

Review

Mobile Learning Reviewed

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About this guide:

It's for: People in the learning and training community who are keen to learn more about the potential applications and practicalities of mobile learning in their organisations.

It's by: Ufi/learndirect and Kineo. Kineo is the leading rapid e-learning specialist in the UK. Kineo has worked on rapid and mobile learning for a wide range of organisations. Ufi/learndirect, as part of its continuing innovation agenda, has recently piloted three mobile learning initiatives in partnership with Kineo to explore its potential. Later in this guide we share our experiences in developing these prototypes along with some lessons learned and best practices.

It explains:

- What we mean by mobile learning
- Which devices can be used
- Who's likely to use mobile learning
- Design considerations for mobile learning
- How three mobile learning prototypes were developed
- Final pointers for mobile learning

[Click here to see some examples](#)

What is mobile learning?

A wide definition of mobile learning (commonly referred to as m-learning) is the ability to learn independently of place and time, facilitated by a range of mobile devices.

Mobile learning has a series of characteristics that potential buyers and designers should be aware of:

Mobile learning characteristics

Ubiquitous

Bite sized

On demand

Typically blended

Can be collaborative

Implications for mobile learning design

Mobile learning content can be accessed anywhere, regardless of location. With ever increasing coverage by mobile network providers, m-learning services can have an increasingly ubiquitous presence. Availability via mobile devices at any time provides convenience for the learner.

Mobile learning components need to be relatively short in duration, given that they're accessed in environments that are likely to be full of potential interruptions that may be a challenge to concentration.

The 'always on' nature of mobile devices provides access on demand for the learner, maximising the potential for delivering valuable content at the point of need.

It's rare for mobile learning to be the primary delivery platform for a topic. It is far more common to use it as part of a blended approach, extending a course offering, providing packaged content that can act as performance support, providing ongoing access to tutors and support, or acting as promotional/teaser material, for example with short quizzes to raise awareness.

Since most mobile devices are designed to enable communication, mobile learning can take advantage of this. Research suggests that the most successful technologies tend to involve rich social practices built around rather simple but reliable technology such as SMS. Youths around the world have developed incredibly rich social practices around this simple, cheap and reliable technology (Rheingold, 2002). Thus mobile learning has the potential to create mobile communities, or at the very least, interaction with a coach/tutor as part of the blend.

Mobile learning characteristics

Can be location dependent
(but doesn't have to be)

Implications for mobile learning design

Mobile devices offer the potential for delivering content that is relevant to the learner's location, e.g. audio tours of a specific office as part of an induction programme delivered via iPod, or sales tips that are relevant for a specific type of customer that can be accessed en route to the client meeting.

Location awareness can be supported by a number of technologies, including triangulation from a mobile phone network or the global positioning system (GPS), pushing location specific content to the user as required.

Note that these characteristics are not technical or device specific, but more about the access and learning experience that mobile learning should deliver to the user. That said, of course, devices are key to the effectiveness and potential of mobile learning – which leads us onto the second key question: which devices should we consider as platforms for mobile learning?

Which devices should we consider for mobile learning?

Mobile devices fall into a series of categories: PDAs/smart phones, digital phones and non-telephony devices including MP3 players. Here we describe the key types in each category.

Device category

PDAs and smart phones

Digital phones

Non-telephony mobile devices

Types

There are three main forms of PDA mobile technologies: Palm operating system (running on 65% of the PDA market). Pocket PC from Microsoft. Smart phones. Gartner research defines a smart phone as "A large-screen, data-centric, handheld device designed to offer complete phone functions whilst simultaneously functioning as a personal digital assistant (PDA)." These include the Blackberry from Research in Motion and Motorola models (often also called Converged Mobile Devices or CMDs).

Nokia, Sony Ericsson and equivalent – a huge range of handsets available including third generation (3G) phones with larger screens and audio/video/flash/java capabilities, these providing greater scope for the delivery of richer mobile learning content.

MP3 players, the dominant being Apple's iPod
Video-enabled MP3 players, again the dominant being video iPods

While 'mobile device' typically means PDAs and digital mobile phones, it might more generally be taken to mean any device that is small, autonomous and unobtrusive enough to accompany people in every moment in their every-day life, and that can be used for some form of learning, for example an MP3 player.

For the purposes of this guide we include PDAs, digital mobile phones, MP3 players such as the iPod, and video-enabled MP3 devices such as the video iPod and its competitors.

We believe that mobile e-learning should be designed to run on at least one device from each category, and the recent prototype project that Ufi/learndirect commissioned from Kineo has targeted one from each of these three categories to maximise potential reach and impact.

So who is using these devices, and what does this tell us about the market for mobile learning? Let's explore these questions now.

What's the market penetration?

In recent years, there has been great interest in the potential for mobile learning, which has resulted in numerous pilot projects and research papers. Cobcroft, Towers, Smith & Bruns (2006) reviewed over 400 publications on mobile learning including conference papers, reports, reviews and research projects.

The focus on mobile learning is not surprising given the ubiquitous nature of mobile devices and the reduction in price for these devices. Of the potential mobile learning devices, mobile phones are clearly the most ubiquitous.

According to a recent report by Strategy Analytics, there are 1.5 billion mobile phones on earth, with 10% year-over-year adoption expected through 2008. Wikipedia's estimates are even higher, citing that there were over 2.69 billion mobile phone subscribers in December 2006.

Mobile phone penetration in the UK

A key question for any organisation looking to develop mobile learning, especially if trying to reach a broader market, must be who in the UK has mobile phones, and to what extent does that population intersect with your target learners.

As early as 2003, a survey in the UK (Crabtree, 2003) found that over 75% of the general population and 90% of young adults owned mobile phones. In April 2005 the Financial Times reported that UK mobile phone penetration was about 86% of the adult population. In March 2006, the penetration rate for Western Europe was reported as 100%, which means there was a mobile phone for every person in the population.

In the UK, the penetration rate was 114.8%, with roughly 87% of the population having one phone, and 27% having two phones. However, availability of a mobile phone is one step on the road to delivering mobile learning to the target audience. We must also consider the sophistication of the devices to determine which models could provide effective mobile learning.

Increased capabilities of mobile devices

Mobile devices are becoming more sophisticated. IDC released its "Worldwide Enterprise Converged Mobile Device Forecast and Analysis" report on Thursday 1st June 2007. This report projects considerable growth in the use of converged mobile devices (CMDs) including smart phones, PDAs and Black-Berry devices.

IDC projects that worldwide shipments of CMDs will see a compound annual growth rate of 54% in the next four years, and by 2011 there will be 82 million such devices in use.

"One of the key drivers for the expected growth in enterprise adoption of CMDs lies in the power to use these devices, beyond basic telephony, to access corporate email, the Internet/Intranet, and securely link to corporate databases," comments Sean Ryan, research analyst for IDC's Mobile Enterprise Devices program.

At the same time, designers and buyers of mobile learning cannot ignore the cost factors of using CMDs for accessing mobile e-learning. All mobile providers charge users for downloads and use of browser functionality on their phones. Providers offer a wide array of packages from fixed use charges to pay-as-you-go and many variants in between. The charges for connected time can be considerable, and may not be apparent to the user until after the fact.

In practice

Watch the costs for the learner

If developing any mobile learning that is likely to incur a download or connection charge, you should clearly signpost to users that this is the case, and where possible, provide an alternative format, e.g. a file that can be downloaded to a PC then 'sideloaded' to a mobile device, so that mobile download charges are not incurred.

Use of internet on mobile devices

Though the majority of mobile phones are not internet-enabled at present, more and more mobile devices are connected to the internet and used to access the internet. In the UK nearly 25% of the online population accesses the internet from their mobile phone, ahead of the US but behind several other European nations as shown here:

	U.S	France	Germany	Italy	Spain	U.K
Online population (000)	152,698	23,980	32,085	17,389	12,281	29,589
Online population accessing Web from mobile phone (%)	19	28	34	34	26	24

Note: The online population consists of people 15 years old and older, accessing the internet from home and work.

Source: comScore Networks, 2006

Clearly device penetration levels for mobile phones and CMDs make mobile learning an attractive proposition. However, we should not just think of mobile devices as always connected and hence providing real time information or tracking – which is why we should also consider the potential of MP3 players.

MP3 player market penetration

The MP3 player market is one of the biggest device success stories of the early years of the millennium. The market leader is clearly Apple's iPod, available in a variety of models. Since its launch in 2001, Apple has sold over 100 million iPods worldwide. Many other players exist in the MP3 player marketplace including Sony, iRiver, Creative and (since November 2006) Microsoft with their Zune MP3 player, but all with much lower market penetration levels.

Functionality varies according to manufacturer, but in essence an MP3 player is effectively a portable mass storage device that allows content to be downloaded and used offline.

Music storage is clearly their primary use, but their mobility and storage capacity makes them ideal mobile learning devices. A significant increase in the podcast and vodcast (videocast) download market evidences that MP3 player users have extended the potential of the device beyond simply music. The commercial market for MP3 downloads is highly developed, though monetising non-music formats (e.g. podcasts and vodcasts) has proved more challenging. In effect the 'book on tape' market has jumped formats to become the commercial podcast market via iTunes and Audible.

The ease of providing podcasts and vodcasts for download has a potential cost advantage, as they can be downloaded for free (assuming the user is on a fixed price broadband line), unlike download or access to learning content via a mobile phone or CMD. Thus, mobile devices used for learning do not require continuous connection. Also, once on the iPod, learning content does not require internet connection for it to be accessed, so there need be no ongoing costs of access after initial download.

Device penetration only tells part of the story though. We need to be clear, as potential designers and commissioners of mobile learning, who is going to actually use the mobile learning that we design.

Who's likely to use mobile learning?

Generational issues

The nature of mobile device users is dramatically different than it was a decade ago. From children to older people to business people on the go, mobile devices are used by most of the population. The widespread use of mobile devices means there is a ready-made market of mobile learning-enabled devices. However, we cannot make assumptions that usage is equally likely across all users. So who is most likely to use mobile learning?

Cobcraft et al argue that the constant exposure to digital technologies, gadgets, games, and mobile devices has evolved a new breed of learner, the 'digital natives': those learners who think and process information fundamentally differently from their predecessors, the 'digital immigrants', whose interaction with these digital tools is not innate.

Oblinger (2003; 2004) considers the key traits of today's learners as being digitally literate, 'always on', mobile, experimental and community oriented. Some have argued that those born after 1982 are digital natives; they have grown up with exposure to the internet and mobile devices.

This millennial generation stays in contact through SMS, mobile phones, chatrooms, and email, whilst simultaneously playing computer games, listening to music, and watching television (Frاند, 2000, p.18; Oblinger, 2003; Rickard & Oblinger, 2003).

Does this mean that mobile learning is more likely to have uptake in the digital native sector of the market? The research would indicate that's not necessarily the case.

The nature of mobile learning has led some to suggest that mobile learning is particularly suited to more mature and independent learners. However, studies show that the range of learners whose needs may be met by m-learning includes mature-aged, gifted, and remote learners, as well as those with cognitive, behavioural or social problems, or with physical or mental difficulties (Savill-Smith & Kent, 2003; Strom & Strom, 2002; Rodríguez, Nussbaum, Zurita, Rosas, & Lagos, 2001).

Further to this, early evaluations of learning with mobile devices have suggested that a wide range of learners respond to learning with mobile devices favourably. For example, 90% of teachers in a study of 100 Palm-equipped classrooms reported that handhelds were effective instructional tools with the potential to impact student learning positively across curricular topics and instructional activities. Most teachers would not fall into the 'digital native' category, suggesting that the potential for mobile learning extends beyond the millennial generation – and clearly their students, who are likely to be the next wave of learners joining organisations, are accepting of this technology.

Ufi/learndirect's view

"Delivering effective learning to hard to reach learners is part of our remit. So we're always looking to use technology to enable that objective. Mobile learning is attractive from that perspective, given the device penetration and the high levels of mobile phone usage for our target audience. It's not a replacement for our core offering, but we're certainly keen to use mobile learning to enhance and supplement it."

Kirstie Donnelly, Director of Products and Marketing, Ufi/learndirect

Kineo's view

"Any organisation that's kitted out its team with mobile devices, such as PDAs or smart phones, should recognise that these are learning delivery devices and should form part of the platform for delivering just in time information and learning to this audience. While it's not the core purpose of these devices, it's a relatively low bandwidth addition to these devices, and inexpensive to pilot and get feedback from your learners."

Stephen Walsh, Kineo

Business drivers

One obvious group of learners to consider for mobile learning is the business user of a mobile device. These learners are often equipped with one or more mobile devices by an employer and hence constitute a ready-made market for mobile learning.

Mobile learning can help address other challenges faced by businesses:

Business challenge

Mobility of staff means that training opportunities in the office, or requiring computer/internet connections, are diminishing

Pace of business change and need for constantly updated information

Time pressures on staff mean an ever decreasing window of opportunity for formal training or even traditional e-learning

How mobile learning can address

Mobile devices are, by their nature, portable and with staff wherever they are and hence instantly accessible. Thus, mobile devices potentially allow business to provide learning to mobile staff and to distribute learning quickly.

Mobile learning can deliver key data at point of need – particularly relevant for workers who need access to updated product specifications, pricing details or other time-sensitive information. In this sense, mobile learning crosses over into the area of performance support (discussed later).

Mobile learning also has the potential to utilise staff downtime, those short periods of time waiting or travelling – time wasted in what Marc Ague has called 'nonplaces'. It has been argued that mobile devices can give you what writer David Metcalf calls a 'time rebate' of an hour or more a day. In essence you can talk, learn or access information in what would otherwise be downtime.

Ufi/learndirect's view

"One of the great advantages we see with mobile learning, as with podcasting, is the time shift – the flexibility provided to the learner to access learning on demand, and in a time and place that provides the greatest advantage to them. We should recognise that a lot of learning is location-specific, so where you access it is critical."

Sara Bingham, Learning and Technology Manager, Ufi/learndirect

Kineo's view

"The time shift element is crucial to mobile learning - While we're keen not to turn every moment of downtime into an enforced learning moment, mobile learning provides the flexibility to provide learning on demand."

Stephen Walsh, Kineo

Convergence of supply and demand factors

Across generational and business issues, we are seeing a convergence of supply factors such as the availability of mobile devices and demand factors such as business requirements for mobile solutions.

Supply Side

Growing use and acceptance of mobile devices

Increasing bandwidth and browser software

Reduction in data access costs

Demand Side

More mobile workforce requiring better access to learning when away from office

Volatile information that requires constant updating and delivery to staff

Pressure to maximise productivity and downtime

The combination of these developments appears to create a significant potential for mobile learning, that's nowhere near being fully explored at this stage.

So, the devices have mobile learning-ready functionality, and the market penetration of mobile devices is considerable. The key challenge that the learning design community faces is how to design effective and engaging mobile learning to deliver on this potential and make it worth accessing. That's what we examine next.

Design considerations for mobile learning

To deliver on the potential of mobile learning, we need to consider:

1. Which types of design approach are best suited to mobile learning?
2. Which types of content are best suited to mobile learning?
3. What are the criteria for effective mobile learning design?

We address these three questions below, and explore a series of potential rapid mobile learning models to build on the answers.

1. Which types of design approach can work in mobile learning?

Mobile devices can be used to provide a wide range of different types of short, support forms of learning intervention. These include:

Design approach

Performance support through instant information

Assessments/ quizzes/ skills checks

Commentary

This is generally reference material, not learning, starting with the simplest media such as text, through to richer media taking advantage of 3G connectivity.

An example of performance support via a mobile phone is the wide range of dictionaries available for PDAs, covering a wide range of languages, law, medicine and other professional topics.

Many would argue that a performance-support application like this is the most suitable format for mobile learning as it requires low context and concentration, is completely on demand, highly searchable and solves an immediate problem – characteristics which map well to the requirements of the mobile user.

An effective front end and search engine are critical if just in time performance support is to be effective on mobile phones – something we explore below in the design approach section.

Examples of effective uses are:

“How do I” situations: for example, a field engineer gets step by step guidance on a particular procedure – this can be particularly effective for rarely used or complex procedures that are unlikely to be memorised.

Mobile devices are well suited to simple structured quizzes. At their simplest, these can be delivered as SMS messages asking the user to choose an option and respond, possibly with a deadline. These can also be delivered with a WAP push to WAP-enabled phones, which can be an effective part of an overall blended approach.

Feedback can come from a tutor (who can use PC to SMS applications to send mass SMSs to a large group and respond), or automatically generated by a computer. Learning and Skills Development Agency in a 2005 m-learning research project developed an SMS quiz engine for exactly this purpose.

Since SMS is available on all phones, and very simple to use, these can be an effective way to engage a mobile learning audience.

Design approach

Assessments/ quizzes/ skills checks

Collaborative learning

Audio learning

Commentary

Going further, Java-based quizzes/games provide increased potential for this learning intervention. The Java 2 Platform Micro Edition (J2ME), compatible with a wide range of phones, enables development of simple but engaging quizzes and games for mobile devices.

A good example is the driving theory test quiz, also developed as part of the LSDA project referenced above. These are practice questions on your phone; which started as a research project, but has now become a commercially available product.

The quiz as skills-check has a strong marketing dimension too, in that it may raise an awareness of a knowledge gap for a learner and provoke them to take action, e.g. enrol in a course.

A range of collaborative learning opportunities are afforded by via mobile learning including:

SMS/voice/email contact with a tutor (if part of a blended programme with tutor support).

Participation in polls via SMS.

Instant messaging facilities (available on many smart phones).

Sharing of information via uploads to a central location, including using MMS (multimedia message sending, e.g. photos) functionality, e.g. as part of a visual merchandising training course.

Audio-based learning devices can include iPod, MP3 players as well as mobile phones, an increasing number of which can download and play MP3 files.

Audio learning also scores well on accessibility, opening up new learning opportunities to the vision impaired – and should ideally be delivered with a text alternative. Examples of audio learning could include:

Site-specific inductions: NHS Greater Glasgow is experimenting with this approach in two hospitals, providing new hires with iPods containing 'audio tours' of their new workplace including key information on MSRA, moving patients and coping with violence.

Design approach

Audio learning

Video learning

Focused learning modules

Commentary

Several schools and universities already use audio learning and short mobile learning modules as revision aids.

Interviews with experts on key aspects of new products (potentially in talk show format with a host and several interviewees).

Structured tips for key subjects, e.g., interviewing well, study skills, negotiation. These could include simple quizzes as the iPod does include basic quiz functionality. Several engines are available to enable quiz development for iPod, such as <http://www.iquizmaker.com>.

Marketing messages around specific course offerings (think structured infomercials) that may include expert views, teasers for course material, and reflective questioning.

These and other ideas for Audio Learning are explored in the earlier "Podcasting Reviewed" guide in this series, available at www.ufi.com/home/section5/10_goodPracticeGuides/goodPractic eGuides.asp.

www.kineo.com/kineo-reports.html.

Mobile devices can play video clips for learning and can avoid many issues around screen size for text or interactions.

Video learning can follow the same formats described above for audio learning, but take advantage of existing video footage available to add tone and fidelity to the learning experience.

Later, we describe an approach to video learning that was applied to the pilot prototypes developed by Ufi and Kineo.

In some circumstances, a short focused learning module can be developed for a mobile device, incorporating more of the standard learning design approach of a variety of presentational screens and question types to create what is, in effect, a short course via a mobile device.

As part of our prototyping, Kineo and Ufi have collaborated to develop two focused learning modules to explore this approach.

In practice

Mobile learning is not e-learning on a phone...

Research indicates that the most effective mobile learning is not a facsimile of an online course on a mobile phone.

A recent JISC report comments "In almost all scenarios, we found that the learning worked best for both the learner and the tutor when it spanned the mobile device, and other media or group activities." Thus, mobile learning is effective as one element of an overall programme of learning interventions in the context of a blend rather than the primary delivery channel for content, so regardless of the design approach, it's critical that mobile learning is deployed within a blend.

To what extent can our prioritised devices support these design approaches in the context of a blend? The table below summarises their potential:

Design approach	PDA	Browser enabled phone	MP3 Player
Performance support through instant information	Yes	Yes	Less likely
Assessments/quizzes	Yes	Yes	Yes
Collaborative learning	Yes	Yes	Yes
Audio learning	Yes	Yes	Yes
Video learning	Depends on device	Depends on device	If video iPod
Focused learning modules	Yes	Yes	Limited text based potential

2. Which types of content are best suited to mobile learning?

If the above represent the set of design approaches available for mobile learning, we must then ask if there are there specific content types that are better suited to mobile learning than others.

The overall view in the existing research work and projects in the mobile learning domain shows that it most probably applies best to these situations:

- Simple, self-contained processes, where specific knowledge should be retrieved/accessed in a certain moment (e.g. definitional or quick hit 'top tips' information), i.e. processes or content that do not require a large volume of context or introduction

- Topics where ability to locate in a specific time/place adds value, e.g. location specific access (reviewing tips for effective presenting en route to sales pitch, while talking to a lawyer about escrow)
- Topics where best practice and advice tips can be easily packaged and presented, e.g. coaching, recruitment, sales skills selections
- Topics where expert opinions and viewpoints can add value (through audio and/or video), particularly use of recognisable experts (which may be a respected leader within the organisation or an authoritative subject matter expert, e.g. Alan Sugar's top tips for interviewing)
- Topics where the target audience is more likely to benefit from access to learning on the move, e.g. salespeople, field engineers (though we should recognise that all learners are mobile to some extent)

In summary, all of the latest research suggests that to be effective mobile learning design is less 'course-like' than most e-learning and has more of a support orientation. The learning is provided:

- when needed, such as just in time and just in place in short segments
- in context often based in terms of task
- used as part of a wider set of learning interventions

Identifying potential design approaches is one aspect of mobile learning, but we must also identify the criteria by which we judge the implementation of any design approach.

3. What are the criteria for effective mobile learning design?

The design criteria for any mobile learning intervention should be based on a contextualised set of generally accepted principles of effective learning design:

Design principle

Keep it short

Keep it simple

In mobile learning context:

As noted several times earlier, mobile learning is subject to frequent interruptions and so must be designed with extremely short windows of opportunity in mind.

We recommend that any individual mobile learning module is kept to five to seven minutes per intervention.

Excessive use of complex navigation and complex interfaces are always bad practice in e-learning, but on a mobile device, where screen and keyboard size compounds this issue, they are deadly.

We recommend minimum navigational effort required by user (which may, we recognise, limit the amount of interaction).

Design principle

Apply a structure

Use media judiciously

In mobile learning context:

Good practice guidelines in learning design should apply to mobile e-learning. In Kineo's rapid e-learning we look to apply a simple but effective learning cycle as follows:

1. Get attention
2. Set the scene
3. Present core content
4. Provide practice/challenge opportunities
5. Summarise key point
6. Call for action and signal support

We find that this learning model (a simplified version of Gagné) works well for screen based rapid e-learning modules.

As discussed above, we do not recommend that mobile learning attempts to mimic the length and density of e-learning modules – but since rapid e-learning attempts to have a lighter touch than traditional e-learning, it can be argued that rapid e-learning design models have more in common with what may work in mobile environments.

Hence, we suggest that the six steps above can act as a checklist for effective content structuring and information design in mobile e-learning, rather than a model that needs to be adhered to in its entirety.

In the section below, we explore how these steps could be applied for three different mobile learning models.

Good e-learning design practice calls for graphics, audio, video, and flash animations to justify their existence by supporting learning objectives and not simply adorning screens that do not need them.

In mobile learning where bandwidth can still be a challenge (at least when on a connected device) this is more true than ever. The richer the media the more there are likely to be download and bandwidth issues, and these can have cost implications for learners, putting on even more pressure to warrant its use.

We recommend minimising the amount of rich media in mobile learning, unless the device is accessed offline e.g. Video enabled iPods where media is downloaded via a PC and then 'sideloaded' onto the mobile device), and if rich media is used, where possible providing an alternative 'thin' version that does not rely on rich media.

Design principle

Make access easy

Provide opportunities for collaboration

In mobile learning context:

Downloading content and applications to mobile devices is still a minority activity. There is risk that this could be a barrier to access for mobile learning, so it's critical to keep it simple. The learning does not have to be delivered via wireless or the internet. Some content can be downloaded via a pc or even pre-loaded on a memory card. This is likely to be a more familiar operation for most users.

We recommend that mobile learning should always strive to be accessible via download to PC first, before sideload to device (e.g. iPod format).

As discussed above, mobile devices, through voice, SMS, email and instant messaging can provide opportunities for collaboration with peers, experts and tutors, though clearly if tutors, coaches or mentors are to be involved, this has a resourcing impact.

Rapid mobile learning: Towards a set of design models

Let's focus on three common forms of mobile learning:

1. Video/audio learning
2. Simple quiz/assessment
3. Performance support

What specific design approach and structure might we consider for each, if say the content area chosen was how to conduct yourself in an interview?

Obviously a precise design approach should be driven by considerations of audience, objectives, its role within the blend, and the nature of the available content. Here we outline an initial framework to consider for rapid mobile learning design, applying the design steps included in the above set of criteria, across three different approaches:

Rapid design step	In Video/audio component?	In quiz/assessment component?	In performance support component?
1. Get attention	10 second intro with shocking fact or stat, e.g., expert audio voice: "90% of people don't get the job because they make a stupid mistake in the interview. Want to be in the 10% who don't make the mistake? Then invest 5 minutes in figuring out how to avoid it."	Same content, using text and potentially graphic to illustrate point	N/a, performance support should be menu driven (though this could potentially be a side-bar fact on a splash screen)

Rapid design step	In Video/audio component?	In quiz/assessment component?	In performance support component?
2. Set the scene	10 second voiceover: "This 5 minute module explains the 5 questions that people most commonly answer incorrectly in an interview. You'll watch a video of different situations then have 5 seconds to decide how you'd handle it."	Text explaining you're in an interview and you're going to be asked 5 questions to see if you can get hired or fired by SMS...	Menu with explanatory text that this short reference tool explains the 5-10 key points to bear in mind when preparing for an interview, can be accessed in any order, and can be accessed on the day of the interview (in the waiting area if you like...)
3. Present content	Video clip of situation 1, interview panel presenting video	Case study question presented (could include graphic)	<p>One screen per tip/best practice Tip: e.g. how to sound assertive without being arrogant.</p> <p>What you can do... Simple bullet points (graphics/audio if relevant e.g. tone of voice).</p> <p>What not to do... Simple bullet points of pitfalls to avoid.</p> <p>Remember one thing: Key point.</p>
4. Provide Practice/ challenge opportunity	Voiceover explaining you have 10 seconds to decide what you'd say in response to the question	<p>MCQ based on question.</p> <p>Feedback to say you're closer to being hired or you're not looking like the candidate most likely...</p>	N/a though reflective questions could be included in the above content presentation.
5. Summarise key point	<p>Expert v/o (or video) Asking learner how they did, how would they do if they're being interviewed in the next 10 minutes?</p> <p>Explain key points to remember (use a three step list or acronym to help embed in memory)</p>	<p>Present learner with score. If less than 60% (or determined level), SMS from tutor to ask if they want to talk a little more about preparation for the interview.</p> <p>Ask them to submit date of next interview</p>	<p>Final screen with all key points summarised.</p> <p>Include links to more reference/contact points/tutor support.</p>

Rapid design step	In Video/audio component?	In quiz/assessment component?	In performance support component?
6. Call for action and signal support	<p>Encourage learners to make notes to help them before the interview Include one url (link to consolidated set of support resources)</p> <p>SMS details for tutor</p>	<p>Send SMS night before next interview with good luck message and reminder of key 3 points to remember.</p> <p>Alternatively, use the calendar/diary function on the phone to set yourself a reminder to look at the quiz the night before your interview.</p>	Repeat SMS idea from assessment example

There are some specific design requirements to consider when delivering just in time information via a mobile device:

- Just in time information, such as product knowledge, may not need a learning design per se, but certainly needs an information design that makes it quick and simple to access what's required.
- It needs to have a powerful search engine that enables users to quickly access the relevant information based on several criteria (e.g. by price, by match to customer needs, by functional spec). Much of the information design effort therefore goes into categorising and packing content to allow people to search using a range of criteria.
- Colour coding or use of icons can be an effective way to codify search results – these methods don't have to take up too much precious screen real estate on a mobile device.

Obviously, there is scope for variation in these designs and customisation required based on what your target audience requires, the subject matter, existing assets and technical and cost constraints. However, by using a structured approach, and crosschecking against the additional criteria above, we can start to work towards design models for mobile learning that are instructionally sound and potentially reusable as rapid mobile learning frameworks.

So what was Ufi/learndirect's experience in piloting approaches to mobile learning?

The next section briefly explores the approach taken and findings.

Ufi mobile learning pilots and experiences

Ufi/learndirect collaborated with Kineo to develop three mobile learning pilots. The criteria for these was to:

- Examine what’s feasible on key devices
- Explore how existing Ufi assets could be re-packaged with new content and interactions
- Explore different learning design and build approaches

The three pilot approaches taken were as follows:

Pilot	Device	Design approach	Authoring tool	Output
1. Reuse of video assets + new interactions for PDA	PDA (HP IPaq)	Short learning module	Flash	Flash (with html launcher so can run on web)
2. Re-use of video assets + new interactions for video enabled MP3 player	Video enabled MP3 player (iPod)	Video + audio component: short performance support module	Quicktime	MPEG4
3. WAP push quiz	Browser enabled phone Nokia 6233 or Sony Ericsson K750i	Simple quiz/assessment	Html	WAP push to browser enabled phone

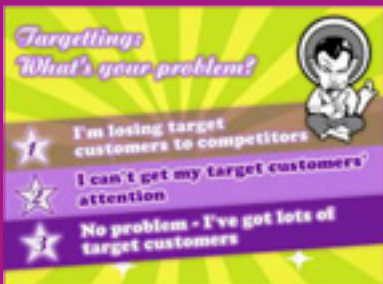
Below we share the approach and findings, to help the learning design community benefit from our experience on these pilots.

1. PDA pilot

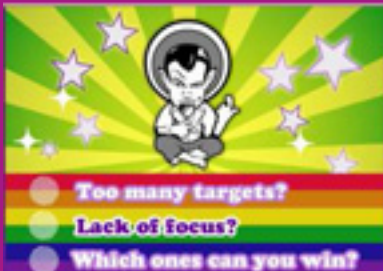
Goal:

Examine a number of existing short video-based comedy films to explore:

- Potential to extend the potential of existing assets with added learning experience
- Delivery potential on PDA
- Process for rapid ‘wraparound’ by creating template screens



Multiple choice questions



Feedback screen



Hot graphic screen

Design approach taken:

We developed a series of new screen templates to wrap around existing video assets, to introduce some interactivity and extend the learning point and rebuilt in Flash:

Screen shots of new screen types introduced.

These new 5 interactive screens used voiceover to follow the style and tone of the original video and to complement and enhance it with additional learning materials to reinforce key messages.

Key observations:

- It is an effective way of delivering additional information and enhancing the video experience
- As always there needs to be alignment between the target audience, content and device: this content is about basic sales training which may or may not be an ideal fit for PDA users
- The templates are inherently reusable once initially set up and could be made easy to populate via XML
- A variety of screen types can be used to achieve this – it's critical to keep them simple and light on animation
 - MCQ
 - Hot graphic
 - Graphic with voiceover
 - Progressive reveal
- Processing power/device capacity is a limitation on PDAs. They do not compress video very well, but are steadily improving
- Using vector graphics as we did in this prototype example provides a way around video compression issues and to allow for scaling on different devices
- Need to keep animations light as it can't handle too many layers at once (a voiceover and building bullet points with changing backgrounds is too much)
- Does not handle building and synced bullet points well (again this is a processor speed issue)
- Length is an issue: more than 5-6 minutes and the experience starts to drag

2. Video enabled iPod

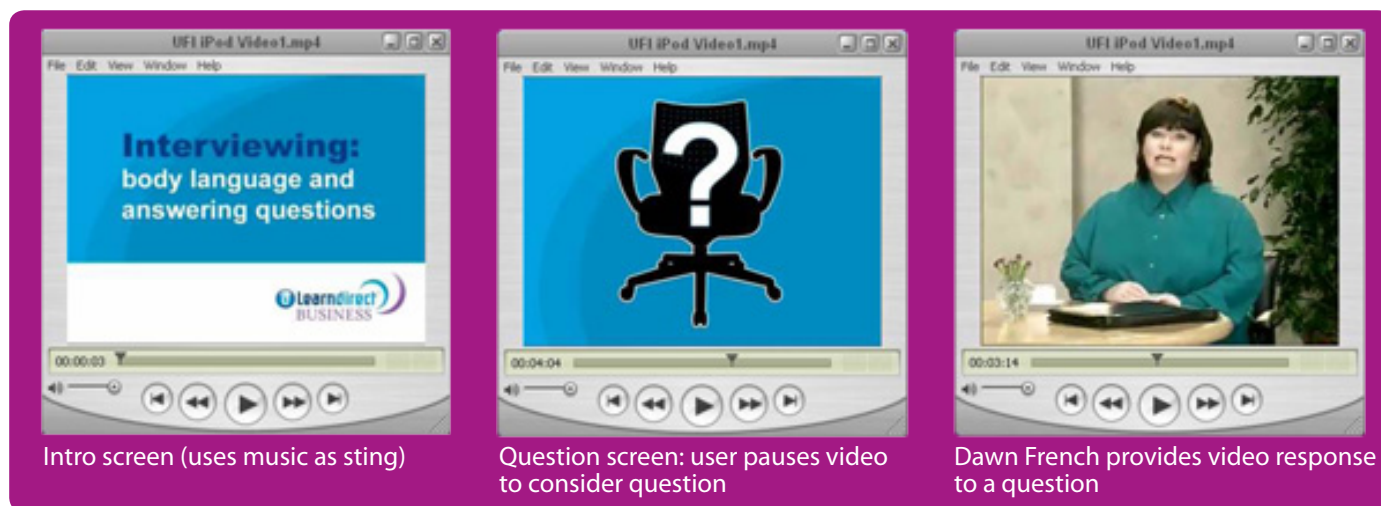
Goal:

Re-use video assets in use in employability offer on effective interviewing to explore potential of extending their reach and impact by deploying to a video enabled iPod.

Design approach:

We took a video asset featuring Dawn French and John Cleese which was produced by Video Arts, known for their entertaining and engaging video-based content and themselves doing some very interesting work around short digital learning chapters. We added question screens with voiceover to the original video, asking the learner to pause and consider the answers. We also included some exercises on how to sit in an interview, eye contact, and responding to questions. The video asset and new screens were designed to be mutually reinforcing.

Sample screen shots:



Key observations:

- It is quite possible to introduce some 'interactivity' to a video deployed to an iPod or MP3 player through well scripted reflective questions, encouraging the learner to pause and reflect
- Keeping the clip short (5-6 minutes max) is critical
- Use of humour helps to reinforce the message
- Video compresses extremely well to the device
- It's quite straightforward to record and add additional screens
- Portable to different devices
- It would be possible to achieve some branching scenarios through the iPod, but may be too complex for the purpose of a simple reinforcement/reminder piece
- Best used, as always, as part of a blend, as a key takeaway and reinforcement component

3. WAP push to mobile phone

We also developed a very simple WAP quiz which can be pushed to a mobile phone, taking some previously written assessments and quizzes and redeploying them to a WAP enabled mobile phone.

Key observations:

- Very limited on volume of text, needs to be kept extremely short
- Need to observe usage and get user feedback as it can be quite tricky to view and use
- Connection charges as it's online, so potential learners must be warned about this
- WAP push message is constrained to 16 characters, suggest an SMS in advance with instructions and making the warning about call charges

In practice

Reusability of assets is ideal for mobile learning

"We're very keen on reusability. We have a vast amount of content that can be redeployed in multiple channels – and we're very interested in the potential of taking digital assets we own or could acquire and packaging them with value-adding material to turn them into short focused learning and performance support components. Our pilots with mobile learning clearly show the potential for this to work and it's something we're certainly keen to explore further."

Kirstie Donnelly, Director of Products and Marketing, Ufi/learndirect

Mobile learning: final considerations

Here are some final thoughts about mobile learning to bear in mind if you're considering taking mobile learning into your organisation:

- 1. Make the cost clear:** If developing any mobile learning that is likely to incur a download or connection charge, you should clearly signpost to users that this is the case, and where possible, provide an alternative format, e.g. a file that can be downloaded to a PC then 'sideloaded' to a mobile device, so that mobile download charges are not incurred.
- 2. Offer offline version:** Any prototyping of mobile learning for should include an MP3 compatible version, to address cost of access issues and explore uptake for this device category.
- 3. Provide for a range of devices:** Consider piloting mobile learning that works on a device from each category with the highest level of user penetration.
- 4. Appeal to business benefits:** Any foray into a mobile learning offering should pay particular attention to the potential for the organisation, stressing the benefits of productivity and access to time-critical information.
- 5. Test a range of design approaches:** Follow the examples provided in this guide to keep it short and simple, but also experiment to divert and establish your own design conventions for mobile learning -- it's a new field, there aren't hard and fast rules
- 6. Use existing content and add to blend:** A great place to start is by extracting and repackaging existing content with a performance support/reinforcement intention, supporting existing materials, rather than attempting to recreate e-learning courses in a new medium, or act as a primary delivery tool with the blend.

Take it further

What do you want to do?

Read other guides in this series

Download an example mobile learning prototype

Help is at:

More UFI guides

More Kineo guides

Download UFI prototype
(mpeg 4 movie file. 9.2MB, best viewed in Quicktime 7.1.3 and above, or iTunes)

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