIVERSITY***

Study habits are changing as an inevitable consequence of the ability for students to instantly access both information, their peers and knowledge-brokers such as academic staff. Social media sites such as Facebook, Twitter and Google+ can blur the lines between the previously-demarcated worlds of the academic and the social. The section of this infoKit on Cultural Considerations provides some guidance as to how to deal with these changes in a positive and reasonable manner.

## Cultural considerations

*JISC infoNet's Change Management infoKit[36] has a useful section on Organisational Cultures[37]*

Considering and responding to the culture of an organisation is key in any change management initiative. As countless JISC reports testify, the culture of an organisation can be an enabler or a barrier for projects aiming to improve or modify the working/learning environments for staff and students at an educational institution.

One of the biggest advantages as well as one of the biggest drawbacks for a mobile learning initiative is it can often serve as a stimulus for wider, sometimes unanticipated, changes within an institution. Once staff, for example, reflect upon their assessment practices as a result of a mobile learning initiatives, it may lead to wider curriculum design implications. The initial stimulus for staff and students getting involved in mobile learning is likely to vary from context to context and, indeed, upon individual preferences and interests. As Julie Laxton, part of the University of Leeds' ALPS team points out it is a case of understanding the

[36] http://www.jiscinfonet.ac.uk/infokits/change-management

[37] http://www.jiscinfonet.ac.uk/infokits/change-management/culture/organisational-cultures

benefits of mobile learning and ‘selling a story’ of positive impact upon practice. In this way both technology and pedagogy work together.

Mobile learning is content-agnostic and, as such, can often help break down existing barriers for wider institutional gains. Julie Usher, a Learning Technologist at the University of Northampton found that being ambitious and seeking input from across teams in the university can be "a challenge" but lead to "some great unexpected outcomes". The mobile learning project at Northampton was "a catalyst, breaking down silos and raising questions about the availability of information". It also, importantly, she points out, led to questions about how such information could "be improved in order to enhance the student experience."


*“It’s really understanding how it can impact practice and selling that story of how it can impact positively on practice.”*

***Julie Laxton, University of Leeds***

*http://youtu.be/AlWdI2JNAR8*

Another benefit of mobile learning is that it allows institutions and staff to re-evaluate their roles in a changing landscape, ensuring that what they provide remains relevant and learner-focused. To ensure that such reflection takes place it’s important for those leading mobile learning projects to engage with various stakeholders across the institution and, as Jackie Carter of Mimas points out, to work in partnership. “I think it’s taking from the learning to the technology, not the other way around” she points out, drawing on her experience of Mimas’ award-winning mobile learning projects.

As long ago as 2004 Futurelab saw mobile learning as heralding a new dawn for learning experiences. Quoting Soloway et al. (2001) the Mobile Technologies and Learning report states that “to make any difference in the classroom at all, computers must be mobile and within ‘arm’s reach’.” In addition, mobile technologies should not “be viewed as simply providing more portable versions of the learning activities that are currently supported on more static machines” as the mobility of the device and the learner “adds a new dimension to the activities that can be supported.” Mobile learning initiatives provide an opportunity for staff to reflect upon their practices and (re-)ask the question How can technology best enable this particular learning outcome?

*There were two main drivers for mobile developments at the University. One was pedagogic and came from the Learning Technology team, who recognised the potential of mobile technology to provide opportunities for more flexible, situated and personalised learning. The other driver came from our Marketing team, who saw mobile development as a way to raise the profile of the institution, and make information more readily available to prospective students, parents and visitors.*

***JULIE USHER, UNIVERSITY OF NORTHAMPTON***

Some mobile learning initiatives are student-centred but with an indirect link to learning and teaching. An example of this would be library reminder services via SMS text messages for borrowing deadlines. As explained in the Quick Wins section these types of mobile learning initiatives are likely to be quicker and cheaper to implement than others and (to paraphrase Prof. John Traxler) can serve as "the low-hanging fruit" that doesn't "frighten the horses". Once senior members of staff are used to checking their email and accessing information on a mobile device, once academic staff are convinced of the benefits of assessment in practice situations, and when learning technologists and IT staff have been reassured as to impacts on their workload, further development can take place. Cultural change can often be a slow and, at times, frustrating process.

*"The culture change is huge and I don't think we should underestimate that."*

***Chris Dearnley, University of Bradford***

*http://www.youtube.com/watch?v=RzXr1TVifGU*

Although the temptation for those in charge of mobile learning is to start with the early adopters of technology, this is not always the best idea. Kyle Bowen of Purdue University, USA, for example, who led the team who developed the innovative 'Hotseat' and 'Mixable' technologies[38] actively avoids early adopters. Not only do early adopters tend to carry less influence than other members of staff, he claims, but aiming for those "with a healthy level of scepticism" can mean that you can genuinely tell if an intervention or initiative is working.

There are many questions to consider when implementing a mobile learning initiative. Some of these will be specifically context-dependent whereas others, such as those given below, can be stated more widely:

1. Does the mobile learning initiative alter the meaning of 'contact time' for staff or students in a significant way?
2. Is this an example of substitution is this transformational for students?
3. Has the mobile learning initiative achieved high level buy-in?
4. Who benefits from this mobile learning initiative? Who (or what) is marginalised?
5. What are the positive, demonstrable, benefits of going with mobile learning in your institution?

[38] http://www.itap.purdue.edu/studio/

> *"Most institutions, especially larger institutions, tend to turn like cruise ships... [W]e have to [remain] agile, which means we have to kind of stay out of that standard mainstream culture of the institution and we have to hit right at the pain points by going directly there and offer solutions. That way, by the time the ship turns all the way around... we've already figured out what some of the issues are."*
>
> *KYLE BOWEN, PURDUE UNIVERSITY, USA*

One of the biggest effects mobile learning is likely to have is to blend and blur the traditional boundaries between informal and formal learning. This is due to the personal nature of the technology and the cultural expectations as to how such technologies are used. However, as Vavoula and Sharples (2008) point out, such blurring of boundaries is not necessarily a bad thing. Seeing informal and formal learning as completely separate leads to the advocates in each camp only to see the weaknesses in the other. Instead, it makes more sense to explore the elements of formality and informality present in all learning situations. Citing Colley, et al. (2003) they advocate four groups of attributes to consider:

- Learning process
- Location and setting
- Learning purposes
- Learning content

Conceptualising mobile learning as comprising of the interrelationship of these four elements is more productive, they claim, than applying a binary distinction between 'formal' and 'informal' learning.

A final thing to consider relating to culture is the various backgrounds from which both staff and students 'come to the table' and interact with one another. Cultural expectations, norms and barriers vary from country to country and between subgroups. It is imperative, therefore, that focus groups and consultations capture feedback from a cross-section of the institution's community.

## References

Futurelab (2004) Mobile Technologies and Learning report[39]

Vavoula, G.N. & Sharples, M. (2009) 'Challenges in Evaluating Mobile Learning' (in Traxler, J., Riordan, B., Dennett, C. (eds) Proceedings of the mLearn 2008 Conference (School of Computing and Information Technology, University of Wolverhampton, pp. 296-303)

[39] http://bit.ly/gipg3Z

# Sustainability

*JISC's Sustainability toolkit[40] is of particular relevance to the advice in this section.*

As the JISC Sustaining and Embedding Innovations Good Practice Guide notes, "Sustainability in innovation projects can be defined as embedding change as well as maintaining and enhancing project outcomes." This is achieved by:

- Changing people and culture.
- Working with existing institutional structures to influence organisational change.
- Embedding or aligning with strategies, processes, systems, initiatives and services.
- Creating usable tools and resources (as part of project outputs) to meet stakeholder needs.
- Developing commercial and open approaches to sustaining and embedding innovation.

Implementing a mobile learning initiative is, at its most basic level, just another change management procedure. It is important, for example, to project manage the initiative effectively, take account of Cultural Considerations, and obtain senior level buy-in. In order to make the change sustainable, however, there must be some kind of momentum to the project, something that keeps it going beyond the initial flurry of excitement and embeds the innovation across the institution.

*"It's worth thinking hard about the implications of what you're going to do in the longer term, rather than the short term - because this is technology that's very much here to stay."*

***Tim Fernando, University of Oxford***

*http://youtu.be/lf4HT24gzAU*

Mobile learning is a many-headed hydra. Whilst this can be useful when trying to align funding for mobile learning initiatives with funding opportunities and institutional priorities, it can lead to issues because of the sheer number of stakeholders and interested parties there are likely to want to be involved. 'Sustainability' means different things to different groups: to finance and marketing teams the focus is upon cost/benefit issues; to IT personnel it is about keeping systems up-to-date; and to academic staff and students it is about the technical systems remaining relevant to desired pedagogical (and social) outcomes.

[40] http://www.jisc.ac.uk/sustainabilitytoolkit

The ways that we approach designing systems, workflows and learning opportunities need to evolve as the metaphors and symbols we use in everyday life change. Take, for example, the symbol used next to a long string of numbers to indicate a telephone number. Often, it is a rotary telephone with the receiver placed on top - something that many university students may never have seen or used in practice. In a similar way, conceptually-speaking, we use frameworks from one area and apply it to another: VLEs and Learning Platforms become glorified filing cabinets, for example. As Vavoula and Sharples (2008) draw attention to, "these 'borrowed' frameworks and tools might no longer be adequate" as mobile learning is not just "learning that is facilitated by mobile technologies" but involves "processes of coming to know through conversations and explorations across multiple contexts" (Vavoula & Sharples, 2008, p.1). The Frameworks for mobile learning section may be able to help your institution with this.

> *"As the individual and organisational use and awareness of the benefits of mobile learning increases there needs to be a parallel change to learning design and pedagogy to make the most of these opportunities. This often starts with an assumption that the same content and activities developed for the VLE and larger screen devices will work just as well on smaller mobile devices. Aside from any technical incompatibilities there's clearly a big difference in terms of teaching and learning activity between what works on 7-inch+ screens and what's realistic on smaller mobile phones. "*
>
> ***RON MITCHELL***

Using metaphors and similies when introducing mobile learning initiatives can be a powerful way to leverage adoption. Care must be taken, however, to ensure that these conceptual frameworks are updated along with additional features and possibilities.

It is a fairly straightforward task to design mobile learning initiatives that focus upon administrative functions and pop quizzes. It is a different matter to design mobile learning initiatives that focus on deep learning and rich interaction. Doing the latter requires a commitment on the part of several stakeholders, not least academic staff. As John Fairhall, Mobile Technologist at the University of Bradford (see Snapshot) notes, it can be very difficult to convince a lecturer to spend time on mobile learning content "when the majority of their students don't have a mobile to use it."

Leveraging the provision already available through external providers is something identified in the Quick Wins section and removes a potential barrier: internally-developed systems and software need a business justification, but this can be difficult to obtain without evidence of need. If staff start using something that is provided as a matter of course with, for example, the institutional VLE or e-Portfolio system, it is a low-risk and low-cost way to investigate potential uses.

The challenge, as Futurelab (2004, p.5) point out, is "to discover how to use mobile technologies to transform learning into a seamless part of daily life to the point where it is not recognised as learning at all." The same is true at the administrative end of the spectrum; using a mobile device to access information quickly and efficiently should become second-nature to staff and students alike. Achieving this involves a great deal of awareness-raising and hand-holding as to what is possible and desirable when using mobile devices.

*"The CAMEL (Collaborative Approaches to the Management of E-Learning) methodology was adopted for CPD as MoLeNET brought new dimensions for a large number of colleagues within the College. A collaborative non-judgemental approach was required in order to allow colleagues to learn from each other as the use of m-devices increased across a diverse number of curriculum areas."*

***DAVE PICKERSGILL, SHEFFIELD COLLEGE***

Taking a collaborative approach to implementing change pays dividends, as Dave Pickersgill from Sheffield College discovered (see quotation to right). Once staff and students are aware of the potential benefits of mobile learning and senior management buy-in has been achieved, using the advice in the Sustaining and Embedding Innovations Good Practice Guide and CAMEL methodology infoKit is likely to lead to a more sustainable mobile learning initiative.

*JISC infoNet's CAMEL methodology infoKit[41] may be of help when thinking through these issues.*

[41] http://www.jiscinfonet.ac.uk/camel

# Pedagogy

Image CC BY-NC *tim caynes*

## Frameworks for mobile learning

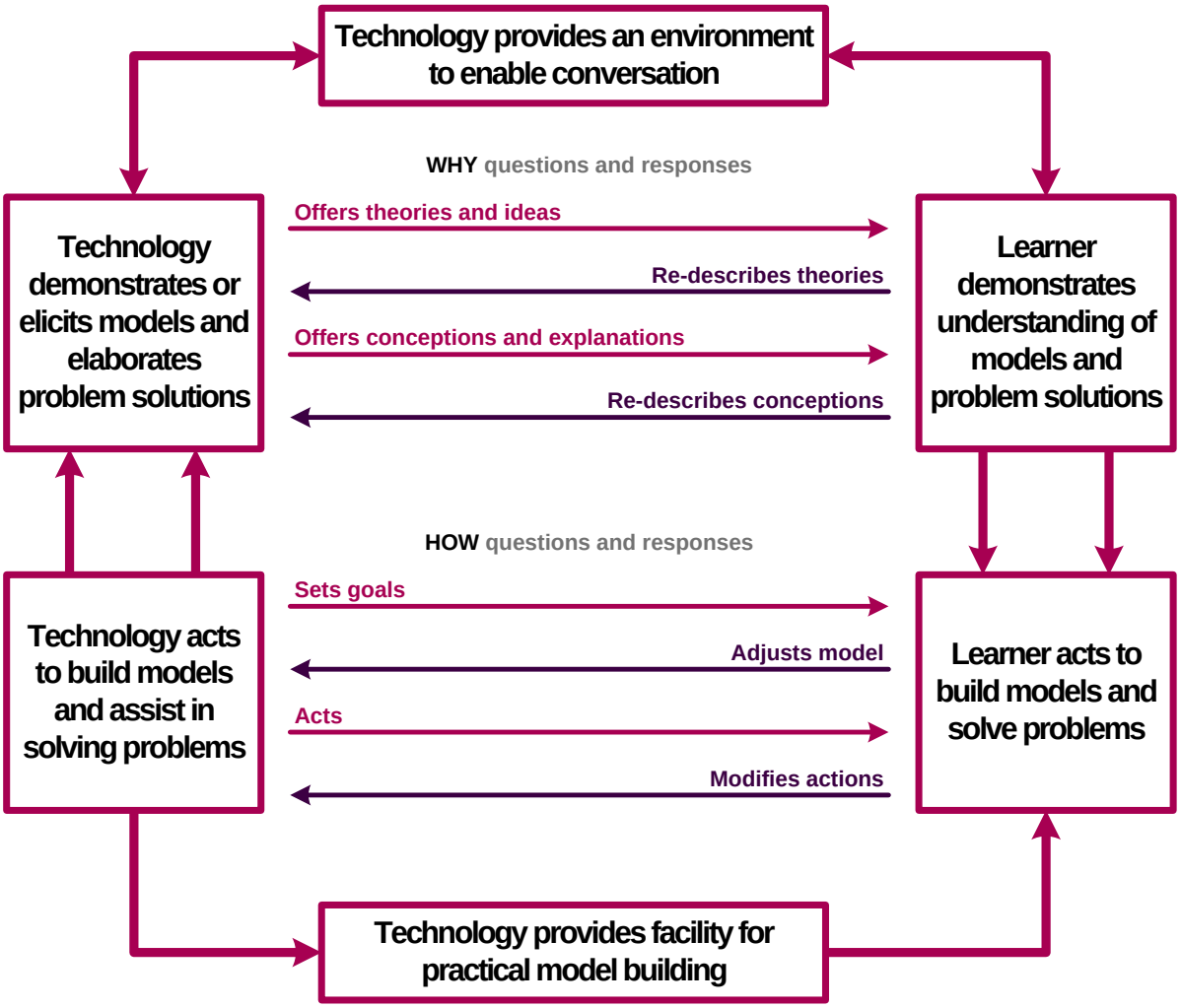
In order to move from academic theorising about mobile learning to operational and successful use frameworks are necessary. There are a variety of such frameworks and, before introducing several which educational institutions may find useful, it is worth recapping a Futurelab overview from 2004 outlining six broad theory-based categories of activity. Knowing what it is that's driving the change you want to see enables successful evaluation of mobile learning initiatives:

- **Behaviourist** - activities that promote learning as a change in learners' observable actions
- **Constructivist** - activities in which learners actively construct new ideas or concepts based on both their previous and current knowledge
- **Situated** - activities that promote learning within an authentic context and culture
- **Collaborative** - activities that promote learning through social interaction
- **Informal and lifelong** - activities that support learning outside a dedicated learning environment
  and formal curriculum
- **Learning and teaching support** - activities that assist in the coordination of learners and resources for learning activities.

Whilst some initiatives may see mobile learning as a way to foster collaborative interactions, others may foreground more behaviourist approaches. It is possible, of course, to blend several categories of activity (although this may make the initiative more difficult to evaluate).

## Laurillard (2002) - A Conversational framework for the effective use of learning technologies

For categories of activity that can be described as Constructivist, Situated, Collaborative and/or Informal, Laurillard's Conversational Framework may be appropriate:




The main roles of mobile technology in supporting the 'conversational learning' promoted by Laurillard are therefore:

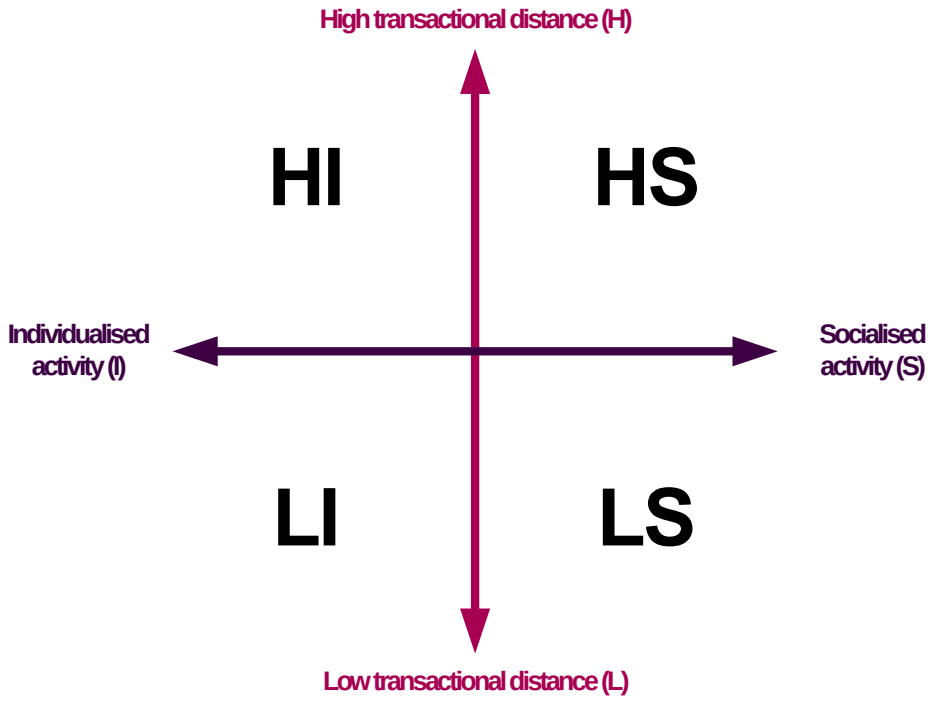
- providing an environment to enable conversation
- enabling learners to build models in order to solve problems

Whereas previous applications of Laurillard's framework may have been static and, perhaps, VLE-based, mobile learning enables this type of learning to be both technology-mediated

and contextual. For more on Laurillard's Conversational Framework, please see her book *Rethinking University Teaching*[42].

## Park (2011) - Pedagogical Framework for Mobile Learning

For those institutions looking for an alternative focus, Park's (2011) pedagogical framework for mobile learning is a way of understanding how 'transactional distance' and the 'social' nature of an activity can be mapped against one another. The former is defined as the 'cognitive space' between individuals whereas the latter is to what extent an activity involves interaction with others in order to be completed successfully:



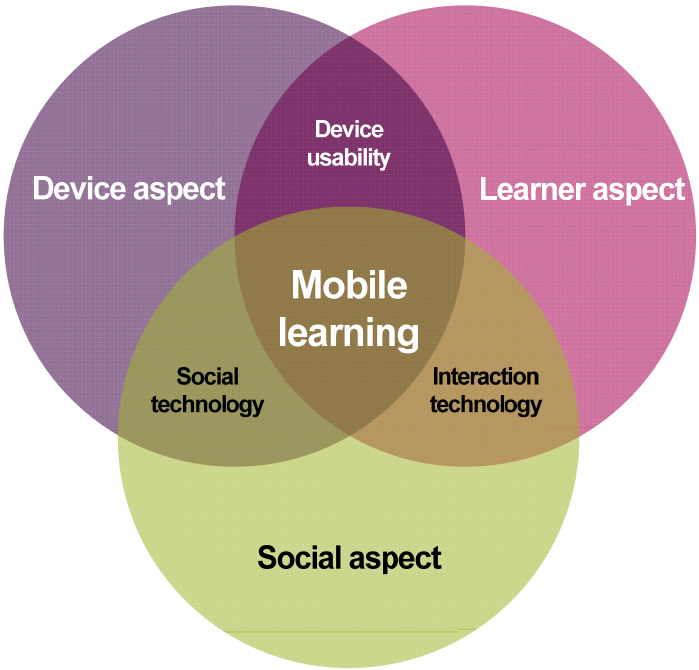

Park's pedagogical framework allows academics and institutions to plan for the type of learning and teaching experiences that may work well in their particular context. Park gives each element a code - with H standing for high transactional distance, L for low transactional distance, S for high social interaction and I for low social interaction.

An HS approach, for example, allows for high transactional distance and high social interaction with peers. This can be appropriate at any level of education, but may be more appropriate with learners who already have expertise in a given area. An LI approach, on the other hand, would be closer to a traditional experience for learners, with highly-structured and with (mostly) individual interaction with a single instructor.

[42] http://bit.ly/rbKfQU

## Koole - A Model for Framing Mobile Learning (2009)

A more holistic framework for mobile learning comes with Koole's FRAME model. This consists of a three-circle Venn diagram comprising the Learner aspect (L), the Social aspect (S) and the Device aspect (D). Taking two or more of these together at the point at which the circles overlap in the Venn diagram:




Koole provides criteria for each of the sections:

- Device Aspect
- Learner Aspect
- Social Aspect
- Device Usability
- Interaction Technology
- Social Technology
- Mobile Learning

Mobile learning is therefore a combination of the interactions between learners, their devices, and other people. Koole also provides a helpful checklist for institutions looking to adopt mobile learning, including the following questions.

In a mobile learning system, have you considered:

1. how use of mobile devices might change the process of interaction between learners, communities, and systems?
2. how learners may most effectively use mobile access to other learners, systems, and devices to recognize and evaluate information and processes to achieve their goals?
3. how learners can become more independent in navigating through and filtering information?
4. how the roles of teachers and learners will change and how to prepare them for that change?

These questions enable the mobility of the learner rather than the device to be at the forefront of the mobile learning initiative.

> *Mobile learning provides enhanced collaboration among learners, access to information, and a deeper contextualization of learning. Hypothetically, effective mobile learning can empower learners by enabling them to better assess and select relevant information, redefine their goals, and reconsider their understanding of concepts within a shifting and growing frame of reference (the information context).*
>
> ***KOOLE (2009)***

## References

Futurelab (2004) Mobile Technologies and Learning report[43]

Koole, M.L. (2009) 'A Model for Framing Mobile Learning', in Ally, M. (ed.), *Mobile Learning: Transforming the Delivery of Education and Training*, Edmonton, 2009, p.38)

Park, Y. (2011) 'A Pedagogical Framework for Mobile Learning: Categorizing Educational Applications of Mobile Technologies into Four Types' (*The International Review of Research in Open and Distance Learning*, 12(2), February 2011)

Wingkvist, A. & Ericsson, M. (2010) 'A Framework to Guide and Structure the Development Process of Mobile Learning Initiatives' (in Montebello, M., et al. *mLearn 2010: Conference Proceedings*, 2010)

[43] http://archive.futurelab.org.uk/resources/publications-reports-articles/literature-reviews/Literature-Review203

## Learning and teaching considerations

Once learners have devices and the institutional support structures are in place (see the Implementation section) the question remains:
*What's different about mobile learning?*

As the quotation to the right from Prof. John Traxler makes clear, mobile learning presents something of a problem for educational instutitons. Whilst the potential of mobile devices for learning is huge, questions remain as to their value for teaching. This subtle tension between the affordances of mobile learning and the constraints of established practice means that, as mentioned throughout this infoKit, mobile learning can serve as a 'Trojan horse' for wider institutional changes.

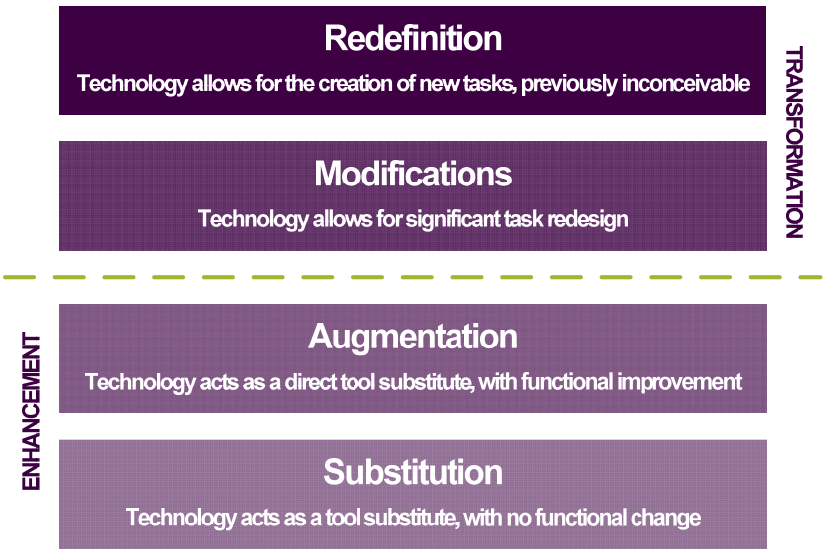
> *[M]obile learning in a wider TEL [Technology-Enhanced Learning] context is the whole problem. It no longer has anything to do with that or institutional contexts. TEL is top-down/centre-out/we-take-the-lead; we are in a situation that's outside-in/bottom-up/they-take-the-lead."*
>
> ***PROF. JOHN TRAXLER, UNIVERSITY OF WOLVERHAMPTON***

One of the biggest changes that mobile learning affords is to blur the previously distinct line (and set of practices) between distance learning and face-to-face (F2F) learning. Park's (2011) framework for mobile learning goes some way to helping map out the different types of ways learners can interact with instructors and one another. However, a more holistic approach such as Laurillard's Conversational Framework or Koole's FRAME model may be more appropriate. See Frameworks for mobile learning for more details.

In terms of the specific details of the type of learning activities that can be undertaken with mobile learning, this will vary from educator to educator and discipline to discipline. "Mobile learning technologies clearly support the transmission and delivery of rich multimedia content" states Prof. John Traxler (2009), but they "also support discussion and discourse, real-time, synchronous and asynchronous, using voice, text and multimedia." Just as different disciplines lend themselves to different styles of teaching, so different mobile learning approaches will be necessary.

Before giving examples of the types of mobile learning activities that can be undertaken by learners it is worth pointing out the ways in which such activities should be reconceptualised to take account of what is possible. The SAMR model[44] by Ruben Puentedura is not so much a framework as a taxonomy of types of learning activity:

[44] http://www.hippasus.com/rrpweblog/archives/000049.html




Conceptualising technology-enhanced learning activities with the help of the SAMR model helps avoid shallow uses of mobile devices for learning. For example, accessing a pre-existing VLE or Learning Platform through a smartphone may count as mobile learning but, on Puentedura's model, constitutes 'Substitution', the lowest form of technology-enhanced learning.

As examples from JISC publications demonstrate, mobile learning can take on a variety of forms and work in a number of contexts. Case Study 5 in *Effective Practice in a Digital Age* (p.28-9), for example, demonstrates the ways in which learning is supported in authentic environments at Southampton Solent University through the use of iPod Touches. Likewise, Case Study 6 in *Effective Assessment in a Digital Age* (p.40-41) shows how feedback can be enhanced by being given and received via mobile devices. Case Studies 2, 7, 8 and 9 in *Emerging Practice in a Digital Age* feature examples of mobile learning, with Case Study 7 showcasing the work of ALPS (see Snapshot) where students on placement can have access to resources, support and assessment tools.

Further examples can be found by following the links in the sidebar underneath 'Case Studies' to the examples from ESCalate, the MoLeNET programmes and the Excellence Gateway.

*New technologies, new pedagogies: Mobile learning in higher education*[45]*, a free book created by members of staff at the University of Wollongong (Australia) is particularly relevant to this section.*

[45] http://ro.uow.edu.au/edupapers/91/

## References

JISC (2009) *Effective Practice in a Digital Age*[46]

JISC (2010) *Effective Assessment in a Digital Age*[47]

JISC (2011) *Emerging Practice in a Digital Age*

Traxler, J. (2009) 'Current State of Mobile Learning' (in Ally, M. (ed.), *Mobile Learning: Transforming the Delivery of Education and Training*, Edmonton: AU Press)

# The importance of context

Whilst context has always been an important factor in TEL (Technology-Enhanced Learning) it is of central importance with mobile learning. As Wingkvist and Ericsson (2010) note, “if the context is not understood well enough, the mobile learning system will not survive beyond the scope of the initiative and the project’s enddate.”

Contexts, however, are not static but fluid and dynamic with important repercussions for both formal and informal learning experiences. In this section we shall look at how contexts have, and are continuing to change, ways in which those contexts can be conceptualised, and (most importantly) how institutions and learners can take advantage of various contexts for learning.

## Changing contexts

The growth of personal mobile technological devices has been staggering. 91% of the UK adult population own or use a mobile phone (Ofcom, 2011) with the overall number of mobile devices exceeding the total population. Indeed, Ofcom has characterised the UK as a nation addicted to smartphones[48]. Whilst such devices were available previously, the move from analogue to digital and the subsequent dramatic drop in price has led to an explosion in adoption. It is now extremely unusual for someone not to carry a mobile device of some kind.

> *As revealed by JISC research, the social context in which learning takes place has also changed, and in ways that were not foreseen in the early part of the 21st century. Learners are increasingly dependent on technology to help them fit learning into their complex, demanding lives. Ownership of personal technologies – from computers to mobile devices – is now pervasive, and use of the internet, including Web 2.0 technologies, is commonplace."*
>
> ***JISC (2009)***

[46] http://www.jisc.ac.uk/publications/programmerelated/2009/effectivepracticedigitalage.aspx

[47] http://www.jisc.ac.uk/digiassess

[48] http://media.ofcom.org.uk/2011/08/04/a-nation-addicted-to-smartphones/

This context of having a device available for personal use at any time changes things significantly for learning and teaching. Indeed, “mobile, personal, and wireless devices are now radically transforming societal notions of discourse and knowledge”. They are “responsible for new forms of art, employment, language, commerce, deprivation, and crime, as well as learning” (Traxler, 2007, p.10). The evolution of such devices, from simple voice and SMS text messaging functionality to ‘smartphone’ functionality with high-speed internet access has meant that “the main barriers to developing... new modes of mobile learning are not technical but social” (Sharples, 2010, p.4).

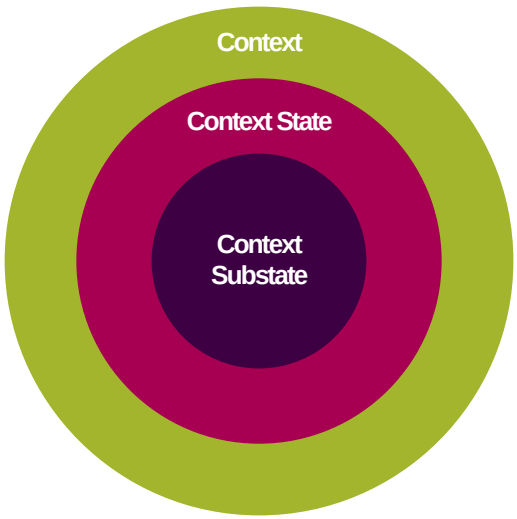
Whereas, previously, knowledge was physically present in places such as libraries with institutions having very formal lines of communication, the growth in use of mobile devices and social networking has changed this dramatically. With a lowered barrier to social interaction and knowledge through technology, students are able to self-organise as well as access relevant information more quickly and efficiently than ever before.

## Understanding context

Context is a word that is used informally in a variety of ways. Within mobile learning it is used extensively and is, perhaps, most helpfully explained by reference to a diagram, derived from the work of Lonsdale (2004) and Sharples (2010).

> *Context can be defined as “the formal or informal setting in which a situation occurs; it can include many aspects or dimensions, such as environment, social activity, goals or tasks of groups and individuals; time (year/month/day).*
>
> ***BROWN (2010)***

Prof. Mike Sharples compares context to an ever-playing movie, “a continually unfolding interaction between people, settings, technologies and other artefacts” (Sharples, 2010). The following ‘context hierarchy’ may be useful in understanding how the different constituent elements interact:




The outer circle constitutes the wider Context, which Lonsdale, et al. (2004) call the “interaction over time between people, settings, technologies and artefacts”. This is followed

by the middle circle (the 'Context State') comprising "elements from the learning and setting at one particular point in time, space or goal sequence." Finally, the inner circle ('Context Substate') is made up of "elements from the learner and setting that are relevant to the current focus of learning and desired level of context awareness."

Whereas some elements of 'context' are reasonably static, there are more rapidly-changing elements - those which Lonsdale, et al. term 'Context Substate'. These can change from learning experience to learning experience and therefore fluctuate even over the period of a module or semester. Wrapped around that comes the 'Context State' which may be an academic department or faculty, and finally the 'Context' may be the wider university or college. Learners and staff operate across these contexts.

As Glahn, et al. (2010) point out, mobile learning allows both a high degree of personalisation as well as enabling a much more social method of learning. It therefore, rather uniquely, allows for learning within and across contexts.

## Taking advantage of contexts for learning

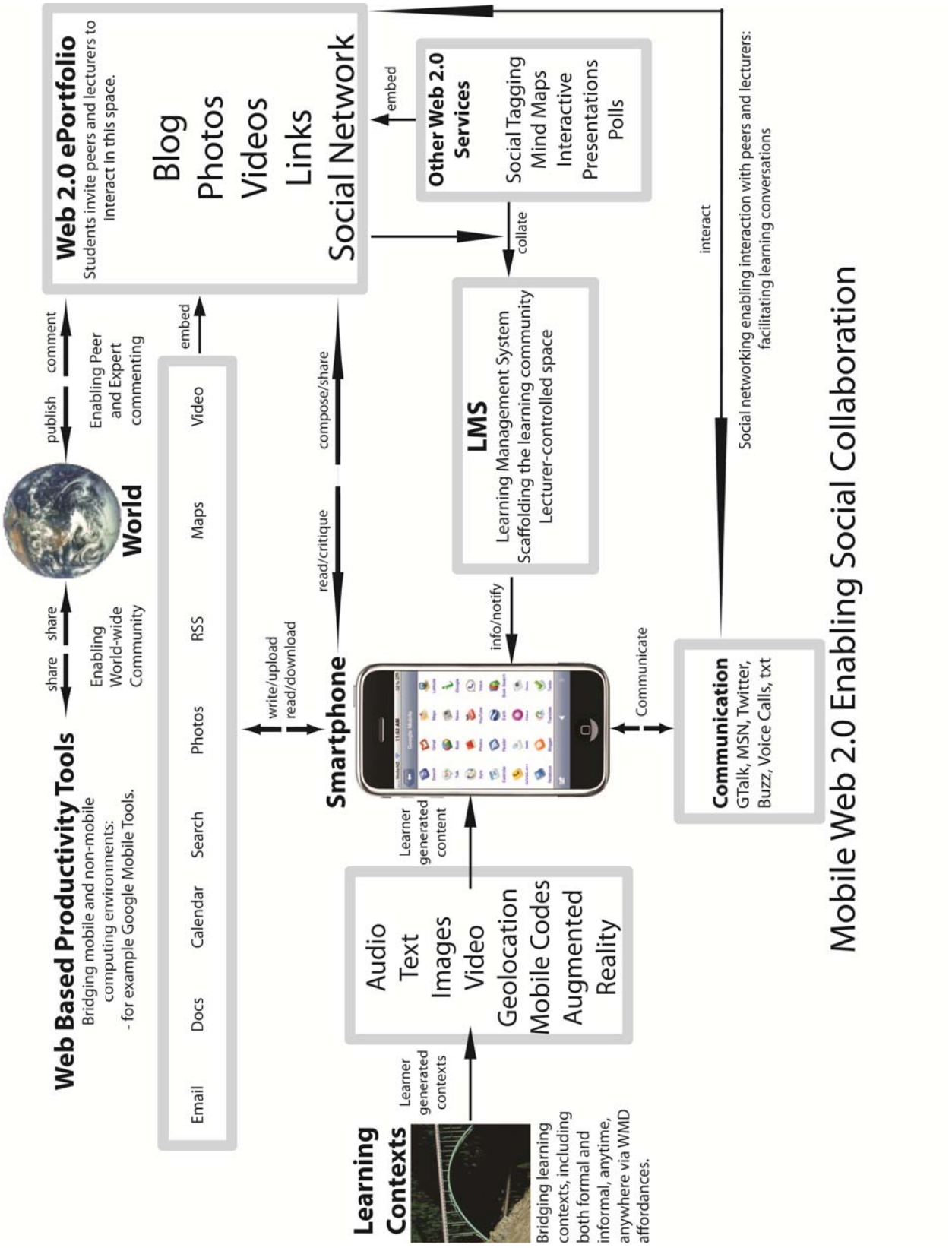
As Tim Fernando explains (see video to the right), with mobile learning the various out-of-classroom contexts mean that the speed at which communications take place or knowledge is accessed is all-important. Whereas traditional TEL interactions involve a significant period of time usually in one pre-booked space, mobile learning interactions are often the inverse of this. Reasonably low-tech and established technologies such as podcasts and pervasive instant message conversations mean that learning can take place "just in time, just enough and just for me" (Rosenberg, 2001).

*"The user interfaces and the speed at which the interactions are performed have to be really well-tuned... Quite often [learners] will be in a social situation... or just need to be getting somewhere quickly."*

***Tim Fernando, University of Oxford***

*http://youtu.be/avANeEAI2Vs*

One way in which modern mobile phones with internet access ('smartphones') can be used as part of institutional contexts is demonstrated by Thom Cochrane of Unitec, New Zealand (see next page):


Mobile Web 2.0 Enabling Social Collaboration
Web 2.0 ePortfolio
Students invite peers and lecturers to interact in this space.
Blog
Photos
Videos
Links
Social Network
embed
Other Web 2.0 Services
Social Tagging
Mind Maps
Interactive Presentations
Polls
collate
LMS
Learning Management System
Scaffolding the learning community
Lecturer-controlled space
interact
Social networking enabling interaction with peers and lecturers: facilitating learning conversations
publish
comment
Enabling Peer and Expert commenting
World
share
share
Enabling World-wide Community
embed
Web Based Productivity Tools
Bridging mobile and non-mobile computing environments:
- for example Google Mobile Tools.
Email
Docs
Calendar
Search
Photos
RSS
Maps
Video
write/upload
read/download
read/critique
compose/share
Smartphone
info/notify
Communicate
Communication
GTalk, MSN, Twitter, Buzz, Voice Calls, txt
Learner generated content
Audio
Text
Images
Video
Geolocation
Mobile Codes
Augmented Reality
Learner generated contexts
Learning Contexts
Bridging learning contexts, including both formal and informal, anytime, anywhere via WMD affordances.

This diagram, reminiscent of Laurillard's Conversational Framework (see Frameworks for mobile learning) shows how the smartphone, and therefore by implication, the learner, can be placed at the centre of a wider social system that allows interaction with academic staff, mentors and peers. Cochrane (2010) found that "when modeled by their lecturers... students in the projects developed a strong sense of community and integrated the technologies into multiple learning environments." In addition, he found that they were "also critiquing and collaborating with their peers." Mobile learning allowed the learning conversation to be focused on learners rather than teachers as the technologies were more personal and personalised. It is the potential for mobile learning to "bridge pedagogically designed learning contexts, facilitate learner generated contexts, and content... while providing personalisation and ubiquitous social connectedness" that makes it different and "sets it apart" from more traditional learning environments.

This is backed up by the findings of Kenny, et al. who comment that effective mobile learning is "defined by the convergence of the device usability, learner, and social aspects to extend their impact beyond their natural boundaries." This "affords enhanced collaboration... ready access to information, and a deeper contextualisation of learning" (Kenny, et al., 2009).

It is because of this ability to bridge contexts of learning that Dr. Mike Short (Vice President of public affairs at Telefonica O2 Europe) believes that 'contextual learning' may be a better term than mobile learning as "we need different tools for different lessons and different learners". Using the term 'contextual learning' he believes demonstrates that the focus is on a "more personalised context that is not tied to one technology, one network, one device, or one eLibrary."

For now, however, 'mobile learning' is a convenient term to describe enhanced educational experiences in a variety of contexts that use mobile devices.

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[49] http://www.jisc.ac.uk/publications/programmerelated/2009/effectivepracticedigitalage.aspx

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[50] http://media.ofcom.org.uk/facts

# Technical Considerations

*Image CC BY-NC mk**

## Technical considerations

Mobile Learning is a fast-moving field with device lifecycles becoming ever shorter. This section looks at some of the general principles behind the technical roll-out of a platform or 'ecosystem' for mobile learning.


*"People... don't like going out of their way to report problems."*

***Tim Fernando, University of Oxford***

*http://youtu.be/qVFOxpAmmGU*

### Important decisions

There are two main decisions when deciding on the approach for institution-centric mobile learning experiences. These decisions should flow not from technical possibility but from some of the considerations mentioned in the Strategy and Pedagogy sections of this infoKit. The first decision is whether the mobile devices used will be provided by the institution or by the students. As we will discover in the Cost/benefit section it is increasingly the case that going down the road of institutionally-provided devices is undesirable in all but the most specialised of cases.

The second technical decision to be made is on the type of interface that is presented to the audience for the mobile learning initiative. This, of course, needs to take into account

whether the audience is closely identified (e.g. a particular group of students) or diverse (e.g. the whole staff and student population). These considerations do not map one-to-one onto the following options but should nevertheless guide implementation.

*JISC CETIS has a useful briefing paper[51] on mobile web apps.*

There are broadly three options for mobile learning 'apps':

- Native
- Web
- Hybrid

The native app is delivered via the app store pertaining to the particular device. This means, for example, that to cover the bases of the main types of smartphones that are currently on campuses, native apps would have to be developed for iOS, Android and BlackBerry devices. The cost in terms of financial outlay and time commitment to do this is prohibitive for all but the largest of institutions. CampusM from Ombiel[52] is an example of a popular native app available across various smartphone devices.

The web app can be accessed via any device that can connect to the internet. There are many ways to do this, including providing an alternative mobile-friendly CSS file for existing content, or building a new portal. If the latter is chosen it is important that it is standards-compliant, using the guidance of the World Wide Web Consortium[53] to ensure cross-platform, and future, compatibility. Bradford University's BradUni.mobi[54] site is a good example of a standards-compliant, mobile-friendly portal.

The advantages of native apps include tighter integration with the various specific features mobile devices as well as offline caching of content. The advantages of web apps, on the other hand, include instant updating of content and lower costs. Hybrid apps, therefore, promise to be the best of both worlds. The native app is a 'shell' which is available through the various app stores and is updated when functional improvements are necessary. However, the content - the information, links, resources and communication opportunities - are web-based and can be updated without updating the whole app. An example of this innovative approach would be JISC Regional Support Centre South East's iOS and Android apps[55] which give access to the latest news, events and funding opportunities from the service.

[51] http://blogs.cetis.ac.uk/mark/2011/03/02/mobile-web-apps-a-briefing-paper/

[52] http://ombiel.com/

[53] http://www.w3.org/

[54] http://www.braduni.mobi/

[55] http://www.rsc-southeast.ac.uk/about/mobile-apps.html

## The Basics

Before building apps and rolling out services to staff and students it is important to have in place those things that will enable a mobile learning ecosystem to flourish. There are three such basics which any institutions should consider as 'standard':

1. Wifi coverage
2. Open data streams
3. A problem-solving system

The received wisdom up until recently has been to 'flood' campuses with wifi access. In other words, an institution could never have too many access points to provide network and internet access to staff, students and, on occasion, the general public. That position is changing, however. Not only have financial constraints meant a re-evalutation of this approach but evolutionary improvements in wifi technologies, along with a more nuanced understanding of when and where students use wifi-enabled devices, mean that such a blanket policy looks outdated.

> *"Our network team have taken a measured approach with the wireless roll out, providing hot spots in all the main areas where staff and students gather or work rather than blanket coverage everywhere. This enables us to provide a cost effective wifi service and minimise the number of access points that are installed in areas where there is no wireless requirement."*
>
> ***JOHN FAIRHALL, UNIVERSITY OF BRADFORD***

Opening data streams, or more precisely exposing systems through web services, is also important as it allows any apps that are developed to easily 'hook into' information available to the institution. Examples of these include RSS feeds, the source XML for which can be used on a variety of platforms including web pages, apps and information screens around campus.

Finally, as Tim Fernando points out in the video at the top of this page, people do not like going out of their way to report problems. A lightweight but context-relevant problem-reporting system may not capture every detail about a particular problem but it would, at least, identify the problem and (often) the affected user. Having partial information about a problem that could be frustrating many users of a service is better than having no information on it at all.

## Some guiding principles

Whilst strategic and pedagogical decisions should always guide technical deployment of hardware and software for mobile learning there are, nevertheless, some guiding principles that may help guide those looking after the technical considerations. Upside Learning[56] has suggest five key mobile learning implementation tips:

1. KISS (Keep It Short and Simple)

[56] http://www.upsidelearning.com/blog/index.php/2010/03/01/five-mobile-learning-implementation-tips/

2. Aim for low information density
3. Use multimedia sparingly
4. Make use of built-in features for collaboration
5. Provide tools as well as content

Their checklists focus on usability as well as the technical and functional aspects of the mobile learning experience - something that, as explained in the section on the importance of context, it is vital to bear in mind. The Open University do a good job of providing support to users of their mobile learning offerings through their mobile portal, learner support blog and apps page (see box to the right). Such a 'joined up' approach requires buy-in from across the institution, as set out in the Strategy section.

*The Open University's Mobile Portal[57], Apps page[58] and Mobile Learner Support blog[59] may interest and inspire those institutions getting to grips with the technical side of mobile learning.*

## Accessibility

One of the least touted features of mobile learning is the amount of accessibility it affords learners. Whilst some, quite rightly, point out the potential for mobile learning to widen the 'digital divide' the amount of personalisation devices enable can be liberating for some learners. The fact that learners are using devices they have chosen and are familiar with means they are in a context with which they are comfortable. Although there is no such things as the 'perfectly' accessible device, learners are likely to have developed workarounds if they know the device's shortcomings.

As John Fairhall from the University of Bradford comments, some smartphones such as the Apple iPhone have "amazing accessibility features" built into them, of which should be made a "bigger deal." However, he points out, "it's important that you don't disadvantage students... unless you're going to ensure everyone's got an appropriate mobile device you need to make sure there's an equivalent PC experience." Although the iPhone has a high level of accessibility at the operating system level, it should be noted that this is not necessarily true of other platforms such as Android and Windows 7. In addition, specific apps may not be accessible to some learners as the text-to-speech functionality may have been neglected by the app developer.

Planned appropriately (see Strategy), mobile learning experiences can be inclusive and designed to be 'accessible' in both the ways outlined above. The issues with the first type of

[57] http://www8.open.ac.uk/about/teaching-and-learning/mobile/

[58] http://appstore.open.ac.uk/

[59] http://www.open.ac.uk/blogs/mLearn/index.php

accessibility tend to be cultural and financial, whereas with the second type they are likely to be technical (for example the font cannot be enlarged) or pedagogical (to do with the overall learning design). For advice on the latter, JISC TechDis has a wide range of advice and guidance on designing for more inclusive mobile learning. Its model of accessible m-learning asks four important questions:

1. Does it support me? (accessible content)
2. Can I work it? (accessible interface)
3. Do I value it? (cultural capital, using 'cool tools')
4. Does it engage me? (accessible task)

JISC TechDis' GoMobile![60] and Upwardly Mobile[61] resources (2009) provide guidance on a range of inclusion opportunities and accessibility issues specifically related to mobile learning. It also has more specific advice on technologies such as e-books[62] and helping those with disabilities choose a mobile device[63]. The JISC Mobile and Wireless Technologies Review[64] (2010) also includes some examples of accessible mobile learning. In addition, the considerations mentioned in Accessibility and mobile and wireless technologies[65] within JISC's Innovative Practice with e-Learning (2005) remain relevant.

## Cost-benefit

> *"The Hawthorne effect is a form of reactivity whereby subjects improve or modify an aspect of their behavior being experimentally measured simply in response to the fact that they are being studied, not in response to any particular experimental manipulation."*
>
> ***WIKIPEDIA***

Weighing up the cost/benefit ratio of learning outcomes can be a problematic and tricky business. Whilst quantitative elements can be measured such as the frequency that a resource is accessed by learners, the number of people connecting to wireless access points, or the cost of making available a mobile app, these do not tell the whole story. The qualitative elements of mobile learning, the ways in which learners can interact with resources, tutors and peers, cannot be recorded easily and holistically through the use of numbers. It is important that institutions, whilst paying attention to issues surrounding sustainability issues, value the 'softer' benefits that mobile learning affords.

[60] http://www.jisctechdis.ac.uk/techdis/resources/detail/goingdigital/go_mobile

[61] http://www.jisctechdis.ac.uk/UpwardlyMobile/

[62] http://www.jisctechdis.ac.uk/techdis/resources/detail/learnersmatter/Good_Practice_Guidance_for_Library_and_Information_Professionals

[63] http://www.jisctechdis.ac.uk/techdis/pages/detail/floating_pages/Buttons_bells_whistles

[64] http://mobilereview.jiscpress.org/

[65] http://www.elearning.ac.uk/innoprac/challenge/accessibility.html

Although any intervention is liable to the Hawthorne effect[66], one way to measure the success of a mobile learning initiative is to track assessment scores, following this up with a series of focus groups or interviews with learners. However, even this can be problematic. As Vavoula and Sharples comment, "although a learning experience can be a well defined event with a start and a finish, learning is an ongoing, lifelong process of personal transformation." As such, they argue, it "requires longitudinal, historical assessment" (Vavoula & Sharples, 2008, p.4).

Focusing on measures of 'intrinsic motivation' through attitudinal surveys can be a reliable predictor of the conditions in place for effective learning. Academics, prompted to focus on students attitudes and satisfaction (particularly in reference to the National Student Survey) are likely to evolve new, more student-centred assessment procedures. Doing so acknowledges that it is "not possible to determine in advance where the learning may occur, nor how it progresses or what outcomes it produces" (Ibid., p.3).

Whilst it can be difficult to agree upon how mobile learning should be evaluated (see Evaluation) there is an increasing consensus on one thing: that learners should bring their own devices. This view, often abbreviated to BYOD (Bring Your Own Device) is backed up with the following rationale:

- Smartphones, tablets and other mobile devices are expensive
- Mobile devices become outdated and (are perceived as) 'obsolete' more quickly than other equipment used for learning
- Students are increasingly likely to have a mobile device that contain functionality that can be used for learning


*"I think in the future we'll concentrate on providing content to the students because... most [students] already have some form of iPhone or BlackBerry anyway."*

***Gareth Frith, University of Leeds***

*http://youtu.be/ptVsmHwRY2E*

Dave Pickersgill of Sheffield College comments that "'if each student has a mobile phone, each worth £100, this equates to £100,000 worth of hardware available for use on a daily basis in the College." He believes that "no school or college can afford to ignore the uses and benefits such a large amount of kit" can bring. Prof. Mike Sharples, who has been described as the godfather of mobile learning[67], agrees, claiming that "there would appear to be no obvious case for institutions to provide students with mobile devices when most already own laptops and smartphones." He points out that institutionally-provided devices would be obsolete within two to three years. Thinking outside of the box, therefore, Sharples suggests that "a strategy could be to progressively replace desktop machines with rooms for student laptops". The money saved could be used, by

[66] http://en.wikipedia.org/wiki/Hawthorne_effect

[67] http://www.handheldlearning.co.uk/content/view/55/1/

negotiating with a supplier, to provide discounted equipment on campus, "with the supplier providing free technical support to students."

Just as colleges and universities do no provide students with paper, pens and stationery items but expect them to be used, the time is coming when mobile devices will be another expected part of a student's toolkit. There are many ways for institutions to facilitate this but it does involve a shift in mindset.

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Vavoula, G.N. & Sharples, M. (2009) 'Challenges in Evaluating Mobile Learning' (in Traxler, J., Riordan, B., Dennett, C. (eds) *Proceedings of the mLearn 2008 Conference* (School of Computing and Information Technology, University of Wolverhampton, pp. 296-303)

## Overcoming barriers and finding enablers

*It is important to consider new initiatives in a holistic way. JISC infoNet's Change Management infoKit[68] is a useful primer for those new to implementing change in institutions and organisations.*

In any change management process there will be technical, procedural and cultural barriers. Often the technical and procedural barriers can be quantified and overcome through persistance whereas the cultural barriers can be multi-faceted and more problematic.

### Identifying barriers

In terms of mobile learning, there can be additional specific barriers to institutional adoption. Whilst using mobile devices may be popular and institutions may, to a great extent, be 'pushing at an open door' there are nevertheless barriers to adoption. Interviewees for this infoKit were keen to share their examples:

> *"The biggest barrier at the minute is still the percentage of students with appropriate devices – but we're getting there."* **(John Fairhall, University of Bradford)**
>
> *"Even though you still think of smart phones as becoming more common, there are still some barriers there for students... [T]hey don't like having to pay for stuff to be downloaded to their phones, because they're on tight budgets."* **(Keith Cole, Mimas)**
>
> *"It really seems to be that students don't consider mobile web apps to be true mobile apps, because you don't get them from the store. And so unless there's something actually in the store to download, they don't really think about it as a mobile app, and*

[68] http://www.jiscinfonet.ac.uk/infokits/change-management

*you kind of have to introduce them to it, kind of go out of your way to introduce it to them."* **(Kyle Bowen, Purdue University, USA)**

The ALPS project at the University of Leeds, referred to in the Snapshots section, had barriers to overcome in addition to those provided by institutions, as Julie Laxton explains (see video to right)

*"Gathering feedback from other professions or the service users... was very challenging for some of our professions."*

***Julie Laxton, University of Leeds***

*http://youtu.be/oHqgaX4Pcr8*

The Wikipedia page for MLearning[69] considers a number of technical and social reasons for barriers to mobile learning, including:

- Multiple standards, multiple screen sizes, multiple operating systems
- Conceptual differences between e- and m-learning
- No demographic boundary
- Potential disruption of students' personal and academic lives
- Tracking of results and proper use of this information

Barriers to mobile learning, as with any change management initiative are heavily context-dependent and will alter in terms of intensity as hardware and software change.

## Finding enablers

As with the barriers to institutional change and mobile learning initiatives in particular, finding the enablers that allow progress to be made differ depending upon context. There are, however, some ways of approaching mobile learning initiatives as well as ideas that can be gleaned from projects that have trod a similar path.

*JISC infoNet's CAMEL[70] model has been used successfully by The Sheffield College in relation to mobile learning. See the ALT Newsletter entry[71] and journal article[72] about their experiences.*

[69] http://en.wikipedia.org/wiki/MLearning

[70] http://www.jiscinfonet.ac.uk/camel

[71] http://newsweaver.co.uk/alt/e_article001395620.cfm?x=bfw3JjK,bdKfF4kB

Claudia Igbrude of the Dublin Institute of Technology, for example, reminds us that SMS text messaging "remains to some extent the lowest common denominator, especially as smartphone use... is not yet at 100%." "Every mobile phone," she points out, "can send and receive texts" and "can be used in scaffolding learning experiences, providing just-in-time learning using keywords."

Tony Bartley of Lowestoft College points out that institutions can use cloud services, "linking to services like Flickr[73], iPadio[74], Posterous[75], Google Docs[76] and the like." Students, he continues, "may already be using [these] anyway, and if not [they] are very easy and free to set up and can provide equally quick wins." Using free and low-cost cloud-based services can often mean that useful tools can "easily be demonstrated to students as easy gain, low cost options."

The following comprises some key barriers with associated enablers identified in the literature and by those interviewed in the course of putting together this infoKit.

| Group | Barrier | Enabler |
|---|---|---|
| **Senior management** | Cost | Cost savings due to fewer PC clusters<br>Improved targeting of information<br>Retention/recruitment |
| **Senior management** | Privacy | Start off with admin side of spectrum<br>Focus groups |
| **Teaching staff** | Distraction | Classroom management (FE)<br>Debate, backchannel and peer support (HE) |
| **Teaching staff** | Workload | Explore subject-based ways to engage staff<br>Use workshops to demonstrate how 'mobile first' can lead to better user outcomes |
| **IT staff** | Compatibility /security | Target key staff (e.g. Director of ITS)<br>Buy-in through finding solution to specified problem |
| **IT staff** | Functionality | Focus on lowest-common denominator<br>Consider two-tier approach (basic and advanced) |
| **Learners** | Disruption to personal life | Set guidelines for staff on engagement<br>Make policies opt-in whilst explaining benefits |
| **Learners** | Unfamiliarity | Don't assume students 'digital natives' - run workshops for learners<br>Consider making mobile learning part of induction activities |

[72] http://alt.conference-services.net/reports/template/onetextabstract.xml?xsl=template/ALTtextabstract.xsl&conferenceID=1613&abstractID=304142

[73] http://flickr.com/

[74] http://ipadio.com/

[75] http://posterous.com/

[76] http://docs.google.com/

## 10 steps to mobile learning adoption


Mobile learning, like any change initiative, involves different stakeholders playing a greater or lesser part. Whilst those who are responsible for the change (the Change Sponsor and Change Manager) should be well-acquainted with the entirity of this Mobile Learning infoKit, other stakeholders may need an overview of the process. As the Mimas snapshot demonstrates, working in partnership is critical.

The generic 10-step process outlined in the image above has been adapted from Gary Woodill's very detailed mLearning Road Map and is a useful overview as to how to successfully implement a mobile learning initiative:

1. Write mobile learning vision statement
2. Gather stakeholder requirements
3. Agree on scope
4. Obtain senior manager buy-in
5. Identify required content
6. Decide in-house or external development
7. Identify champions
8. Create and test beta content

9. Gain feedback and iterate offering
10. Roll out to wider group

After the initial mobile learning roll-out, consider:

- Constant updating of policies as challenges/opportunities arise
- Changing course as the mobile landscape changes
- Updating job roles and responsibilities as requirements and scope alter
- Providing ongoing training for all stakeholders

Ensuring that a mobile learning initiative is successful involves being able to answer the following questions:

- What is the learning problem you are trying to solve?
- What technology will you require?
- What skills will teachers/facilitators have to learn?
- What would be the cost of implementation?
- How can you facilitate acceptance?
- How will you measure success?

*(questions taken from Mobl21 article Implementing a mobile learning solution? Think ahead![77])*

[77] http://www.mobl21.com/blog/16/implementing-mobile-learning-solution

# Evaluation

Evaluating a change involving technology can be challenging for a variety of reasons, from the number of variables involved to the 'Hawthorne Effect' (explained in Cost/benefit section). For mobile learning the complexities surrounding evaluating the success of an initiative are often heightened because of the added difficulty of evaluating across various contexts. Vavoula and Sharples (2008) argue that "in order to establish, document and evaluate learning within and across contexts" it is necessary to analyse:

> *"A major task for educational evaluation is to identify and analyse learning within and across contexts. For mobile learning, the interest is not only in how learning occurs in a variety of settings, but also how people create new contexts for learning through their interactions and how they progress learning across contexts."*
>
> ***VAVOULA & SHARPLES (2008)***

- physical setting and layout of the learning space *(the 'where')*
- social setting *(who, with whom, from whom)*
- learning objectives and outcomes *(why and what)*
- learning methods and activities *(how)*
- learning progress and history *(when)*
- learning tools *(how)*

In order to be able to evaluate the effectiveness of a change management initiative it is important to have a baseline from which to work as well as clear success criteria. Whilst projects may often yield unexpected benefits (and come up against unexpected barriers) it is important to share the key elements against which the project shall be judged.

JISC has a range of resources and publications to help institutions evaluate mobile learning initiatives:

- Different routes to evidencing value[78] - a blog post from the JISC Curriculum Design and Delivery team referencing a report summarising evaluation methods and techniques[79]
- e-Learning programme and project evaluation[80] - a Glenaffric-produced and JISC-funded resource featuring a checklist, handbook and a six step model for evaluation.

[78] http://jisccdd.jiscinvolve.org/wp/2011/06/29/different-routes-to-evidencing-value/

[79] http://www.jisc.ac.uk/media/documents/programmes/curriculumdelivery/Synthesis%20of%20Evaluation%20Activities_JISC%20Curriculum%20Delivery%20projects_2011v3.doc

[80] http://www.jisc.ac.uk/whatwedo/programmes/elearningcapital/evaluation.aspx

- Exploring Tangible Benefits of e-Learning[81] - a JISC infoNet publication discussing various ways 'benefits' relating to e-Learning can be conceptualised and measured.
- Evaluating Your Practice[82] - a resource from JISC infoNet demonstrating the Evaluation Cycle incorporating the five 'Rs' of Rationale, Resources, Review, Reflection and Revision.
- Guidance on learner-centred evaluation[83] - looking at evaluation from a pedagogical point of view, this JISC resource provides guidance on developing learner-centred evaluation questions, gathering and analysing data from learners and on 'purposive sampling'.
- Measuring Benefits[84] - JISC infoNet's P3M infoKit includes a short but useful overview on how to measure benefits of a programme or project.

Traxler (2007, p.8-9) points out that "there are no *a priori* attributes of a 'good' evaluation of learning" but that there are, however, some "tentative candidate attributes" of what would make a 'good' evaluation of mobile learning initiative. These are that mobile learning should be:

- Rigorous (trustworthy and transferable conclusions)
- Efficient (cost, effort, time)
- Ethical
- Legal
- Proportionate ("not more ponderous, onerous, or time-consuming that the learning")
- Appropriate (technology, learners, ethos)
- Consistent
- Authentic
- Aligned (to chosen medium/technology)

Using these as headings for the evaluation of a mobile learning initiative allows organisations to focus on those aspects of mobile learning that make a real and sustainable impact on an institution.

[81] http://www.jiscinfonet.ac.uk/publications/publications/info/tangible-benefits-publication

[82] http://www.jiscinfonet.ac.uk/InfoKits/effective-use-of-VLEs/evaluating-your-practice

[83] http://www.jisc.ac.uk/whatwedo/programmes/elearningcapital/evaluation/learnereval.aspx

[84] http://www.jiscinfonet.ac.uk/infokits/programme-management/measuring-benefits

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# Snapshots

*Image CC BY James Bowe*

## University of Bradford

The University of Bradford[85] has a particularly forward-thinking, learner-focused and reasonably mature mobile learning initiative. It has been built, in part, upon participation in JISC-funded programmes under the leadership of Becka Currant (Dean of Students) and project management of John Fairhall (Mobile Technology Adviser).

### Background

Bradford's profile is slightly different to that of other universities, being heavily involved in the 'widening participation' scheme and having a significant proportion of mature students. As a result, although some form of mobile learning initiative was seen as a priority, the details of what it would involve and look like in practice were uncertain. To discover what was possible, explains Becka Colley, the team decided to "monitor the key national research info that is published" but, equally importantly they asked students their opinion which, she says, "is at the heart of what we do and why we do it. The students tell us and we listen and act."

Once student input had been sought and a literature review completed, the Bradford team realised that they needed a focus. John Fairhall takes up the story:

> *"We tried to do something a little bit different. We knew we had these strategic objectives with a strong emphasis on mobile so our plan was to do a literature review of all previous JISC mobile projects and find some that delivered results in these areas. We found 3 that we thought would be a good fit but only the resource to do*

[85] http://www.bradford.ac.uk/external/

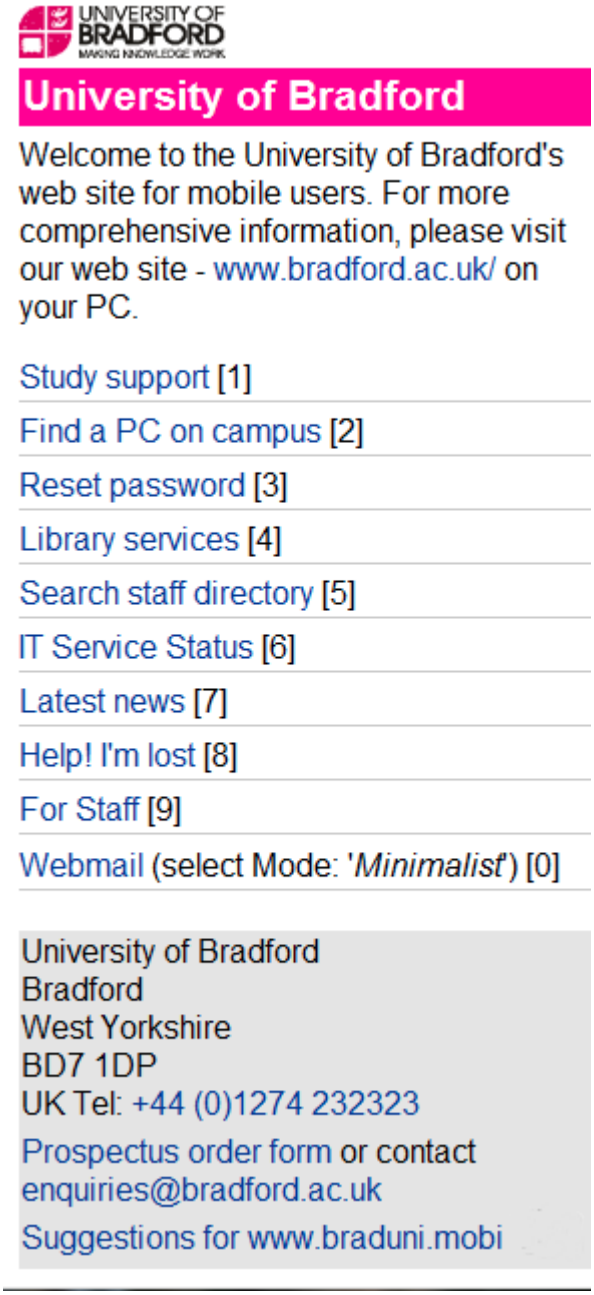
> *one – so we asked the senior managers to vote on which one they wanted implemented. A Bradfordised version of the Kingston KASTANET project won. After a follow up feasibility study, impact assessment and tender process we've now got the TxtTools SMS system, and have just completed case studies of its use in four departments."* **(John Fairhall, University of Bradford)**

One of the reasons John Fairhall gives for the success of Bradford's mobile learning initiative is getting senior staff on board from the start: "Having them on side definitely opens doors, and when you do hit a road block their support can be very helpful."

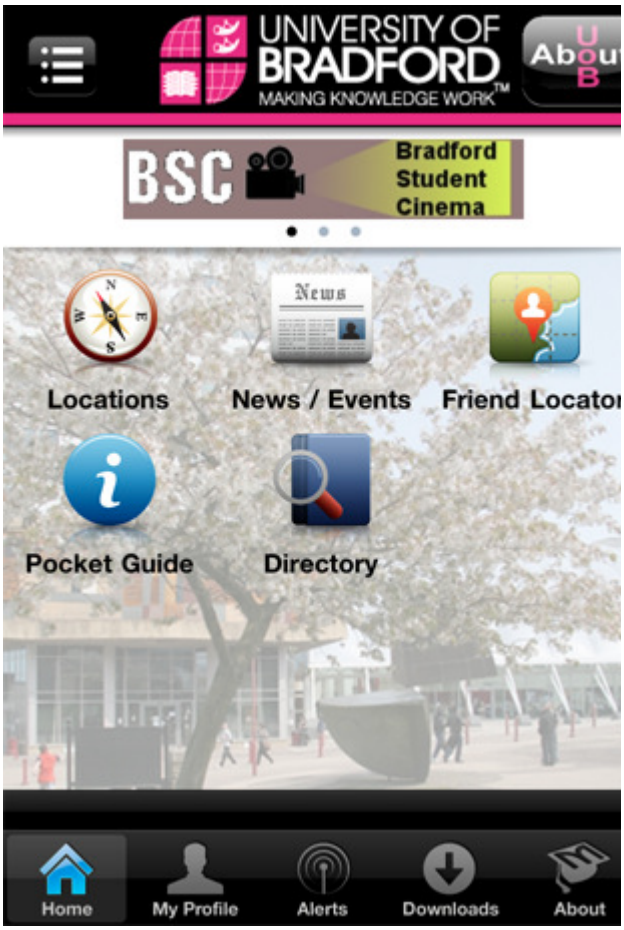
## Experiences

In addition to the use of SMS text messages mentioned above as part of the JISC Building Capacity programme, Bradford has developed two other mobile learning-related offerings to students. The first is a very basic XHTML-compliant mobile site which provides links to information on study support, library services, webmail and other items that would be to the left of the spectrum diagram in the Quick Wins section. The numbers next to the links correspond to button that can be pressed on non-touchscreen phones to access that particular link.

Slightly further to 'right' of the mobile learning spectrum is the About UoB app, made available through a partnership with oMbiel Ltd. This app in its unbranded form is known as campusM and includes (in addition to the functionality of braduni.mobi) the ability to use the GPS functionality of smartphones to find nearby computer rooms, the location of your friends, and maps of each campus.




**braduni.mobi webapp**[86]




**AboutUoB iPhone app**

(powered by oMbiel's campusM[87])

The multi-pronged approach favoured by the Bradford team is built upon a concern to maximise accessibility whilst keeping an eye to the future. To ensure a consistent user experience the desktop icon in computer clusters look the same as the About UoB app on a mobile device. "It means that for mobile users who log on to a student cluster machine they would be able to recognise and interact with the app in a similar way," explains Becka Colley. This is also an important consideration when it comes to disability issues. As John

[86] http://www.braduni.mobi/

[87] http://itunes.apple.com/us/app/id391327000?mt=8

Fairhall explains, “unless you’re going to ensure everyones got an appropriate mobile device you need to make sure theres an equivalent PC experience."

The technical side of getting started with mobile learning is not difficult (“it’s just the technical work to get it on a mobile and then promoting it” says John Fairhall) but ensuring the appropriate policies and access are in place requires some thought. This is especially important when a number of different mobile technologies and systems are used. In Bradford’s case, the use of SMS texting, braduni.mobi (developed in-house) and About UoB (from an external provider) means that planning and delivering a cohesive mobile learning strategy takes discussion and iteration.

## Lessons learned

### The importance of co-ordination

Any kind of change within an organisation can lead to resistance and barriers. In the case of the University of Bradford, reflects Becka Colley, they were “conflicting pressures on the time of the individuals involved, the funds to pay staff and for further developments of the app and strategy.” In addition, she says, a lack of overall co-ordination from the beginning meant that staff who engaged in the mobile learning initiative came from all over the university. This, whilst “great for collaborative working” was “less good when it came to accountability and overall management.” This has been rectified through the creation of a new group focused on campus life, chaired by a senior manager and which various sub-groups feed into.

### Iteration is key

Once students and other stakeholders have been asked for their input it is important to go back to them and ask for feedback on what has been developed. John Fairhall explains Bradford’s approach:

> *"At the first focus group the developers outlined the options for implementing the first recommendation, a way forward was agreed, the developers then went away and implemented it. The next week they came back to the focus group, the implementation was reviewed to ensure everyone was happy with it or if it needed tweaking, and the next change was planned. This process repeated until we got the release version of the client."*

Such an approach ensures an ongoing dialogue between what users want and what can be achieved given the various constraints (time/money/technical) developers work within.

### Cultural change can be difficult

Often, those who are most enthusiastic about technology are not those best-placed to test and evaluate it in the longer-term. As we saw with Kyle Bowen’s experience at Purdue University (see Cultural Considerations) early adopters can often focus too much on the technology rather than what can be achieved by using it. Becka Colley notes that “it's only recently that we have moved away from just early adopters using things and for it to have become more mainstream.”

When it comes to persuading staff to get on board with mobile learning, the correct approach can be difficult to find. Often, the pressure can come from students and can be helped by external providers making available mobile versions of their offerings.

> *"It's very hard to convince a lecturer to spend time on something like that when the majority of their students don't have a mobile to use it. The number of Smartphones amongst our students has gone up to around 20% but it would still be hard to convince a lecturer to spend time on such a small portion. Luckily for us our main learning platforms, Blackboard, QuestionMark Perception and PebblePad have all released mobile apps / mobile friendly web versions / APIs for us to build in to the App and Braduni.mobi. So from September pretty much any elearning a lecturer does will be available on both Computer and Mobile without any extra effort on the lecturers part. Whilst it may not represent my ideal bite size nugget format, I do think it's a major win."* **(John Fairhall***)*

## Conclusion

The University of Bradford has embraced mobile learning through a balanced approach including input from reports and publications (JISC and elsewhere) as well as from IT staff and, perhaps most importantly, students. As Becka Colley notes, the time to start experimenting and getting started with mobile learning is now:

> *"Students access HE at all different stages of their lives and for all sorts of reasons. Therefore it's crucial that things are offered on a variety of platforms and at a number of times to ensure that what is made available meets the needs of the users. Different people will want different things at different stages, but as we move into more and more people using mobile as their platform of choice we need to be able to offer access to materials as early as possible in order to enable them to engage effectively."*

As she also points out, "communication is one of the hardest things for an organisation to get right, but when it's done well it means everything else falls in to place and becomes more successful." Not only have Bradford managed to provide a platform to improve access to information for students, but they have thoughtfully brought together key people and groups to enhance communication within the institution.

# University of Leeds Medical School

The University of Leeds[88] is a large, single-site university with a large medical school. They are perhaps best known within e-Learning for their deployment of Apple iPhones to medical students but have a history of mobile learning initiatives. This snapshot contains input from Andy Pellow (Information Management & Technology Manager) and Gareth Frith (Technology Enhanced Learning Manager)

## Background

Mobile learning at the University of Leeds began around 2007 with the HEFCE-funded ALPS (Assessment and Learning in Practice Settings) of which the University of Leeds Medical School was part. Initially the decision was made to go with a Windows mobile approach and focused on e-Portfolios and VLE access. At the end of this process the existing approach was rejected for a variety of reasons including hardware difficulties and logistical issues. As Andy Pellow comments:

> *"We got started with mobile learning through the Assessment in Practice Learning Settings (ALPS) Centre of Excellence in Teaching and Learning. ALPS aimed to improve assessment and learning for health and social care students. Mobile devices were the obvious tools to deliver and collect assessments of students in clinical placements. However, at that time there were only a few windows mobile smart-phone devices and even fewer applications supported by them. We were really were starting from scratch!"*

Gareth Frith, now Technology Enhanced Learning Manager at the University of Leeds, was appointed subsequent to this project as the institution "needed someone who had the skills to manage and guide the mobile learning programme through a rapidly changing environment.". Gareth talked to commercial providers and was influenced by the successful MoLeNET programmes (2007-2010) as well as what organisations such as Tesco were doing in corporate mobile learning/training.

## Experiences

There were three main advantages for the University of Leeds approaching mobile learning through an established and externally-funded project:

1. There was an agreed focus for the project which a mobile learning project could augment
2. Capital funding through the CETL (Centre for Excellent in Teaching and Learning) gave a financial incentive to invest in hardware.

[88] http://www.leeds.ac.uk/

3. The ALPS project involved Vice Chancellor-level signup meaning that staff engagement was almost guaranteed.

After experimenting with some early smartphones the University of Leeds mobile learning team starting looking in September 2009 how they could embed outcomes of the ALPS project into the Medicine course. They identified a particular problem, namely: How can we support fourth and fifth-year medical students on placements?

The difficulty had been twofold: communication between student and tutor whilst out on placement, and a way of capturing experiences in situ. After coming up with a plan involving the use of Apple iPhones, the mobile learning team organised a workshop with clinical teachers (early 2010). As a result of a burgeoning wider acceptance of mobile technology in clinical settings and the desirability of the technology on offer, the plan was accepted by staff. Although some resistance was experienced from the NHS they were, says Gareth Frith, “pushing at an open door” when they suggested mobile assessments in addition to existing student work.

Following this workshop and approval by the NHS students Apple iPhones containing e-Books and assessment apps were distributed to medical students. Although the approach was inspired by previous work by the University of Brighton (student textbooks) and Cardiff University (assessment) the unique offer for medical students at the University of Leeds was the combination of the two.

> *“Our overall aim is to ensure that graduating students are fully equipped to perform confidently and competently at the start of their professional careers. Practice placements contribute significantly to this outcome. By using mobile devices integrated with tools such as e-portfolios, we are able to provide students with the means to collect and reflect on feedback on their performance as it happens. By providing access to up-to-date knowledge bases through the devices, students can augment their learning wherever and whenever they are learning.”* **(Andy Pellow)**

As of 2011, students have started using the Apple iPhones in informal group work. Issues relating to connectivity have been ironed out, with the University negotiating a deal with O2 for data whilst students are responsible (on a Pay-As-You-Go basis) for voice calls and text messages. In addition, the Medical School has sparked some cross-fertilisation with the Electronic Engineering department working on some app development.

Although in 2010 the University of Leeds’ mobile learning team judged the Apple iPhone to have ‘apps base’ they are keen to stress that they are technology-agnostic. The focus, they specify, is on cultural change and mobile learning has been a ‘Trojan horse’ in that respect.

## Specify the problem to be solved

Mobile learning is a buzz-phrase and can get people excited. However, one of the keys to successful mobile learning implementations is to specify the problem that will be solved through the adoption of mobile learning. The Leeds mobile learning team successfully identified, planned for, and implemented a solution to the problem of How can we support fourth and fifth-year medical students on placements?

### Gain feedback on your plans from stakeholders

In order to feel ownership of an initiative key stakeholders such as teaching staff and learning support need to have a hand in planning. The workshop that the mobile learning team set up to share their vision with staff in early 2010 led to early acceptance of the idea and wider support to go to the NHS for their approval.

Without such feedback and early buy-in from stakeholders the amount of internal issues a mobile learning initiative has to face is likely to be high. In addition, going to a group with a potential solution to a problem (see previous point) rather than a 'nice to have' prevents endless debate about the necessity for introducing mobile devices.

### Mobile learning can be a 'Trojan horse'

The ability for mobile learning initiatives to drive wider changes within institutions has been well-documented including, for example, reports by the MoLeNET programmes. Once staff move slightly outside their comfort zones and are successful their willingness to try other 'new' things increases. In the Leeds example, the familiarity (either through ownership or media coverage) of the Apple iPhone made it less of an unknown, which meant they were more likely to accept for use in a context that had previously shunned mobile technologies. As Andy Pellow notes, "Our experience with mobile learning is changing the way we support and provide learning resources for students. It has captured the imagination of staff and students alike who are approaching us with new ideas to develop new mobile apps and services."

Once mobile learning is established within one pocket of an institution, a combination of research interests, friendships and student pressure can often lead to pressure to adopt it more widely . At the University of Leeds cross-fertilisation occurred with Electronic Engineering, but it could equally have happened with other departments which send their students on placement.

## Conclusion

The University of Leeds have gained national media coverage through their use of Apple iPhones with medical students on placement. This, however, has been built upon a longer history of mobile learning made possible through a combination of external funding, senior management buy-in and focused projects. The mobile learning team identified key benefits of mobile learning and engaged early with stakeholders to ensure their support.

Building upon an existing project, the mobile learning team managed to solve a problem for clinical teachers building on the experiences of two other institutions and negotiating with external telecommunications providers. Mobile learning is now firmly embedded in the University of Leeds Medical School: the team can focus on iterating existing provision and engaging staff in other faculties.

# Mimas

Mimas[89] is a Centre of Excellence and national data centre hosted by the University of Manchester. They have been involved in a series of mobile learning initiatives. This snapshot contains input from Keith Cole (Director), Jackie Carter (Senior Manager), Matt Ramirez (Project Officer) and Shiraz Anwar (UX Design and Project Manager).

## Background

Mimas started with their mobile learning journey in around 2005 when Stuart Smith (then a member of the Mimas team) suggested that Mimas help develop a mobile learning solution for students on vocational courses. The Learning and Skills Council and JISC-funded Hairdressing Training[90] project won the Handheld Learning Conference award in 2008 and, as Jackie Carter explains, paved the way for further initiatives:

> *"On the back of [the award] and the University taking notice of it and putting out a press release that we helped them write, people in the Manchester Museum who were teaching a Master's program contacted us - because there was another opportunity to bid for funding. We didn't get it, actually, but it showed that there was wider exposure at that point."*

Keith Cole remembers that Stuart Smith came up with a "compelling business case" for mobile learning: the material needed by learners could not be accessed in salons. This, argued Stuart, could be the case for other types of student who might not have internet access where they are doing their training.

## Experiences

With one success under their belt, the Mimas teamed looked for other ways they could develop mobile learning resources. A JISC-funded service (now closed) called Intute featured a 'Virtual Training Suite' which consisted of web-based information helping students learn how to locate resources for use on their course. Through a Rapid Innovation grant, Mimas took one of those web-based tutorials and turned it into a mobile application.

Further projects resulted from Mimas' interest in mobile learning, including the Mobile Internet Detective which, the team recall, resulted in real challenges of how to present content so that it is displayed correctly on mobile devices. Instead of just re-purposing content, the team realised the importance of usability and the student experience. It was a stimulus for something that has become a core part of what Mimas now do.

[89] http://mimas.ac.uk/

[90] http://hairdressing.ac.uk/

Mobile learning was becoming a hot topic in 2009 and Mimas decided to dedicate their annual Mimas Open Forum to the subject. July 2009 saw big names in the world of mobile learning head to Manchester for a conference which showed how serious Mimas now is about mobile technology and mobile learning. The amount of activity Mimas now undertakes in the mobile arena has mushroomed since 2009, including (at the time of writing) the SCARLET project[91] which involves Augmented Reality, and Mobile Mimas[92] which provides researchers a mobile-friendly way of accessing a wealth of information and articles.

## Lessons learned

Because of the iterative and small-scale way Mimas have developed their mobile learning offerings the team has had chance to reflect on what makes them successful. They make the following recommendations:

### Work in partnership

Rather than finding learning experiences to fit mobile technologies, Jackie Carter stresses the importance of focusing on learning. Her major recommendation is "working in partnership" which she believes gives much more attention to what the technology means on the ground with students. Keith Cole goes one step further adding that it's important to have the right team in place:

> *"I think it's having a combination of staff with the right skills. So it's people who understand the technologies. People who understand how to get user requirements from focus groups. It's not a case of just, say, we'll develop that interface, but making sure that it meets users' needs... [It's] developing something that's actually usable rather than just something developed because the technology enabled you to do it."*

Working in partnership is difficult, but as the examples throughout this infoKit show, it is key to successful mobile learning initiatives.

### Provide the business case

Partly due to what Gartner Inc.[93] have dubbed the 'Hype Cycle' of technology there are often times when people get excited about particular new products or services. Whilst such positive energy can lead to impetus and a welcome change in the status quo, it has to be tempered with some pragmatism, as Jackie Carter points out:

> *"[T]here might be enthusiasm within a project or activity to do something but sometimes that can get overruled. And... the university is increasingly driven by the need to demonstrate impact particularly on the student experience. So, what we probably have now is evidence to take to the university to say 'this can positively impact the student experience'."*

[91] http://www.jisc.ac.uk/whatwedo/programmes/elearning/ltig/scarlet.aspx

[92] http://mimas.ac.uk/portfolio/current/#mobile-mimas

[93] http://www.gartner.com/technology/research/methodologies/hype-cycle.jsp

Every institution has more or less pressing agendas and priority areas within which it is best to work in order to gain traction. Often, by discussing ideas and attempting to align them with such agendas and areas, synergies and serendipitous connections can be made.

### Experiment

Not only is it important to bring the right members of staff together with a mix of experience, knowledge and expertise but, says Keith Cole, it is also vital to experiment. He talks of the need when you've got staff with good ideas to "give them the opportunity to develop these, try these technologies out in a sort of sandpit environment." Such a culture of support not only allows existing ideas to bloom but "prepares people to come up with these ideas".

Ideas for experimentation may often come from parts of the institution or organisation which lack seniority. As Keith Cole notes, it's necessary to listen to ideas from all quarters, as "these might be the way forward in terms of providing certain interfaces that students want". After all, "students' behaviour is changing: they're less likely to go to the library and they don't necessarily use web based browsers".

## Conclusion

Mimas have become an emerging authority on mobile learning as a result of early experimentation and a commitment to consulting with learners. Although there have been 'failures' - Mimas have not always been successful in bidding for funding - they have learned from mistakes, ensuring that they provide a sound business case for their projects. Perhaps most importantly, Mimas have embraced mobile learning through senior management buy-in and forged productive partnerships with other organisations. They have seen mobile learning as not merely the focus of a single short-lived project, but have endeavoured to make it a core part of what they do as a team.

# EOI Spain's School of Industrial Organisation

EOI[94] is a business school in Spain pioneering specialised training programmes around business skills and improving companies. It delivers over 80,000 hours of classes per year between its two campuses in Madrid and Seville.

## Background

Mobile learning philosophy at EOI is focused upon:

- integrating the possibilities offered by mobile devices to develop an open and networked education
- accessing information from anywhere and at anytime
- facilitating in which different people make connections

EOI has been working since 2009 using Google's free Android Mobile operating system, creating Creative Commons licensed content by building within platforms such as Moodle. They also make use of social networks to promote knowledge sharing. *"We see education as something that is not one way (teacher to student), but something global where everyone can enrich their knowledge"* says Tíscar Lara, Vice Dean of Digital Culture at EOI.

## Experiences

The EOI Mobile learning project started in 2009 as result of a deep process of reflection which led to an institutional Strategic Plan towards 2020. It analysed the trends in ICT education uses across the world, identifying the combination of connectivism, design thinking, open content and mobile learning as the underpinning methodology for EOI in the future. After setting the pedagogical framework, the second decision was to choose the software and hardware to facilitate mobile learning within the School. Since EOI is committed to supporting free software and open knowledge, it appeared that the best option in this case was Google's Android mobile operating system.

In the EOI model, both the hardware and the 3G connectivity is free for the students; the school pays for the total cost and gives them the devices for their personal and educational use. At the end of the academic year, the students keep the devices for themselves. The mobile learning project is now in its third year and, since 2009, has reached around 1500 students studying towards an MBA or other professional Masters degree.

Each year EOI chooses what it feels to be the best Android device available in the market, focusing especially on the improved screen specifications available. In 2009 students were given an HTC smartphone, in 2010 a Samsung Galaxy 7-inch tablet and in 2011 an 8.9-inch Samsung Galaxy Tab. The provision of mobile devices by EOI guarantees student access to their personal learning environment anytime and anywhere. The 'standard' applications and platforms used at the school include Google Apps for communication and collaboration, blogs as personal portfolios and social networking sites (Twitter, Facebook and LinkedIn) for knowledge distribution and sharing.

[94] http://www.eoi.es/portal/en/

According to Tíscar Lara, mobile learning is as much about identity as it is technology:

> *"One of the key points of learning at EOI is the building of digital identity by producing and sharing knowledge, so the mobile devices are used in two directions: as a way of using the open content produced by EOI in different formats (docs, video, audio, wiki, etc.) and by different agents (from researchers to professors, but also by students in their regular assignments and collaborative portfolios) and as a environment for interaction from the classroom to the open social media networks."*

## Lessons learned

### Not so digital natives

"We needed to organise training courses and tutorials in order to bring effective mobile learning to the classes" says Lara. There are staff dedicated to help teachers become profficient with mobile technology and open education. EOI offers continuous training for teachers so they can learn how to enhace students' learning by using mobile learning methodologies.

EOI also noticed that students themselves needed some guidance to use the devices creatively and to their full potential. "In their first week at EOI, all of our students have an intensive mobile learning course to explore their devices but also to learn how to use the collaborative tools, how to blog, how to communicate in social networks, how to share knowledge with creative commons licences, etc." Lara adds.

### Structural changes

Introducing mobile learning in the class goes beyond simply using the mobile device to Access knowledge. As Tíscar Lara notes *"it is a trojan horse that forced us to make changes around the way we conceive teaching and learning, in the way of how physical spaces are designed and also in the way of how the core syllabus is organised in terms of schedule, assignments and evaluation."*

Mobile learning at EOI has provoked a series of structural changes in the school, such as transforming the library in a place for collaboration rather than merely individual study. It also allows for more time to be given to online homework and 'flipped' education by students working together whilst in school and accessing content at home.

### Unexpected uses

Effective mobile learning requires design, organisation and guidance to lead to intended results. However, it often produces unexpected results and benefits when students experiment. This, in turn, can create some worries for the staff teams in charge of the mobile learning project evaluation. In the EOI experience, as Lara comments *"we have learned that it is important not only to accept it but also to promote it by encouraging the students, and also the professors, to be creative and explore mobile learning far beyond we can envision it from the institutional point of view. This sense of freedom is very positive to make mobile learning a viable methodology for personal and professional learning."*

## Conclusion

Mobile learning at EOI has produced a richer learning process for the students and teachers because of the more personalised content and greater interactivity afforded by the devices.

On the other hand, mobile learning has also meant a cultural change for both students and professors. They need to be digital ‘savvy’, to understand the complexity of digital society and culture, to experiment with collaborative tools and open knowledge, and to building their digital identity as professionals.

# Case Studies

### ESCalate
http://escalate.ac.uk/8250

### Excellence Gateway
http://www.excellencegateway.org.uk/casestudies

### MoLeNET
http://www.molenet.org.uk/pubs

# Going further

Trends (*coming soon!*)

# Appendix

## Bee Motif

As with the Open Educational Resources infoKit[95], when JISC infoNet came to finalising a design for the Mobile Learning infoKit, we needed a motif. A seemingly-obvious choice would be to use images of mobile phones and other mobile devices but this would remove the focus from the mobility of the learner.

After seeking opinions via Twitter and a thread on Quora[96] the front-runners were birds and bees. We chose the latter because of their obviously-collaborative nature and the links with the social element of mobile learning. We'd like to thank those who suggested ideas, as well as those photographers who kindly shared their wonderful images under a Creative Commons license.

[95] http://openeducationalresource.pbworks.com/

[96] http://www.quora.com/What-kind-of-visual-motif-is-appropriate-to-illustrate-a-mobile-learning-resource

# Glossary

**Agile project management** - a project management methodology stressing the iterative nature of determining user requirements along with flexibility and interaction between developers and users.

**Android** - Google's (Open Source) mobile operating system

**BlackBerry** - Mobile devices produced by RIM

**BYOD** - Bring Your Own Device

**CAMEL** - Collaborative Approaches to the Management of E-Learning

**CMS** - Content Management System

**CSS** - Cascading Style Sheets

**FE** - Further Education

**GPS** - Global Positioning System

**GSMA** - Global System for Mobiles Association (see http://www.gsmworld.com) but when founded was originally 'Groupe Speciale Mobile Association'. It is a trade body for mobile operators devoted to promoting and standardising the GSM/3G mobile telephone system. As with JISC,it is usually referred to by acronym.

**HE** - Higher Education

**iOS** - Apple's mobile operating system

**JANET** - the UK's academic and research network, connecting several hundred educational institutions, research councils and related organisations.

**JISC** - Joint Information Systems Committee, although usually referred to by acronym.

**Laptop** - A mobile computer with a screen, keyboard and battery. Usually wifi-enabled.

**LMS** - Learning Management System

**Loanership** - A scheme whereby a user treats an institutionally-provided device as their own but must give it back to the institution at the end of their studies.

**MoLeNET** - The Mobile Learning Network (an initiative that provided capital funding to Further Education institutions as well as mentoring, research and evaluation)

**MP3 player** - an audio device that plays digital music stored in MP3 format

**NSS** - National Student Survey

**NUS** - National Union of Students

**Ofcom** - Office of Communications (a UK government-approved body that regulates the telecommunications industry)

**PDA** - Personal Digital Assistant

**RDF** - Resource Description Framework

**RIM** - Research in Motion

**RSS** - RDF Site Summary (often called Really Simple Syndication). A way of publishing frequently-updated resources in a standardised format.

**SCORM** - Sharable Content Object Reference Model (a collection of standards and specifications for e-learning resources)

**Smartphone -** An advanced mobile phone combining the functionality of a PDA and mobile phone. Many also feature MP3 player functionality, touschreens, cameras, wifi, GPS and 3G internet access.

**SMS** - Short Message Service. A standardised text messaging service usable on most (if not all) mobile phones.

**Stylesheet** - See CSS.

**Tablet** - a touchscreen device that has some or all of the features of a full-size personal computer.

**TEL** - Technology-Enhanced Learning

**Transactional distance** - the ‘cognitive space’ between instructors and learners in an educational setting.

**Trojan horse** - A phrase used metaphorically and inspired by Virgil’s account of the Trojan War in which the Greeks hid inside a large wooden horse to gain access to Troy. In this context, it represents more revolutionary ideas and concepts that can be smuggled within other seemingly standard projects or initiatives.

**UCISA** - Universities and Colleges Information Systems Association.

**USB** - Universal Serial Bus (a standard for connecting data and power supplies between computers and peripherals)

**VLE** - Virtual Learning Environment

**Wifi** - A standard for wirelessly connecting mobile devices to networks and/or the internet.

**XML** - A set of rules for encoding documents in machine and human-readable form.

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[97] http://creativecommons.org/licenses/by-nc/3.0/