

---

**National College of Ireland**  
**MSc Learning Technologies**  
2009/2010

**Barriers to the Embrace of Mobile Learning in the  
Company Setting**

Dissertation

Anne O'Connell BEng, HDip.  
08874484  
aoconnell\_us@yahoo.com



National  
College *of*  
Ireland

*The college for a  
learning society*

---

I hereby certify that this material, which I now submit for assessment of the programme of study leading to the award of Master of Science in Learning Technologies is entirely my own work and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

Signed:

Aime Connell

Date:

02 August 2010

Student Number:

08874484

## Table of Contents

Abstract.....	- 2 -
Acknowledgements .....	- 3 -
1. Introduction .....	- 4 -
1.1 Literature Review.....	- 5 -
Learning Theory & Instructional Design.....	- 5 -
RSS Feeds and Podcasts .....	- 10 -
Mobile Learning .....	- 11 -
Mobile Applications .....	- 14 -
Mobile Learning in Action .....	- 16 -
Mobile Phone Usage and Mobile Networks.....	- 18 -
Data Plans .....	- 19 -
Usability.....	- 20 -
Context.....	- 23 -
Cloud Computing .....	- 25 -
1.2 Research Questions.....	- 26 -
2. Method.....	- 27 -
2.1 Preliminary Questionnaire .....	- 27 -
2.2 Online Survey .....	- 32 -
2.3 Interview .....	- 41 -
3. Results .....	- 43 -
3.1 Preliminary Questionnaire .....	- 43 -
3.2 Online Survey .....	- 46 -
3.3 Interview .....	- 57 -

## TABLE OF CONTENTS

---

4. Discussion.....	- 59 -
5. Future Perspectives.....	- 64 -
References .....	- 65 -
Appendix A: PRELIMINARY QUESTIONNAIRE.....	- 71 -
Appendix B: ONLINE SURVEY.....	- 74 -
Appendix C: RESULTS OF PRELIMINARY QUESTIONNAIRE.....	- 80 -
Appendix D: RESULTS OF ONLINE SURVEY .....	- 100 -

## **Abstract**

During the past two decades the topic of mobile learning has generated much interest. Academics and authors have explored the feasibility of using hand held devices in learning. Funded projects have researched the possibilities mobile learning would bring to learners and educators in all settings from an educational setting through industry and corporations. Focus was given to the advances that mobile learning would provide across all economies and demographics from aid workers in developing countries to large financial institutions in first world countries.

This report investigates why mobile learning has not been better adopted as a learning delivery method in the company setting since its inception. The research analyses learning theories and instructional design methods to understand if gaps exist in requirements that mobile learning cannot fill. Mobile learning literature was studied to understand the conclusions prior research had drawn regarding scope and barriers to mobile learning. Suspected influencers such as location based services, service provider data plans and advances in mobile devices and technologies were investigated to determine what is happening today that may drive success or failure of mobile learning in the near future.

Surveys and questionnaires were used to collect data from company employees to determine success rates of mobile learning and user views and expectation about the scope within their organization to utilize this learning delivery method. An interview with a successful mobile learning provider was completed to understand their views of the requirements for success in the mobile learning market.

The research concludes that despite well over a decade of hype around the topic of mobile learning, few successes in mobile learning were evident prior to very recently. However an explosion in the availability of smart phones, together with 3G telecom networks to support internet access from handheld devices sets the scene to overcome many of the old barriers and finally allow mobile learning to complement other learning delivery methods in the company setting.

## **Acknowledgements**

The completion of this thesis has been a rewarding and at times challenging experience for me. This would not have been possible without the support and assistance of a number of people. I take this opportunity to acknowledge and thank those individuals.

I would like to thank my project supervisor, Dr. Eugene O'Loughlin for his continued support and advice. Additionally I thank all my lecturers at National College of Ireland during the past two years. Thanks also to my friends, family and contacts that encouraged me throughout the process and those who answered my surveys. A special thanks to Keith O'Loughlin, Head of Technology Services at Intuition who took the time to meet with me in person to discuss his experiences and views with me in addition to sharing his expertise. Finally thanks to my colleagues at Ericsson who supported and encouraged me through my journey.

## 1. Introduction

Mobile Learning has been described as any learning when the learner is not at a fixed, predetermined location or when the learner takes advantage of the learning opportunities provided by mobile technologies (O'Malley et al, 2003). Kukulska-Hulme (2005) described mobile learning as being partially about learning but also partially about the breakthroughs of mobile computing and global marketing of mobile devices.

During the 1990's much enthusiasm was shown for mobile learning and the potential of the handheld mobile device as a method of delivering learning material to all types of learners. The term ubiquitous was suddenly synonymous with mobile learning. Many major mobile learning research projects were funded. Dedicated conferences and seminars were run. Initiatives and trial courses were developed and deployed in a variety of settings from 3rd level college to health workers in Africa.

During that past decade, mobile phones have become smarter, more reliable and more available to the generic user. Certainly as mobile devices become more available, we also see a wider variety of phone types and operating systems available. Perhaps the wide array of platforms and the lack of standards are slowing down the embrace of mobile learning. With mobile technologies changing and advancing so rapidly today, are organizations simply not able to keep abreast of the available options? Why is mobile learning deployment so sporadic in organisations? Years of effort have been invested in development of standards for PC based courses and online learning and determining the best way to incorporate instructional design requirements into these courses. Perhaps there is too much focus from organizations on attempting to deploy a similar solution as the PC based learning to the mobile device. Are organisations too focused on the technology available and not giving enough thought to how these mobile devices can be best used in a simple manner to aid employee learning? Is security a concern for organizations worried about company information stored on a handheld device that could be more easily lost or stolen than a laptop? How will companies protect their information? Can streaming content provide a solution to this problem?

This research is aimed to investigate some of these issues which may be barriers to the embrace of mobile learning in a company setting. Surveys and interviews were used to assist me in collecting data. Employees at a wide range of companies were targeted to answer questionnaires to assist me in discovering the opinions and perceptions of employees regarding mobile learning and the use of mobile devices for informal learning. Informal interviews with mobile learning and technology experts gave me an insight into some of the issues in developing and promoting mobile learning to companies.

### ***1.1 Literature Review***

This literature review investigates the existing research into the current status of mobile learning. Mobile learning is defined as the provision of training and education on mobile devices including smartphones, Personal Digital Assistants (PDAs) and mobile phones (Kcegan 2005). This literature review will explore learning theories and instructional design concepts in an attempt to evaluate if mobile learning can meet the requirements of these theories and concepts in the delivery of content to the learner. Additionally, some of the existing views towards mLearning are studied to appreciate what academics and authors have written about the topic. A study of mobile applications and existing examples of mobile learning provide a good picture of the status of mobile learning today. Some possible barriers to the success of mobile learning are examined by looking at mobile device usability. The review will also examine mobile phone data plans, cloud computing, mobile device usability and how all of these influence mLearning.

### **Learning Theory & Instructional Design**

Skinner (1954) describes the importance of basic behaviourism principles of stimulus-response, feedback and reinforcement. Truelove (2007) describes the first four levels of Maslow (1943)'s hierarchy of needs as "deficit needs", explaining that at once these needs are met these cease to be motivating. The last level, self actualisation, is different. "These needs involve the continuous desire to fulfil potentials". In order to be self-actualising, the lower order needs must be fulfilled at least to some extent. Truelove

explains that training and learning is a critical ingredient for motivation “The more someone can do, the more you can motivate them”.



**Figure 1: Maslow's Hierarchy of Needs**

In 1956 Bloom's Cognitive Taxonomy provided a method for classifying educational objectives. It is a useful tool assisting trainers to determine what level of cognitive skill they want their learners to attain. Higher level learning is dependent on the achievement of learning at the lower-level first. That is, learning is hierarchical. This table shows Bloom's levels from low to high:

**Table 1 - Bloom's Cognitive Taxonomy**

Category	Example
Knowledge	The learner must recall information
Comprehension	The learner understands what is being communicated by making use of the communication.
Application	The learner uses abstractions (e.g. ideas) in particular and concrete situations.
Analysis	The learner can break down a communication into its constituent elements or parts.
Synthesis	The learner puts together elements or parts to form a whole.
Evaluation	The learner makes judgments about the value of material or methods for a given purpose.

Truelove (2007)

Each classification should be a “purely descriptive scheme in which every type of educational goal can be represented in a relatively neutral fashion” (Bloom 1956).

Gagne (1985) created a nine-step process called “the events of instruction”, which correlate to and address the conditions of learning. The figure below shows these instructional events with the associated mental processes in the right column.

**Table 2 - Gagne's 9 Events of Instruction**

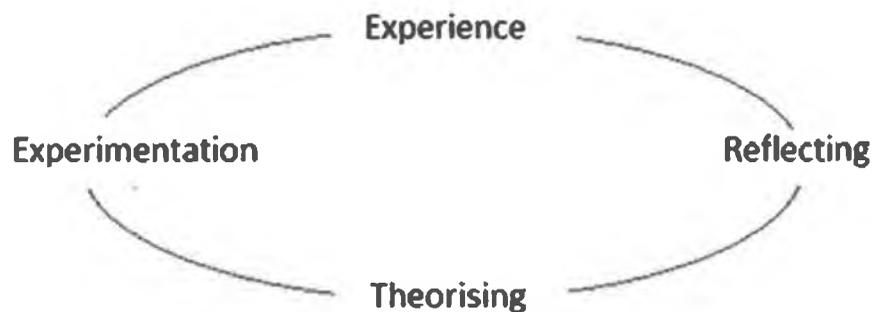
<b>Instructional Event</b>	<b>Associated Mental Processes</b>
1. Gain attention	Stimuli activates receptors
2. Inform learners of objectives	Creates level of expectation for learning
3. Stimulate recall of prior learning	Retrieval and activation of short-term memory
4. Present the content	Selective perception of content
5. Provide "learning guidance"	Semantic encoding for storage long-term memory
6. Elicit performance (practice)	Responds to questions to enhance encoding and verification
7. Provide feedback	Reinforcement and assessment of correct performance
8. Assess performance	Retrieval and reinforcement of content as final evaluation
9. Enhance retention and transfer to the job	Retrieval and generalization of learned skill to new situation

(Gagne, 1985)

According to Gagne, intellectual skills are cumulative in nature, once a new skill has been learned it becomes the prerequisite entry skill of a higher order skill. Novak et al (1984) also stated that knowledge is constructed from previous knowledge. Ellis (1994) states that deliberate and careful scaffolding of instruction helps students become independent learners. Mednick et al, (1964) state that in classical conditioning “the unconditional stimulus occurs without regard to the subject’s behaviour”, whereas in

operant conditioning “the reward is contingent on the occurrence of a response”. They describe classical conditioning as preparatory or anticipatory but operant conditioning as serving primarily to guide “an organism which already has certain critical responses available”.

Kolb (1984) developed four stages in the learning cycle: experience, reflecting, theorising and experimentation.



**Figure 2 - The Learning Cycle - based on Kolb (1984)**

Often the trainers greatest contribution is ensuring that appropriate “reflection has taken place for the fundamental aspects of the learning to be internalised” (Gough, 1996).

Ellis (1994) stated that “increased opportunity to learn content is correlated positively with increased student achievement”. However Illeris (2008) finds that as the learning possibilities far outweigh what an individual can possibly learn, defences against learning are inevitable. Mayer (2001) finds that when a topic is difficult for learners to understand from words alone that multimedia offers a “potentially powerful” way to assist to assist understanding. He stated that the method of presentation and use of text embedded in images versus text separate from images was important. Also how narration is used as opposed to text was important. Sweller (2002) discusses the “redundancy effect” which occurs when additional information, rather than enhancing learning, actually interferes with learning. As an example he explains that instead of integrating a diagram with redundant text or presenting this redundant text in auditory form, learning is enhanced by eliminating the text.

Discussing learner needs, Rosenberg (2001), outlines how employees should have access to the information required to perform their jobs, “whenever and wherever it is required”. Employees expect an extensive approach to information that is reliable, accurate, complete and organized for easy retrieval and use. A company’s learning strategy should ensure the content is the correct content, in the right format and continuously available. A correct balance between training and information should exist. Employers must realise that it’s not always necessary to deliver a training course (Rosenberg, 2001). Pressure has a negative effect on the performance of a poorly learned skill while performance of a well learned skill is improved by that same amount of pressure. (Mednick, Pollio & Loftus, 1964)

In the late 1950’s Kirkpatrick developed a model for training evaluation that is still used today. It is composed of four levels:

**Table 3 - Kirkpatrick’s Levels of Evaluation**

Kirkpatrick’s Levels of Evaluation	
Reaction	What did the learner think about the training?
Learning	Have the learning objectives been met?
Behaviour	Did the learning transfer to the job?
Results	Has the training helped departmental/organisational performance?

(Kirkpatrick, 1950)

Evaluation of training is important for many reasons. In addition to providing required feedback regarding the efficiency of the delivery method and knowledge and skills imparted on the learners, it also enables the “effectiveness of an investment in training to be appraised which can help justify expenditure on future programmes” Truelove (2007).

In discussion on the barriers to learning Illeris (2008) states that contexts and situations that are deemed unacceptable can cause a resistance to learning. A resistance to learning is potentially developed in unacceptable situations. Another important barrier to learning discussed by Illeris is defence against learning which is manifested when “the learning possibilities far exceed what an individual can manage”. Schugurensky (2007)

suggests that we cannot isolate learning from the activity, the culture and the context in which it takes place. Novak & Gowin (1984) stated "The learner must choose to learn; learning is a responsibility that cannot be shared". Rosenberg (2006) warns that badly developed training, unnecessary training, training delivered to the wrong people or training delivered at the wrong can be worthless despite the perfect use of technology for that delivery.

Prensky (2009) determined that his earlier categorisation of Digital Natives and Digital Immigrants as a method of differentiating between the young people of today and many of their elders in terms of their exposure and awareness of digital technology will become less relevant as we move further into the 21<sup>st</sup> century. He suggests the term digital wisdom. "Digital wisdom transcends the generational divide defined by the immigrant/native distinction. Many digital immigrants exhibit digital wisdom." Prensky states that digital technology enhances memory and this Digital cognitive enhancement is a reality in every profession, even in non-technical fields. Digital technology will never replace the human mind but can enhance our search for knowledge and our development of wisdom. "The digitally wise look for the cases where technology enhances thinking and understanding".

Janson & Janson (2009) wrote about Digital Learning Objects (DLOs). A DLO is any digital resource that can be reused to support learning. DLO's challenge learners to question the information, investigate further, analyze and synthesize information, problem solve, make decisions, and reflect on their learning. DLOs permit students to work at a pace that suits them and can provide "scaffolded learning tasks that offer real-time feedback on performance in a variety of supportive and engaging ways". Masie (2002) wrote "People are not single method learners" and described blended learning as the use of two or more distinct methods of training. Masie believed that blended learning adds a much greater opportunity for the learner to master the content and "move towards transfer and performance" than single method learning.

### **RSS Feeds and Podcasts**

Richardson (2009) described RSS (Real Simple Syndication) as the "next killer app for educators". With the vast amount of information available on the Internet,

learners can become bewildered. RSS allows learners to read “more content from more sources in less time” and also receive updates when information with matching keywords is published. It has easier to create and absorb content including multimedia, text and digital images. “The almost ubiquitous presence of photo-video-audio upload-it-as-you-go cell phones and free as-much-space-as-you-want hosting online have begun to blur many of the cultural definitions of privacy and communication that we’ve lived under for generations”. Podcasting allows cheap and simple method of recording audio and/or video to share with others. Screen-casting is a method of recording what a user does on computer screen with an audio narration to accompany it. Richardson describes the ease with which podcasts, videos and screen-casts can be recorded and published.

Edirisingha (2009) considers the availability of free and easy to use software on the Internet for creating, editing, distributing and accessing audio and video files, combined with the widespread ownership of digital media players has led to the “podcasting culture” of today. In relation to learning, she cites Bell (2008) "Just because a device has learning affordances does not mean that learning can (or should) be made part of the repertoires of its use" In relation to digital media players not being designed for educational setting, she suggests a process where academic community can engage students and help them "tame" their digital media players. O’Loughlin (2010) describes podcasts and vodcasts as "largely non-interactive" unless specialised software is used in their development. He outlined that they may not include desirable instructional design features such as interactive questions and exercises for the learner. To avoid mobile deliveries becoming a barrier to learning and teaching, O’Loughlin suggests that instructional designers need new strategies in developing content for mobile devices in order to maximise educational value.

### **Mobile Learning**

Prensky (2010) refers to today’s youth as being “deeply and permanently technologically enhanced” and quotes one students as stating “If I lose my cell phone, I lose half my brain”. Nash (2007) states the ability to work with many different types of content on mobile devices to identify, comprehend, categorize, and synthesize information "on the fly" is an important and largely unexplored value of mLearning.

Metcalf (2006) warns that mobile learning should not be about pouring through course material on very small screen but being able to get the right information at the right time just about anywhere. The goal should be to develop learning content that "integrates with mobile applications and provide learning and performance in just-in-time, just-in-place dynamic".

In the same way that the art of teaching varies from instructor led to online, teaching from the mobile device also has special requirements. Online learning cannot be a simple converted into mobile learning. "The peculiarities of mobile learning: the time gaps and places of its use" need to be considered (Pieri & Diamantini, 2009). "Contextuality is only a relational property that holds between objects or activities. It is not simply the case that something is or is not in context; rather, it may or may not be contextually relevant to some particular activity" (Dourish, 2004). Kukulska-Hulme (2007) discusses some barriers to mobile learning with the "nature of mobile interaction being that it is frequently interrupted or fragmented", may be highly context-dependent, and occurs in physical surroundings that may be far from the ideal.

Peters (2007) finds that mLearning will assist learners in gaining "specific skills of immediate value in the knowledge-based economy". She identifies the key features of mobile learning as "its ability to provide learning that is 'just in time, just enough and just for me' learning that is situated (typically in the field or at the workplace); and learning that is contextualised through mediation with peers and teachers". Peters states that informal learning using mobile devices is already "embedded in our daily lives". In Peters view, web-enabled phones are being used by learners to locate information and mobile learning is already occurring at the workplace, although the focus tends to be on business needs, rather than the technology used for delivery.

Ubiquitous and pervasive learning practices will bring about positive changes in educational systems. This "new culture of learning" is inevitable but it could take people some time to adapt these practices (Kramer, 2009). Caudill (2007) states "One of the possibly unexpected, but very real, demands of designing mLearning environments is to maintain the proper focus during the design phase". He stresses the importance when working with mLearning pedagogy of focusing on the learner, rather than the mobile

device technology. Dawson (2007) writes that mobile devices need minimal setup time and little support. "For many learners, handheld device can appear less threatening than a laptop or desktop computer and can allow technology to be used in a more personal way". Mobile technologies are appealing to young people and have been successful in engaging them in learning where other methods have failed.

With regard to distance education models Gregson (2007) finds that mLearning has the potential to overcome access issues, support learners who are mobile and want to learn at their own convenience in addition to providing "the option of engaging with learning communities, and making use of different media according to individual study preferences." In a paper for the MLearn Conference, Keegan (2005) answering the question 'Why has mobile learning not moved from project status to the mainstream?' stated that mobile learning was not seen as a satisfactory revenue stream by the telecommunications operators. His view was that if the mobile manufacturers could be encouraged to contemplate the usability of devices for mLearning, greater successes could be achieved in terms of encouraging users to embrace mLearning as a learning method. If course developers and educators were inspired to foster mLearning as a delivery method, the mobile manufacturers and course developers could join forces to "develop an interface that allows for optimal course development". Ally (2009) reinforces this idea concluding that work is required with mobile phone manufacturers to ensure "handset design is suited to the design and delivery of mLearning content". He extrapolates from research that most mobile devices are designed for business and industry related uses more and not for use in education and training. Ally also recommends that educators and course developers "liaise with the manufacturers of mobile devices to help build mobile devices that meet the requirements for education". Success in mobile learning will only occur when the mobile device is adapted to the learner instead of the learner and course developer adapting to the device as were his findings. According to the Horizon Report (2010) the portability of mobile devices and their ability to connect to the Internet almost anywhere "makes them ideal as a store of reference materials and learning experiences, as well as general-use tools for fieldwork, where they can be used to record observations via voice, text, or multimedia, and access reference sources in real time".

Mobile technologies make it possible to use numerous devices in the field, with maximum flexibility and portability, but Nash (2007) writes that “the sheer number of variables (types of devices, environmental variations, context differences, blend of components), creates a number of potential pitfalls for the instructional designer and learner”.

### **Mobile Applications**

A Juniper Research (2010) report noted that advertising was likely to form an increasing share of MLBS-related revenues over the next five years. Morgan Stanley (2009) believe the “always on, always there” mobile communications strengthened by real-time location information provides great opportunity for advertisers and retailers. Furthermore, in terms of Mobile Advertising they also state that personalized, location-aware ads increase engagement. In forecasts of emerging technologies, the Horizon Report (2010) predicts that Electronic Books are likely to enter mainstream use on campuses within 3 to 5 years. The report states that in addition to readers like the Kindle and Sony Reader, a number of reader applications for iPhones, Android phones, and other smartphones have entered the market.

Outside of the learning environment there are plenty examples of mobile device usage in companies. WorkTrack Construction & Crews is a wireless location and time card software system for construction companies and subcontractors. It allows workers in the field to wirelessly submit job and time data directly from the field, removing the requirement for paper timesheets. The application allows employees to enter their time directly into a cell phone allowing employers to track job and task times, breaks, mileage etc. “Construction & Crews showed that a worker was running a personal errand on company time, using a company truck and charging the company for the gas” (Worktrack, 2009).

Today in many European countries railway companies deliver tickets to rail passengers on their mobile phones via Mobile Ticket technology. Tickets can be purchased directly with mobile phones and delivered to mobile terminal by SMS (short message containing a 2-D bar code. The price of the ticket is invoiced from the customer by the telecom operator in conjunction of the monthly phone bill or directly debited from

a pre-paid account. This service removes the requirement to carry cash for ticket purchase, eliminates queuing time for customers at the ticket office and results in improved customer service and convenience (IPCS Group, 2007).

The 'Epocrates Essentials' is an application for mobile devices including iPhone, Blackberry, Palm and Windows Mobile. It provides a drug and disease reference and clinical information to medical professionals. The application provides drug information, details of interactions and disease information in addition to alternative medicines and pricing information "giving medical students faster access to health information, and more face-time with patients" (Allbusiness, 2009).

BlackBerry App World catalogue offers hundreds of applications to BlackBerry smartphone users. Categories of applications include Business, Education, Entertainment, Health and Wellness Business, Maps and Navigation, Reference and eBooks and many more. These applications provide BlackBerry users the opportunity to learn guitar, foreign language skills to reading books from their handheld device (BlackBerry, 2010). Mobile Phone provider Sony Ericsson offers an array of downloads for their phone users such as tourist guides (Interactive Mobile Guides) to destinations in tourist locations like Greece, Canada and Japan. Language training courses provide pedagogical mobile language learning tools for the learner to build language skills in a number of available languages including French, Spanish, German, Italian and Swedish. The language tool teaches common words and phrases which are divided into categories that can be learned with flash cards, word lists and quizzes. Applications can be purchased by phone or credit card (Sony Ericsson, 2010).

Companies are exploiting the iPhone's capability by creating apps that will allow users to control their home systems, for example heating, lighting and alarm from practically anyplace.



**Figure 3- Home Entertainment Magazine (2008)**

At the Barcelona Mobile World Congress (2010) Ericsson announced the opening of its eStore, “a hosted platform with more than 30,000 applications that mobile carriers can use to offer those apps to their own customers. The store's applications can be used by any mobile device, regardless of make or operating system”. This store is for service providers only not for end users (Light Reading Mobile, 2010).

### **Mobile Learning in Action**

In his chapter on “mLearning Value Proposition”, Metcalf (2006) describes business areas where wireless mobile devices can amplify personal productivity. He gives the following examples of where the mobile devices are used "consistently and commonly": Access to CRM (Customer Resource Management) Systems is valuable for the service technician while on the job. Busy executives take advantage of down time at airports and while travelling Sales representatives carrying detailed product information on their mobile device can discuss detailed product information with clients.

Hot Lava Mobile from OutStart is an LCMS (Learning Content Management System) that supports creation, delivery and tracking of Mobile content. Marketing material including Surveys, Quizzes and Usage Reports can be created. Performance Support including job aids and checklists along learning such as Courses and Assessments can be created. The content can be delivered to a wide range of mobile devices and the usage tracked (Outstart 2010). Alcatel-Lucent University (2010)

successfully used Outstart's Hot Lava Mobile at a 2009 sales conference to conduct live surveys via mobile devices with more than 1000 sales staff. The project allowed their training team to use a web-enabled mobile device, to survey attendees at the conference (American Society for Training & Development (2010)). Rob Sharpe, Director of Sales Training and Recruiting at Black and Decker presented a case study at the Learning Technologies Conference in January 2010 reporting how their company field sales team use mobile learning to keep up to date on latest products and product information allowing them to get "just enough information, just in time". Using their smart mobile devices the sales team also create videos to share with their colleagues (Certpoint, 2010).

In developing countries in Africa Community Health Workers (CHWs) are the only contact with the national health system for many poor and rural populations. Often CHWs have only received very limited medical training. As a solution to this a mobile phone-based application CommCare was developed to improve their effectiveness and help them in organizing their work, tracking patient visits, accessing health protocols, and collecting and accessing data (Centre for Global Health and Economic Development, 2009).

At the 2007 'Seriously Mobile Summit', Cardinali, the CEO of Giunti Labs, described their production of training and testing nuggets, known as 'LearnPills', compatible with a wide range of hand-held devices. Location based delivery is also added to increase the context awareness of streamed learning experiences. "For leading publishers and service providers, we are developing scenarios where learners log on to a web portal empowered by Giunti Labs' learn eXact Lobster Digital Repository (DR) automatically versioning the more appropriate content and 'pull' these nuggets to them. Alternatively, they can receive an email or SMS based notification to download the materials (a 'push' approach)" Giunti Labs (2010).

Keegan (2002) dedicated a chapter of his book 'The future of learning: From eLearning to mLearning', supported by the Leonardo da Vinci programme of the European Union, to presenting and analysing 30 mobile learning initiatives in 2001, demonstrating "the growing importance of mLearning as a field of educational research and endeavour".

### **Mobile Phone Usage and Mobile Networks**

In Ireland, from 2002 to 2008, MobileActive.org reported that the number of Mobile Cellular Subscriptions per 100 people increased from 76.3 to 115.9 (MobileActive.org, 2009). In developing countries the increase in mobile phone usage is also noted. The Millennium Development Goals Report (2008) reports that in 2006 in Africa, that over 60 million new mobile subscribers were added, with the number of mobile subscribers surpassing the number of fixed telephone subscribers in almost every country in Africa. "With around 200 million subscribers by the end of 2006, 22 per cent of Africa's population had a mobile phone, compared to 3 per cent with fixed telephone lines and 5 per cent who are Internet users."

In the past year there has been a large increase in the number and variety of smartphones available allowing users to access the Internet on the move. Globally during the first quarter of 2010, "314 million mobile phones were sold, of which 54.3 million were smartphone models" (RTÉ, 2010). According to Morgan Stanley (2009), mobile internet is increasing at a faster rate than desktop Internet did with 5 major trends converging, those trends being: 3G, Social Networking, Video, VoIP and Impressive Mobile Devices. Regarding the pace of change, Morgan Stanley expects that within 5 years more users will likely connect to the Internet via mobile devices than desktop PCs. In January 2010 Gartner reported that mobile phones will overtake PCs as the most common device for Internet access worldwide by 2013 "by which time it is expected that the combined installed base of smartphones and browser-equipped enhanced phones will exceed 1.82 billion units" (Gartner, 2010).

In 2007, Google made a major impact on the mobile phone industry with its Android operating system Google (2007). In 2010 at the Mobile World Congress in Barcelona, Spain, Microsoft presented the Windows Phone 7 Series (Microsoft, 2010). Morgan Stanley (2009) predicted that smartphones will out-ship the global notebook and netbook market in 2010 and out-ship the global PC market (that is, notebook, netbook and desktop) by 2012.

A CNN report estimated that the typical iPhone owner consumes four times the bandwidth of the typical wireless subscriber. In addition to sending e-mail messages and

accessing the web, iPhone users also view YouTube videos and maps. Apple's iPhone users are reported to be the hungriest mobile Internet consumers of all. The reason is that Smartphones users are constantly changing location, all the time tapping into the network resources, from a few seconds to hours at a time. At festivals or events where large groups of smartphone users are collected in one area, the effect can be total gridlock. This CNN report states that by 2010, global mobile data traffic is expected to be six times the 2008 levels (CNN, 2009). A result of this problem was highlighted in a report in the UK Telegraph in December 2009, when network problems experienced on O2's network in London were blamed on an increase in customers with smartphones, particularly the iPhone, using applications that repeatedly pull data off the internet. Over the Christmas period, the network had become clogged up to the extent that O2 customers in London were at times unable to make or receive calls or download data (Telegraph.co.uk, 2009).

Fourth Generation wireless (4G) is the new buzz word in Telecom Networks. Techspot (2010) describes 4G as "the stage of mobile communications that will enable things like IP-based voice, data, gaming services and high quality streamed multimedia on portable devices with cable modem-like transmission speeds". However, the set of standards and frequencies to define 4G have not yet been established as of yet by the International Telecommunication Union.

### **Data Plans**

Mobile data plans available to users could become a challenge to mLearning. Morgan Stanley (2009) believe that the rapid increase in mobile Internet usage will soon put a strain on carrier networks in densely populated areas in the USA and Western Europe. AT&T modified its data plan, removing the unlimited monthly \$29.99 data plan for mobile customers instead now offering two choices for low- and high-volume users, offering subscribers who don't consume as much data on their smartphones the chance to pay less (Enterprise Mobile Today, 2010). In response to AT&T's change in data plans New York Times (2010) predicts that "applications that stream high-bandwidth video and route phone calls and face-to-face video chats over the Internet could be seriously affected. Applications that constantly send a phone owner's location - continually uploading and downloading data from the network - could also face challenges".

In an article relating to AT&T changes in data plans, ABI Research (2010) speculate that the new tiered plans will create an opportunity for those users hoping to upgrade to the smart phone but discouraged until now by the cost of the smart phone data-plan. With this barrier now removed, consumers may opt for a cheap smart phone on a low usage plan to migrate into the smart phone world. In time "as users become more sophisticated and learn to leverage more smart phone features, they will naturally evolve towards more advanced smart phones that offer greater data capabilities. That in turn will require a higher-level data plan". Morgan Stanley (2009) reported that Wi-Fi provides benefits to the network carrier and the consumer. A Wi-Fi network gives carriers 70% cost advantage – AT&T reported 70% cost advantage from offloading data traffic from 3G network onto Wi-Fi. Additionally consumers enjoy lower access fees and equipment costs.

### **Usability**

The physical attributes of mobile devices was seen as a major concern in terms of usability. Students revealed concern regarding the size of their PDAs, inadequate memory and short battery life (Sharples, Corlett & Bull, 2005). Kukulska-Hulme (2007) is in agreement with this sentiment expressing that limitations in hardware that have been overcome for some time in computers are “back on the usability agenda when mobile devices have to be charged regularly, run out of memory, and may be unreliable”. Users also regularly upgrade mobile devices replacing existing devices with new models, even before they have grasped the full functionality of their existing device. In this paper entitled ‘Mobile Usability in Educational Contexts: What have we learnt?’ Kukulska-Hulme cites Gilbert et al (2005): "In many markets, mobile phones have a product life cycle of 12 months or less. Some subscribers are able to put their new phones to immediate and full use. For others, the learning curve is so steep that they move on to a replacement without having learned to exploit the functionality available in the first one" Keijzers et al (2008) uses the term “feature fatigue” to describe the phenomenon of increasing the number of useful functions at the expense of usability in mobile devices. This research states that although users know that products with more features are more difficult to use, they initially choose high-feature models.

Kukulska-Hulme summarizes feedback from multiple projects, reporting that results can be conflicting depending on use and the setting. In some instances the small screen of the PDA did not seem to present a problem - size of the device was viewed positively by students, "who appreciated being able to have a quick look at the device for example before an exam instead of having to carry a book or A4 papers" whereas in another project screen size was identified as the biggest drawback to using PDAs, noting especially that for sight impaired learners "the environment is impossible". Students expressed varied opinions concerning reading from a small screen. It seems that a small screen may be a problem, but not always. Kukulska-Hulme reported additional conflicting reports received regarding the user selecting from a list of options as a method to make it easier to interact with a mobile device. Some projects reported that "drop-down lists and checklists proved useful in a mobile medical training context". On the other hand an additional study in a museum setting identified that "choosing from a list of pre-written messages on the screen of the PDA did not necessarily facilitate peer-to-peer communication". The applications and circumstances of use were very different. A high level of dissatisfaction was reported among some PDA students regarding the poor wireless network functionality. On the other hand, with regard to speed, another project reported that "their medical and nursing students tended to prefer a smaller device, with colour display, to a faster one, noting that usability seems more important than performance".

In an article, MSNBC (2008) asked the question "Phone are getting smarter, but are their batteries?" With the growth in the smartphone market, phones are used to surf the Web, e-mail and download and view videos, all of which put more demands on phone batteries. The article quotes Kevin Burden, ABI Research's mobile devices research director as saying "There are ways of improving cell phone battery life, but there are very few ways of improving the batteries themselves. Essentially, battery technology is governed by God — there are just no new elements showing up in the Periodic Table".

While mobile phone talk-times generally range from 3 to 7 hours, when extra duties, such as Internet use and video, figuring out battery life becomes more difficult. The battery has not leap-frogged at the same speed as microelectronics. During the last decades only 5 to 10 percent gains in capacity per year have been achieved and "the ultimate miracle

battery is still nowhere in sight”. As long as the battery remains based on an electro-chemical process, limitations of life expectancy and power density must be taken into account. The battery remains the ‘weak link’ for the foreseeable future (Buchmann, 2001). However, Dawson (2007) states that “devices have become more powerful in processor memory and battery life; the functions they possess are more numerous and flexible. Added to this the cost of technology is falling”.

According to the Horizon Report (2010) the mobile devices today are becoming ever more capable, and the boundaries between them more and more blurred. Budiu et al (2010) report that a frustration for users of powerful phones (such as the iPhone) is with websites that are designed for regular feature phones, due to the size difference between the iPhone screen and that of a typical feature phone “a feature-phone website looks sparse and clumsy on the iPhone. Often, because of resolution differences, font sizes for feature phone websites are minuscule on the iPhone, so users need to zoom in (and thus work more) to read the content on the page.”. Nielsen (2009) stated that mobile use is one of the biggest challenges now facing many websites. Gartner (2010) predicts that “websites not optimized for the smaller-screen formats will become a market barrier for their owners — much content and many sites will need to be reformatted/rebuilt”. Mobile web users expect to access their information with fewer clicks than regular PC users. This is due to the smaller and less user friendly key options on mobile devices.

Usability Heuristics defined by Nielsen (1994), lists “Consistency and standards” as one of the ten general principles for user interface design, explaining that “Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.” Although these principles were defined for general user interface design, the same rules should apply for access to information from the mobile device. In a series of usability test on website access from mobile phones, Nielsen (2009) found that the bigger the screen, the better the user experience when accessing websites. The following table shows results of Nielsen’s tests involving users attempting specific tasks on each of 36 websites and 34 web-wide tasks where participants could use any site they chose.

**Table 4 - User Experience Success Rates by Phone Type**

Phone Type	User Experience Success Rates
Feature phones	38%
Smart phones	55%
Touch phones	75%

To encourage learners to embrace mLearning as a learning method, a course and interface must be right first time. "Usability influences whether learning is an engaging experience and has an impact on learning effectiveness and efficiency" (Kukulska-Hulme & Traxler, 2005). In their view learners will discard technologies and indeed discard the learning materials that are unusable. Regarding learners with disabilities, Kukulska-Hulme (2007), citing Dodd, Pearson & Green (2005) stated concerns regarding the introduction of teaching methods that may be dependent on inaccessible mobile technology. These concerns include demands placed on vision, hearing and mobility skills by the size of the mobile device. Rainger (2005) raises the issue of "equitable use". Aside from the size issue with mobile phones, touch-screen functionality could also prove problematic for user with disabilities or limited dexterity. Nielsen (2009) lists input issues as another usability concern with mobile devices. These include issues typing data, difficulty operating without a mouse and additional time required operating menus, buttons, hypertext links and scrolling. Nielsen reports that "text entry is particularly slow and littered with typos, even on devices with dedicated mini-keyboards".

### **Context**

Dey (2001) discusses the ambiguous use of the terms context and context-aware and develops a concise definition for both terms. He defines context as "any information that can be used to characterize the situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application, including the user and applications themselves". Dey states that a system is context-aware if "it uses context to provide relevant information and/or services to the user, where relevancy depends on the user's task". In a discussion regarding context, Schilit et al

(1994) describes some "proximate selection" examples of located objects as input and output devices that require co-location for use, for example, printers and displays. A second type is the "set of objects that you are already interacting with, and which need to be addressed by a software process", for example people in the same room to whom you would like to "beam" a document. The third type described is the set of places one wants to find out about: restaurants and stores. Dourish (2004) discusses two broad categories of context. The first category involves systems that encode context along with information so that it can later be used, for example as a retrieval cue. The second category involves using context dynamically to tailor the behaviour of the system or its response to patterns of use, e.g. Tourist Guide presenting relevant information depending on the user location.

GPS features of devices, enabling location-based and context-sensitive learning, is increasingly employed in mobile learning. Emergency services already use location-aware systems to detect the exact physical location of mobile devices. In addition to location information, context-sensitive systems are also aware of the activities of learners and therefore can offer to give assistance in the form of appropriate learning content (Smith & Cook 2009). Due to a large extent to the iPhone 3G and the Google's Android phone, millions of people are now carrying a device in their pocket that not only knows the precise location they are in but "also plugs into the Internet to share that info, merge it with online databases, and find out what – and who – is in the immediate vicinity" (Morgan Stanley, 2009). Juniper Research (2010) found that while Mobile Location Based Services (MLBS) had looked promising, in fact during the 2000-2007 timeframe little progress was made. However improvements in handset user interfaces combined with better access to a range of application distribution channels had led to greater interest from service providers in providing MLBS applications. Additionally, "the deployment of high capacity network infrastructure and attendant increases in mobile Internet adoption, providing greater opportunities for browser-based services" has aided the growth. The MLBS market is expected to exceed \$12 billion by 2014. Morgan Stanley (2009) report quotes Matthew Honan from Wired saying "Simply put, location changes everything. This one input – our coordinates – has the potential to change all the

outputs. Where we shop, who we talk to, what we read, what we search for, where we go – they all change once we merge location and the Web.”

Mobility is an essential component for pervasive (ubiquitous) environments (Loureiro, Ferreira, Almeida & Perkusich, 2007). In mobility terms Loureiro et al outline some challenges: Mobile devices are "resource-poor when compared to personal computers" thus software designers need to consider methods to save processor usage and storage space when designing for mobile devices. Techniques for saving energy also need to be implemented in mobile applications because of the limited capacity batteries. Wireless connectivity can vary in terms of performance and reliability from one location to the next. Additionally due to the broadcast nature of wireless links, they are easier to eavesdrop with than wired links. Therefore, security is an even greater issue for mobile networks than fixed networks.

In terms of context, a factor that must be taken into account is bandwidth requirements. Presenting information that changes, either due to the user moving or the contents of the dialog changing causes updates in network traffic (Schilit et al, 1994). Dourish (2004) explains some of the problem relating to context is that context is being continually renegotiated and defined in the Personal and Ubiquitous Computing course of action. However through this negotiation, the actions that individuals undertake can become intelligible and meaningful to each other.

### **Cloud Computing**

ABI Research (2009) predicts that “Cloud computing will bring unprecedented sophistication to mobile applications”. Today many complicated mobile applications require "robust computing power" on the handset. Mobile Cloud technology would allow applications to run on servers thus reducing the requirement of processing power and memory on the headset. With multiple mobile operating systems in use today, developers of mobile applications face difficulties in developing applications that will function on multiple devices. The mobile cloud could also eliminate this problem in the future with applications running on servers instead of locally thus requiring only one version of the application to run on different device types. A current issue with mobile cloud computing is that cloud-based application will stop working if connection is lost, which could be a

problem for mobile users in poor network coverage areas. The research from ABI suggests that "new programming languages such as HTML 5 will enable data caching on the handset" - this will allow the user to continue to use the application until cellular signal is restored.

In an article in Chief Learning Officer Magazine January, 2010, discussing learning in 2010, Masie (2010) discusses seeing early signs of new learning systems, for example LMS and LCMS, in development. He describes these systems as slim in size, located in the computing cloud and more focused on learners who engage in social, mobile and contextual learning.

### ***1.2 Research Questions***

The problem to be investigated is why mobile learning is not featured significantly in more organisations despite over a decade of hype. In order to investigate this I ask the following questions:

What are the reasons that mobile learning is not embraced as a method for delivering learning content to employees in companies today?

Why are handheld mobile devices not widely utilised as learning devices for formal and informal learning in companies?

What are the barriers to the success of mobile learning as a learning delivery method in companies today?

## 2. Method

This section describes the methodology used for data collection for my study. Questionnaires were distributed to a range of companies and interviews with learning and a technology expert was carried out. I made the decision to use a qualitative approach in my research. Taking a qualitative approach would allow me to focus on people's subjective experiences, views and interpretations of mobile learning as a delivery method.

### *2.1 Preliminary Questionnaire*

A preliminary questionnaire was created to gather basic data regarding mobile phone usage in companies and employee exposure to mobile learning. The feedback and data received in this questionnaire enabled me to determine the employees' knowledge regarding the concept of mobile learning and their views in terms of advantages and disadvantages of using the mobile device to access learning content. It would also give me an initial indication of the penetration of mobile learning in these companies. The resulting data from this questionnaire would assist me in building the official online questionnaire for data collection.

The preliminary questionnaire was emailed to 15 professional individuals at a range of large companies. The individual subjects chosen were professional employees who had been employed for five years or longer in a professional organisation. My expectation in selecting this group was that they should have enough service with the companies in question to understand the learning strategies and learning options available through their company. The organizations targeted included high technology, telecoms, pharmaceuticals, training and finance companies. Email was chosen as the distribution method for the first questionnaire as it was considered the method most likely to be answered by the respondents. Also it allowed the respondents freedom and flexibility in expanding on answers as desired. It would also allow them flexibility in returning to complete the survey at a later time. As only brief analysis would be completed on the initial questionnaire responses I considered this method was adequate. This initial questionnaire can be found in Appendix 1.

The introduction to the questionnaire provided a brief introduction to my studies and my proposed research question to explain the purpose of my survey. I assured confidentiality to all participants in order to allow respondents to answer questions openly regardless of whether or not they felt empowered to share information regarding their organisations' learning practices. A brief definition of eLearning and mLearning was included for the participants. For the purpose of this survey, mobile learning was explained to refer "to any learning completed by the learner on their hand-held mobile device. These devices might include the Mobile Phone (Cell Phone), PDA (Personal Digital Assistant), Smart Phone, the Blackberry etc". The definition was important as I wanted to ensure respondents did not include learning from a laptop computer in their answers regarding mobile learning. The questionnaire consisted of multiple choice and open ended question types. Multiple choice question types were used in questions that I wanted to limit the respondents' focus to particular direction. Open text questions were used when I chose to allow for a wide range of responses and opinions. The open-text answers could also give me insight into opinions that I had not previously considered.

- 1. Does your company use eLearning courses to deliver training**  
**(a) internally to company employees**  
**(b) externally to your customers/clients**  
**(c) a combination of both (a) and (b)**  
**(d) not at all**

**Answer:**

The first questions queries the respondents regarding the use of eLearning as a learning delivery method within their company. This was an important initial question to determine whether companies that have a strong base in eLearning would be more likely to embrace mobile learning as a delivery method also.

- 2. If yes, are these eLearning courses**  
**(a) designed in-house by developers at your company**  
**(b) designed by external developers at your company's request**  
**(c) purchased "off the shelf" to meet your company's needs**  
**(d) a combination of all 3 of the above**

**Answer:**

Question 2 asks how the company sourced their eLearning. This question was included to determine if companies that develop eLearning in-house are more likely to also develop some type of mobile content or if any correlation applies.

**3. Does your company provide all employees or certain groups within organization with Mobile Phones or PDAs?**

**Answer:**

This question asks if the company provides mobile phones to employees within the organisation to determine if companies that do provide mobile phones to their employees are more likely to embark on a mobile learning initiative.

**4. What type of devices are these?**

**Answer:**

Question 4 queries the type of devices provided to employees to determine if there is any connection between the types of phones provided to employees and the company's likelihood to embrace mobile learning.

**5. Does your company use Mobile Learning, Podcasts, RSS-feeds to deliver learning material to employees?**

**Answer:**

Question 5 asks if the company uses mobile learning, podcasts or RSS-feeds to deliver learning material to their employees. Podcasts and RSS-feeds were specifically mentioned in addition to mobile learning in an effort to provoke the respondent to consider any type of learning that is delivered to the mobile device.

**6. If yes to Q5, what type of learning material is made available to the employee via mobile device (e.g. short summary of instructor led training/new product feature/tips & tricks/company news etc)?**

**Answer:**

This question tries to determine what type of information is delivered to mobile devices in an effort to determine where mobile learning fits in within the company's learning landscape.

**7. If yes, in what format is learning material made available to the employee via mobile device (e.g. Podcasts/RSS Feeds/ mobile applications/eBooks)?**

**Answer:**

Question 7 queries the format that is used in delivering content to mobile devices. This information will be useful to analyse the types of content most delivered to mobile devices in the organisation.

**8. At what frequency do you receive learning material to your mobile device (e.g. daily/weekly/monthly)?**

**Answer:**

Question 8 regarding the frequency that learning content was received to the employee's mobile device was asked to determine if mobile learning was a regular delivery method for learning content. This data would assist in determining how vested the organisation is in the use of mobile learning.

**9. How is the mobile content deployed to the mobile phone? Does your employer push the content to your device or must you find and download the content from an appropriate server?**

**Answer:**

Question 9 queries how the organisation sends the content to the employee's mobile device. This information would give insight into whether mobile learning was viewed as an optional learning method in the company where the learners search and download the content on their own initiative versus a situation where the company is more proactive in enforcing mobile learning within the organisation.

**10. Is your Mobile Learning connected to a Learning Management System (LMS) that tracks uptake/completion of content? If yes, which LMS?**

**Answer:**

Question 10 asks if the mobile learning is connected to a Learning Management System (LMS) that tracks user completion of content and also which LMS are most commonly used. This information would indicate if the company used mobile learning in a formalised way. The use of an LMS might indicate that the company has invested

financially in mobile learning. Also the answers to this question would give me some additional information regarding LMS systems that support mobile learning deliveries.

**11. Do you know any companies that use mobile learning widely? If so, which company?**

**Answer:**

Question 11 is simply looking for information regarding any companies that the respondent may know that successfully uses mobile learning. This information would allow me to complete further analysis and research into such companies.

**12. Do you think mobile learning would be a useful learning delivery method in your organisation?**

**Answer:**

The purpose of question 12 was to get the employee's own view on the suitability of mobile learning as a delivery method for content within their own company.

**13. If you already partake in Mobile Learning what do you consider the main advantages and disadvantages of mobile learning?**

**If you have not been exposed to mobile learning, what would you expect to be main advantages and disadvantages?**

**Answer:**

The final question seeks the respondents' views on the advantages and disadvantages of mobile learning as a delivery method. This question was asked to collect different opinions about mobile learning which could be useful in the analysis.

I contacted 15 employees at different companies to request their permission for me to email the questionnaire to them. Ten of these agreed to answer the questionnaire. The questionnaire was sent in the body of the email and additionally as a word document attachment to provide flexibility to the respondents.

The results from the preliminary questionnaire are detailed in the results section. These allowed me to make some important decisions regarding the method of data collection for the official survey, the questions to include in the survey and the question types to use in the final survey for data collection.

---

## ***2.2 Online Survey***

Despite the conviction that email was the best method of delivery, I realised that an online survey would allow me to better categorise users answers and would also assist in the data compilation. Therefore, my official questionnaire was created using an online survey tool. After analysis of Internet applications available for survey creation, eSurveyPro was chosen as it provided good flexibility in terms of the questions types available. The use of drop down list, multiple choice single response and multiple choice multiple response would allow me to gather and analyse data more easily. The free text options would allow flexibility in the responses given to certain question where the respondent's opinions were important. Additionally, this application provided options to view summary or detailed results at any time while the survey was still open for responses.

High technology, telecommunications and financial companies were targeted. The survey was sent to fifty professionals. The audience for the survey was chosen by selecting companies that I expected to be sizable enough to have a good learning strategy. The individual respondents were selected based on the expectation that they would have good understanding of technology and mobile phone capabilities. The survey was divided into 3 sections: "The Workplace", "Your Personal Experiences" and "Your views". The sections were chosen to allow the individual questions to be grouped in a method that would create a logical flow through the survey. Each clearly labelled section would be presented to the respondent on a separate page with a next and previous button allowing the user to navigate between pages. The survey was tested on some colleagues for readability and functionality before being distributed.

The first section, the workplace, was designed to retrieve data about mobile phone usage and mobile learning use in the respondent's company.



**Mobile Learning Questionnaire**  
Answers marked with a \* are required

**Mobile Learning: Section 1/3 The Workplace**  
My name is Anne O'Connell.

I am currently completing my Thesis for an MSc in Learning Technologies at National College of Ireland.

This survey is to enable me to gather qualitative data for analysis.

In this questionnaire, Mobile Learning (m-Learning) refers to any learning completed on the learners hand-held mobile device (feature phones, smart phones etc.).

Any information you provide will be treated confidentially.  
No respondent names or company details will be published in my thesis or shared with any other sources.

Thank you for your time in completing this survey!

The introduction to this section presented information regarding the purpose of the survey and assuring respondent confidentiality. It was considered important to include a confidentiality statement to the respondent to reassure them that their names or company names would not be published in my results nor shared with any third parties. It was hoped that respondents would feel more willing to share information once this guarantee had been given. Additionally the introduction was used to define the meaning of the term mobile learning for the purpose of this survey. It has been my experience that some individuals refer to learning from a laptop to also fall under the category of mobile learning. This definition clarified that for the purpose of this survey mobile learning refers to learning from a hand held device.

The first question requests the respondents name, job title and company.

1. Please provide the following information:  
Your details (name/company name) will be treated with confidentiality.

Your Name (optional)

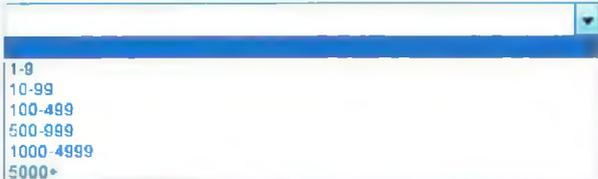
Job Title

Company Name (optional)

Name and company name were marked as optional as I considered that many people would prefer to answer anonymously regardless of confidentiality assurance that had stated in the introduction. Job title was requested as it would be useful to understand the respondent's position in the organisation.

Question 2 queries the size of the organisation.

2. How many employees are in your organization worldwide?



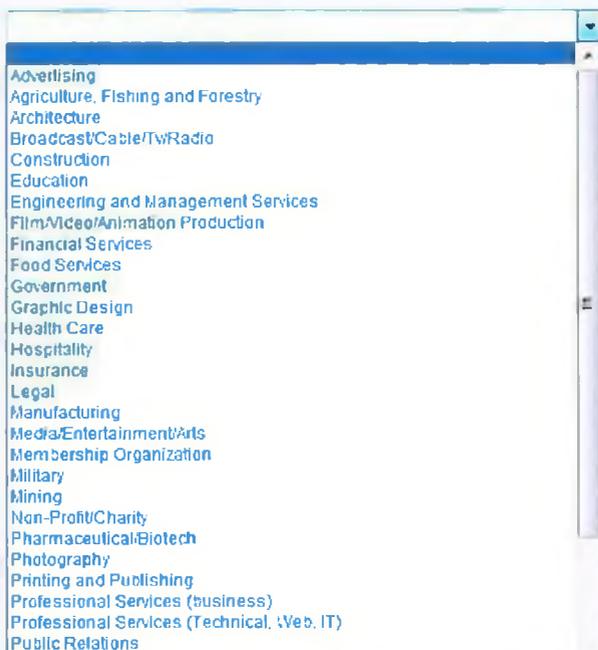
A screenshot of a dropdown menu with a blue header bar. The menu is open, showing a list of employee count ranges. The options are: 1-9, 10-99, 100-499, 500-999, 1000-4999, and 5000+.

- 1-9
- 10-99
- 100-499
- 500-999
- 1000-4999
- 5000+

The size of the company was requested to allow for analysis on any correlation between the size of the company and the use of mobile learning or the type of mobile learning used.

Question 3 requests information regarding the category of company that employs the respondent.

3. Which best describes your industry?



A screenshot of a dropdown menu with a blue header bar. The menu is open, showing a list of industry categories. The options are: Advertising, Agriculture, Fishing and Forestry, Architecture, Broadcast/Cable/Tv/Radio, Construction, Education, Engineering and Management Services, Film/Video/Animation Production, Financial Services, Food Services, Government, Graphic Design, Health Care, Hospitality, Insurance, Legal, Manufacturing, Media/Entertainment/Arts, Membership Organization, Military, Mining, Non-Profit/Charity, Pharmaceutical/Biotech, Photography, Printing and Publishing, Professional Services (business), Professional Services (Technical, Web, IT), and Public Relations.

- Advertising
- Agriculture, Fishing and Forestry
- Architecture
- Broadcast/Cable/Tv/Radio
- Construction
- Education
- Engineering and Management Services
- Film/Video/Animation Production
- Financial Services
- Food Services
- Government
- Graphic Design
- Health Care
- Hospitality
- Insurance
- Legal
- Manufacturing
- Media/Entertainment/Arts
- Membership Organization
- Military
- Mining
- Non-Profit/Charity
- Pharmaceutical/Biotech
- Photography
- Printing and Publishing
- Professional Services (business)
- Professional Services (Technical, Web, IT)
- Public Relations

It will be useful to assess if certain industry categories can be seen to favour mobile learning as a learning delivery method more than other industries categories.

Question 4 was copied from the preliminary questionnaire to assess if there is a correlation between embrace of mobile learning and embrace of eLearning within companies.

4. Does your company use eLearning courses to deliver training ...

- internally to company employees
- externally to your customers/clients
- a combination of both
- not at all

Question 5 was also copied from the preliminary questionnaire to assess if companies who design their own eLearning courses are more likely to embrace mobile learning.

5. If yes to Question 4, are these eLearning courses...  
Select multiple answers if applicable.

- designed in-house by developers at your company
- designed by external developers at your company's request
- purchased 'off the shelf' to meet your company's needs

Question 6 uses categories to assess the range of employees that receive company mobile devices from their employers.

6. Does your company provide employees with Mobile Phones?

All     Most     Some     Few     None

The responses to this question will allow for comparative analysis on the provision of company mobile devices and the delivery of content to mobile devices within the company.

Question 7 was included to query the respondent on the type of company phone provided.

7. Which category best describes these phones?

- Feature Phone
- Smart Phone
- Combination of phone types
- N/A

This data will be used to assess if companies providing smart phones to employees are more likely to embrace a strategy to deploy learning content to employee mobile device.

Question 8 uses a drop down list of major mobile phone makes to query the type of mobile device predominantly distributed to employees.

**8. If your company provides mobile phones to employees, please select the make of phone that best describes the most dominant phone provided.**

Apple iPhone  
 HTC  
 Motorola  
 Nokia  
 Palm  
 RIM Blackberry  
 Samsung  
 Seny Ericsson  
 Other

This question is asked to analyse the data to assess if companies deliver content to particular types of device above others.

The purpose of question 9 is to assess the type of mobile learning in use at the respondent's company.

**9. If your company uses Mobile Learning, what type of Mobile Learning is used to deliver learning material (formal or informal) to employees?**  
 (Please select multiple answers if applicable)

Structured Mobile Learning Course  
 Podcasts  
 Video Podcasts (Vodcasts)  
 RSS-feeds  
 eBooks  
 Other (Please Specify)

The question will also trigger the respondents to consider all types of mobile learning that may exist.

Question 10 serves to determine the type of information that is distributed to their mobile device.

**10. What type of Learning Material is made available to employees via mobile devices?**  
 Please select multiple answers if applicable.

short summary of Instructor led training  
 new product features & functions  
 tips & tricks  
 company news  
 Other (Please Specify)

A multiple choice multiple response question type with an additional free text option was used to best capture the types of content that could be delivered to the mobile devices. The frequency of receipt of material to the mobile device is queried in question 11.

11. At what frequency do you receive learning material to your mobile device?

- daily
- weekly
- monthly
- a few times a year
- never

This will provide data regarding the level of mobile learning in use at the respondents company.

Question 12 relates to whether the company pushes mobile content to the employee's device or if the employee takes the initiative to search for and download content as required.

12. How is the mobile content deployed to the mobile phone?

- My company sends the content to my phone
- I find & download the content
- Combination of both

The final question in Section1 asks if the receipt and completion of learning content is tracked by an LMS. This information may assist in determining how vested the company is in mobile learning from a technology perspective. It will also give valuable information on the companies' views on mobile training being mandatory or optional.

13. Is your Mobile Learning connected to a Learning Management System (LMS) that tracks use/completion of content?

Yes       No       Sometimes       I don't know

The "I don't know" option was included as it was expected that some respondents might not be familiar with the concept of Learning Management Systems or completion tracking.

Section 2 of the survey relates to the respondents personal usage of mobile devices. This section is designed to examine personal views to informal learning from mobile devices.

1. Does your mobile phone provide Internet access?

Yes

No

The first question is designed to determine the number of respondents that can access the Internet from their mobile phone. This data will be useful combined with later questions to analyse the percentage of respondents with Internet access that regularly use their phones for informal learning.

2. Do you access the Internet for informal learning in your own time e.g. for research, DIY tips, How-to videos etc. using your mobile phone?

Yes  No

Question 2 queries whether the respondent uses their mobile device for informal learning. Example of research, DIY tip and how-to videos are listed to bring to mind some tasks that can be considered informal learning.

3. How often do you use you mobile phone for Internet access?

daily

weekly

once a month or less

never

Internet access is not available on my phone

The purpose of question 3 is to assess the frequency that the respondent uses their mobile phone for internet access.

4. Which websites do you most often visit using your mobile phone?  
Please select all that apply and use the "other" field to add additional information.

Social Networking e.g. Facebook, Twitter

News

Email

Videos/Podcasts e.g. YouTube

Shopping

Banking

Work related sites

Other (Please Specify)

Question 4 queries the type of websites accessed by the respondents using their mobile phone. This data will give good insight into how widely the respondents rely on the mobile device for Internet access and what portion of their Internet access is for entertainment versus learning.

5. Have you ever viewed or downloaded a Podcast/Vodcast on your phone?

Yes  No

With the popularity today of YouTube and podcasting, question 5 is designed to allow me to determine the percentage of respondents who have accessed podcasts using their mobile phone.

6. If you answered Yes to Q 5, please give a brief description of the type of Podcasts/Vodcasts viewed/downloaded. For example, were these mostly for entertainment, informal learning, formal learning etc?

The purpose of question 6 is to investigate the type of podcasts viewed by respondents on their mobile phone. This information will be used to access if the podcasts were for entertainment or learning purposes.

7. Have you ever received RSS feeds to your mobile phone?

Yes  No

Question 7 relates to the respondents use of RSS feeds. This question is asked to determine if respondents have used RSS functionality on the mobile phones.

8. If you answered Yes to Q7, please describe the type of RSS feeds received?  
For example, mention the type of content e.g. news/educational/product updates/sport updates etc.

Further detail on the types of RSS feeds received is asked in question 8, again to determine if RSS feed usage is for learning or entertainment purpose. This question was

designed as an open text question as opposed to a direct question on whether the RSS feeds were learning or entertainment as some users may be inclined to only answer learning if the content is formal learning.

The third section of the questionnaire queries the user regarding their views on mobile learning. This data will give the option of extracting additional information from the respondents based on their opinions regardless of whether or not their company uses mobile learning. It is hoped that the questions in the previous sections may have provoked some thought in the respondent with regard to mobile learning even if they have not yet experienced this form of learning delivery.

1. Do you know any companies that use Mobile Learning?

Yes  No

The first question asks if the respondent knows any companies currently using mobile learning. In the cases where the respondent's company doesn't use mobile learning, this answer can provide extra information about other companies that were not surveyed.

2. If yes to Q1, can you provide the name of the company/companies?

Question 2 asks specifically for the name of companies using mobile learning. This information will allow me to perform further analysis on companies involved in mobile learning.

3. Do you think that Mobile Learning would be a useful learning delivery method in your organisation in conjunction with Instructor Led Training and eLearning?

Yes  No

The purpose of question is to determine the respondent's view on whether mobile learning could be a useful method of learning in their company.

4. If you already use Mobile Learning, what do you consider the main advantages and disadvantages of this delivery method for learning?

If you have not been exposed to Mobile Learning, what would you expect to be the main advantages and disadvantages of this delivery method?



The final question in the survey asks for the respondents views about the advantages and disadvantages. This question was included to provide me with possible additional views that had not already been considered regarding the advantages and barriers or disadvantages to mobile learning in companies.

### ***2.3 Interview***

A respondent to my online survey listed the company Intuition as a company involved in mobile learning. On further investigation it was determined that this was a leading mobile learning company in my locality. A meeting was arranged to discuss successes, views and vision regarding mobile learning. My intent attending the meeting was to learn the answers to the following questions:

How long has intuition been involved in mobile learning? This question was interesting to me as I had not discovered a large number of companies using mobile learning. The intent was to discover how long they had experienced success in the field of mobile learning and whether they had simply produced some pilot courses versus serious mobile learning deployments.

Who are some of their customers? The purpose of this question was to determine if their successes were limited to particular industries or across many industries.

What type of solution do they provide? This question was asked to determine if Intuition provided tracked content and discover how the content is deployed to end users.

What sets them apart from other mobile learning providers in the industry? The purpose of this question was to determine what gives Intuition the edge over their competitors. The answers received and the information gained is discussed in the Results section.

### 3. Results

This chapter describes the results collected from the preliminary questionnaire, the online survey and the interview.

#### 3.1 Preliminary Questionnaire

Of the 15 preliminary questionnaires distributed, 10 responses were received. Nine of the ten respondents reported that eLearning is used in their company. The following pie-chart shows the distribution of the use of eLearning to deliver training internally to employees and externally to customers.



Figure 4 - eLearning use in the company

Of the nine companies using eLearning, the following chart shows the distribution of how these companies source their eLearning content, that is, the number of companies developing their eLearning internally, using external developers, or purchasing eLearning off-the-shelf and lastly a combination of all three methods to source eLearning content.



Figure 5 - eLearning sourcing

Of the 10 questionnaires returned, 8 respondents reported that employees in their company received company mobile devices. The following table shows the predominant types of devices reported by these respondents.

**Table 5 - Types of Devices Reported**

<b>TYPE OF DEVICE</b>	<b># OF RESPONDENTS</b>
Blackberry	4
Android Nexus	1
iPhone	1
Sony Ericsson	1
Nokia	1

Of the 10 questionnaires received, two respondents reported that mobile learning of some type is used within their company. For each of these two respondents' companies, the following table shows the type of content distributed to employees via the mobile device:

**Table 6 - Type of content distributed via mobile device**

	<b>Summary of Training Material</b>	<b>New Product features</b>	<b>Tips &amp; Tricks</b>	<b>Company News</b>
<b>Respondent A</b>	X			X
<b>Respondent B</b>		X		

Table 7 shows the methods used to distribute content to employees at these two respondents' companies.

**Table 7 - Mobile Learning Method(s) used**

	<b>Mobile Applications</b>	<b>Podcasts</b>	<b>RSS Feeds</b>	<b>eBooks</b>
<b>Respondent A</b>	X	X		
<b>Respondent B</b>		X		

Regarding the frequency that employees in these two companies received learning content to their mobile devices, one answered that mobile content was received at least monthly and the other that their company had delivered mobile content to employees only as a proof of concept. Neither of these respondents' companies used a Learning Management System to push the content to the learners' devices or track the learners' use or completion of content.

The penultimate question asked if the respondents thought that mobile learning would be a useful learning delivery method within their organization. Half of the respondents felt that mobile learning could be useful in their organization. Respondent1 stated that "Lower down the organisation is where the real learning potential could be" He suggested that there could be a good case for using mobile learning to train front line employees who are interacting with customers. "Given the rate of change in our business it would be a useful tool to keep on top of changes". Respondent1 also makes the case that moving up the organisation to more senior levels that there could be more scope to leverage mobile feeds as a communication tool more than a learning tool. Respondent6 considers the real potential of mobile learning to be as an extension of her company's online learning offering, allowing users to access information on whichever device they choose depending on their location. She has yet to see many real use-cases where mobile learning is the 'only' solution to solve a company's learning problem.

The final question asked respondents about their views on the advantages and disadvantages of mobile learning. The two main advantages stated by respondents were the speed at which information could be accessed and the ability to access learning content while away from the office. Additional answers included that the time saved by not pulling sales professionals from the field to learn at a computer station would be beneficial; easier access at home and allowing more people who travel, for example, sales teams, access to learning at all times - while they wait at the airport – taxi cab ride – or anywhere would be advantageous. Respondent6 stated as a caveat to mobile learning to be a success the company would need to track the learning process, test the learners' knowledge and have the learners apply that knowledge to ensure the solution really works.

Regarding the disadvantages of mobile learning the user interface and screen size featured as the main concerns of respondents. Respondent 1 felt that mobile devices were not yet “there” in terms of user interface and software to run initiative programmes that would require medium periods of interaction. Additionally it was stated that content is not always suitable for mobile devices and altering content, for example, websites and movies etc, for viewing on mobile devices is tedious. Respondent6 stated possible security risks (depending on how the data is pushed to users) as another disadvantage of mobile learning. Respondent7 answered that the wide array of mobile devices available and the ever changing options and interfaces make it difficult to invest on delivering content to mobile devices.

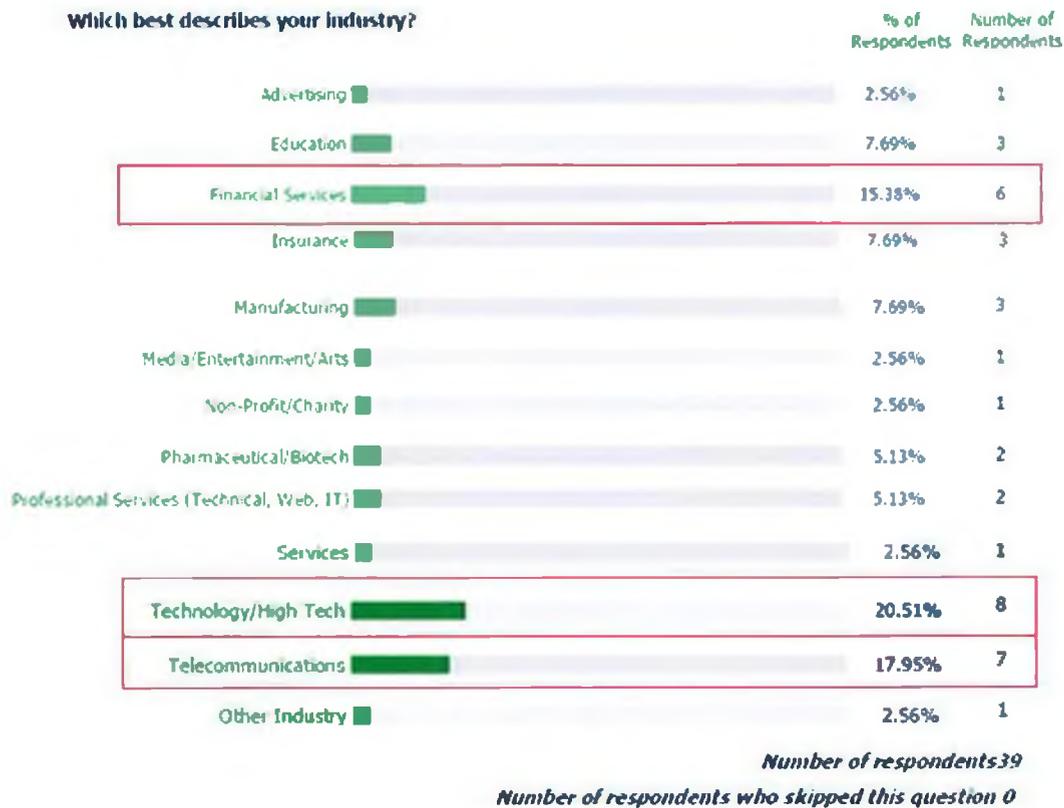
### 3.2 Online Survey

The results of the survey are included in Appendix D of this report. Thirty nine respondents completed the online survey. As assured in the survey request respondents’ names and company information has been removed from the survey results to protect the identity of respondents’ and their companies. The results showed that 59% of the respondents are employed by companies with more than 5000 employees.



The majority of the respondents are employed by Financial Services, Telecommunications and Technology/High Tech industries.

## RESULTS



A total of 72% of the respondents reported that eLearning is used in their company to deliver training to company employees, to their customers or a combination of both.

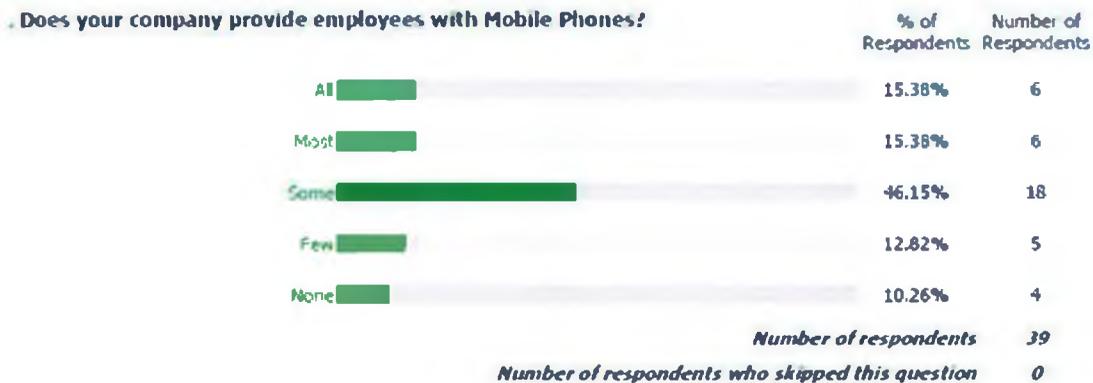


When questioned about how their company sources eLearning from, a combination of answers were received. The majority of eLearning is created in-house or designed externally at the company's request. Eight respondents did answer that they purchased eLearning off-the-shelf. As this question was a multiple choice, multiple response

questions, the chart is not indicative of the exact scenario. Companies source their eLearning courses in multiple ways.



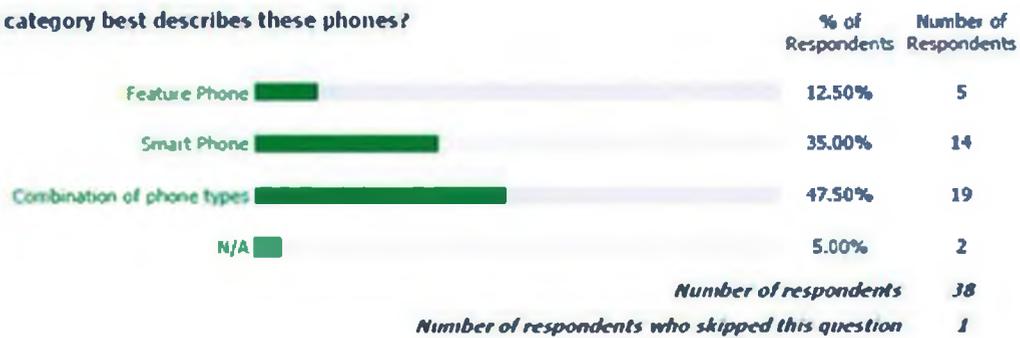
Regarding mobile phone distribution by companies to their employees the results indicate that only 31% of companies provide mobile devices to most or all employees. 46% of respondents answered that some employees in their company are provided with mobile phones. This section of the data is ambiguous as the respondents' interpretation of the categories most, 'some' and 'all' is unclear.



The majority of the company-provided phones are smart phones or a combination of smart phones and feature phones.

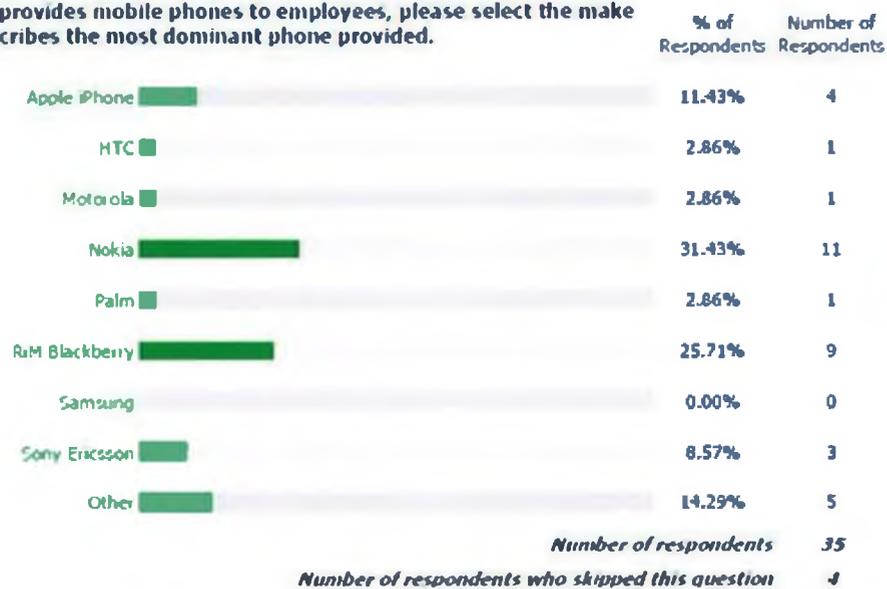
## RESULTS

### Which category best describes these phones?



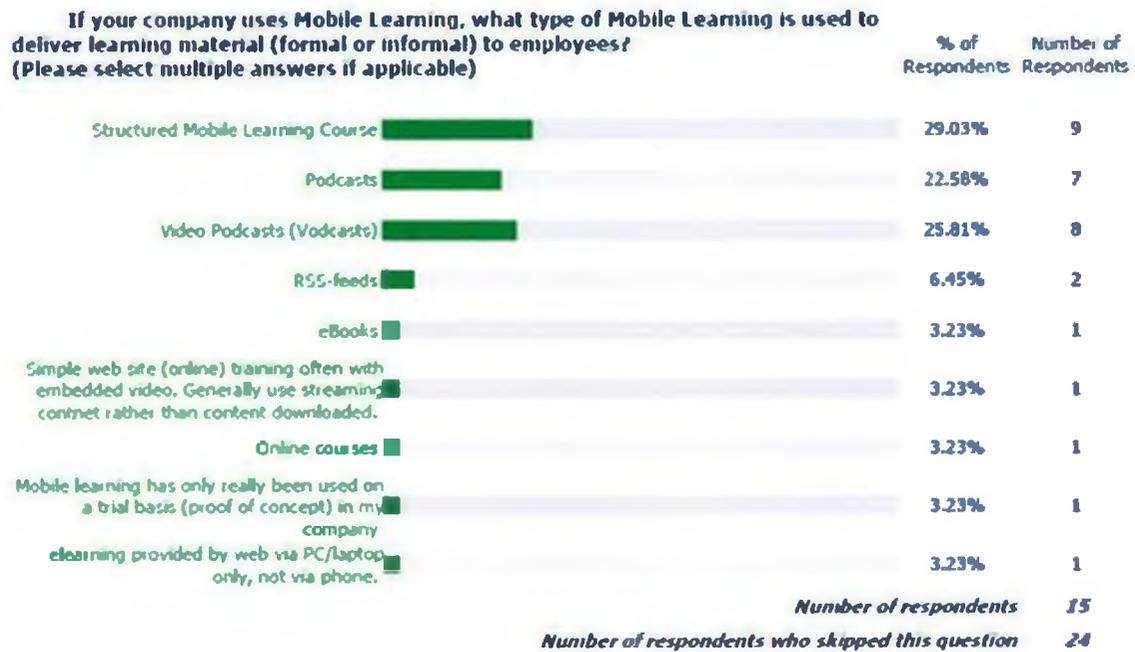
The dominant brands of phones provided to employees were Nokia, RIM BlackBerry and Apple iPhone.

### If your company provides mobile phones to employees, please select the make of phone that best describes the most dominant phone provided.



Of the 39 responses received, 14 respondents reported some level of learning from mobile devices in their company. The majority of mobile learning content used by the companies surveyed used structured mobile learning content, podcasts and video podcasts.

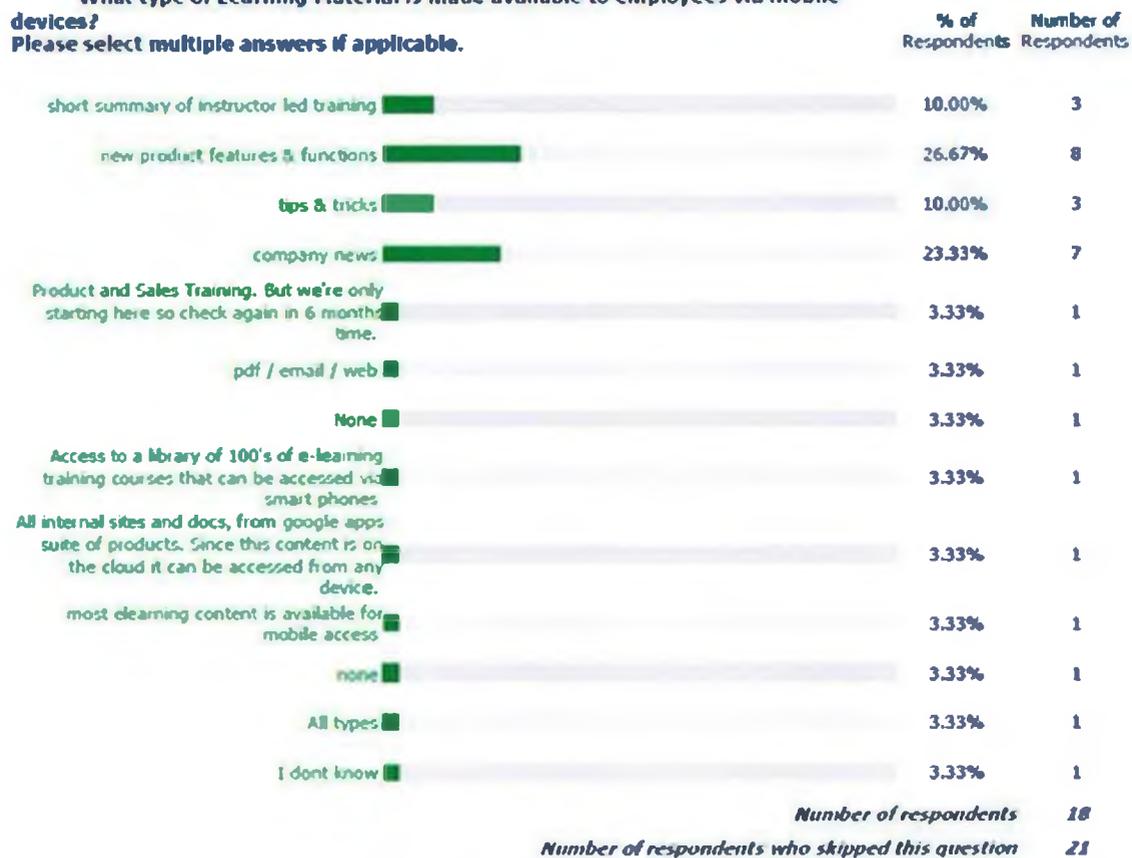
## RESULTS



The predominant type of content delivered to the respondents' mobile phones was new products features and functions and company news.

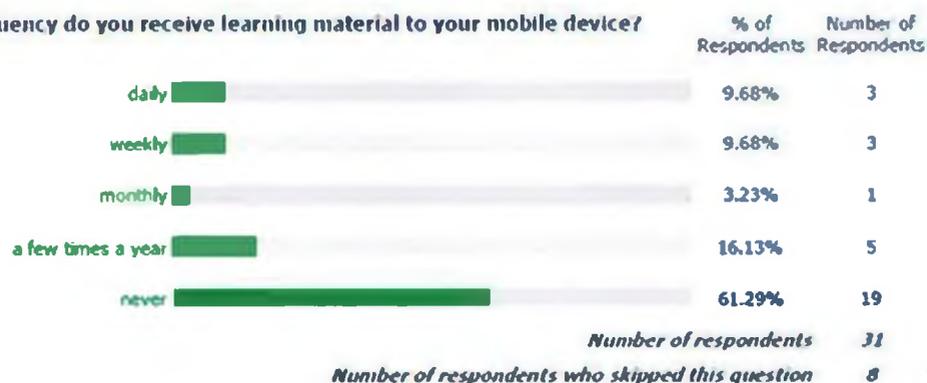
## RESULTS

**What type of Learning Material is made available to employees via mobile devices?**  
Please select multiple answers if applicable.

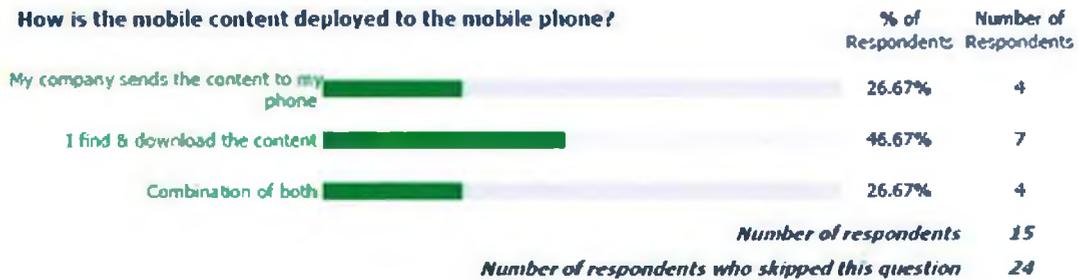


Regarding the frequency that learning material is delivered to the respondents' mobile device, only 3 respondents answered that they receive content daily with an additional 3 respondents reporting that they receive content weekly.

**At what frequency do you receive learning material to your mobile device?**



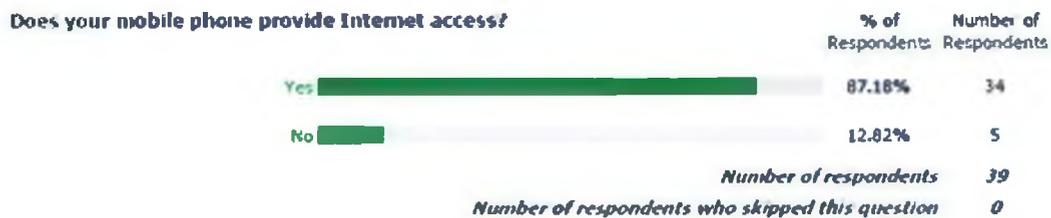
The most common method of deploying content to the employee’s mobile device was reported to be one where the respondent locates and downloads the content.



Three respondents reported that their mobile content is connected to a Learning Management system.



The second section of the online survey questioned respondents regarding their personal experience of mobile phone use. 87% of respondents reported that their mobile phone provides Internet access.

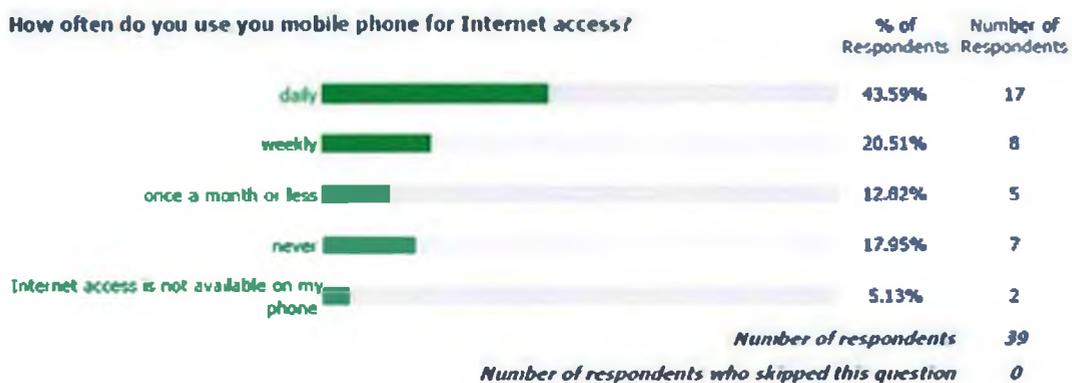


Twenty of the thirty-nine respondents reported that they use their mobile phone to access the internet for some type of informal learning in their own time.

## RESULTS

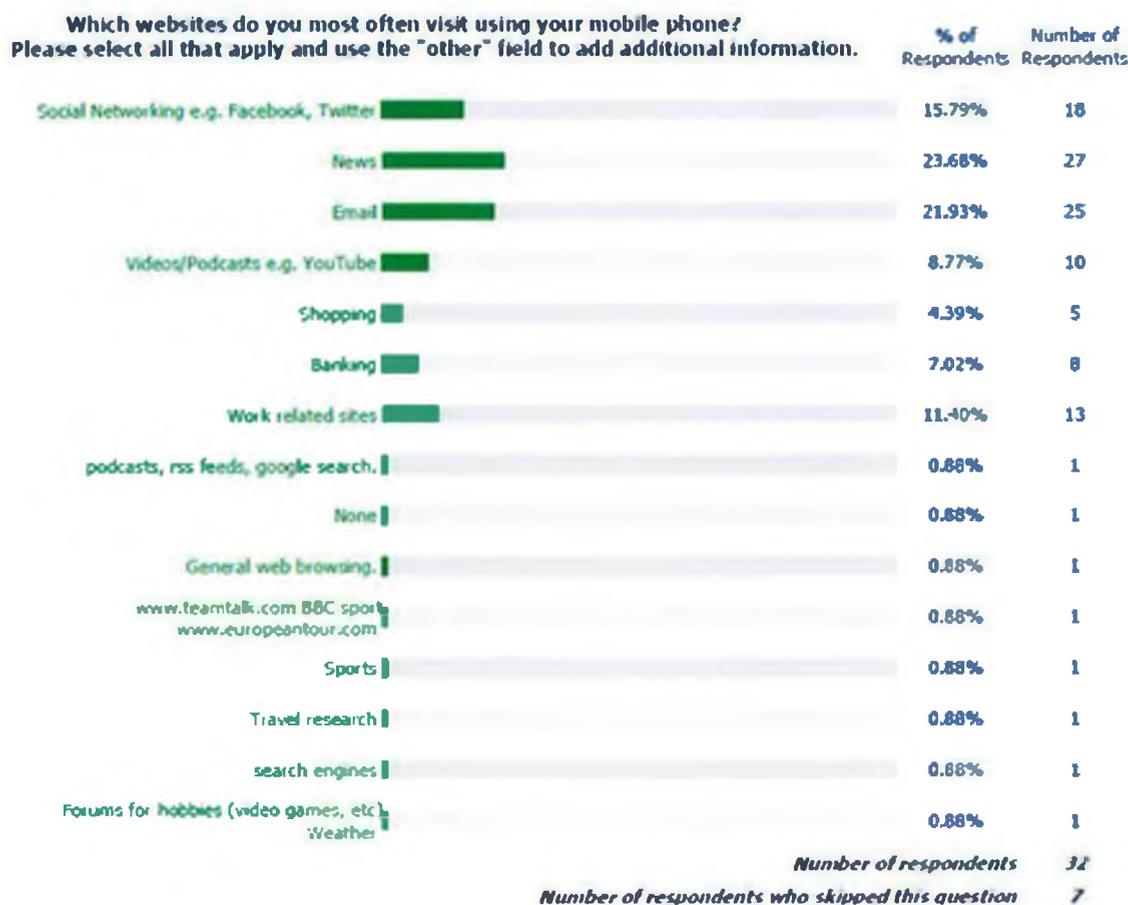


64% of respondents access the Internet using their mobile phone at least weekly, with 45% reporting that they use their mobile phone to access the Internet daily.

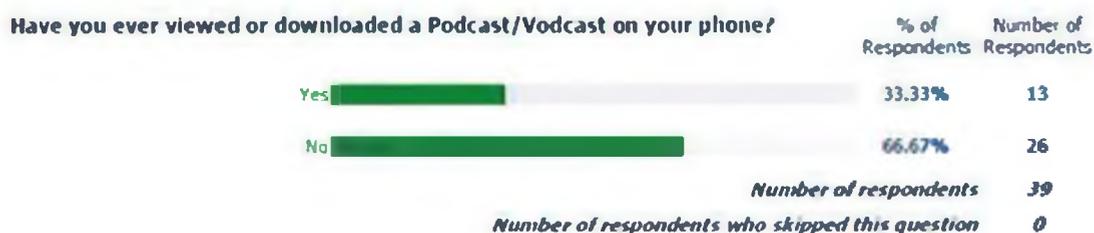


Email, news and social networking were the main categories of Internet sites accessed by the respondents using their mobile device. These categories made a total of 60% of the Internet sites accessed by respondents.

## RESULTS



33% of respondents have viewed or downloaded a podcast using their mobile phone.



The respondents were asked to give a brief description of the podcasts downloaded to their mobile device. The results from the 13 respondents included five respondents reporting that they viewed podcast for entertainment, and 6 for learning, either formal or informal.

**6. If you answered Yes to Q.5, please give a brief description of the type of Podcasts/Vodcasts viewed/downloaded. For example, were these mostly for entertainment, informal learning, formal learning etc?**

1. Entertainment and informal learning
2. News, magazines, Radio broadcasts, informal learning, entertainment
3. Discussion, comedy, news, technical talks career related. More for entertainment, informal learning.
4. Entertainment
5. Access youtube on regular basis. Many internal sites embed videos on them which are also available to stream online. never really download them to phone as this has more security implications, generally stream the content.
6. informal learning
7. Formal learning. Product Updates
8. learning (photoshop user/power mac user) and recreational radio pod casts today fm.
9. company broadcasts; formal learning
10. Formal Learning Vodcast from the LIA website - a "webinar" for formal learning for QFA designation (Qualified Financial Advisor).
11. Entertainment
12. Oracle internal
13. Weekly one to one

*Number of Respondents 13*

*Number of respondents who skipped this question 26*

Seven of the 39 respondents reported that they have received RSS feeds to their mobile phones.

<b>Have you ever received RSS feeds to your mobile phone?</b>	<b>% of Respondents</b>	<b>Number of Respondents</b>
Yes 	17.95%	7
No	82.05%	32
	<i>Number of respondents</i>	<i>39</i>
	<i>Number of respondents who skipped this question</i>	<i>0</i>

Of the seven respondents that had received RSS feeds to their mobile phone, six of these reported that the RSS feeds were news updates.

The third section of the online questionnaire questioned users about their personal opinions regarding mobile learning.

<b>Do you know any companies that use Mobile Learning?</b>	<b>% of Respondents</b>	<b>Number of Respondents</b>
Yes 	10.53%	4
No	89.47%	34
	<i>Number of respondents</i>	<i>38</i>
	<i>Number of respondents who skipped this question</i>	<i>1</i>

The respondents named the following as companies that are currently using mobile learning:

- Intuition
- IBM
- Vodafone/O2
- BT

A total of 25 respondents answered that they consider that mobile learning would be a useful learning delivery method in their company. 14 respondents do not think mobile learning would be a useful delivery method.



The final question of the survey regarding the respondents’ views on the advantages and disadvantages of mobile learning was answered by 25 of the 39 respondents. The main advantage listed was flexibility regarding when and where the content could be accessed by the learner on their mobile device. The expectation was expressed that mobile learning would be a useful delivery method for field engineers requiring access to step by step instruction while working on equipment. Respondents also stated that mobile learning would be most useful for product updates and short nuggets of information employing video and podcast technology. It was also stated that mobile learning would be advantage for reinforcing learner information.

The main disadvantage listed was by respondents was limitations due to screen size of the mobile device. Some respondents stated that the rapidity of changes introduced into devices would cause problems creating content that could be deployed consistently across different device types. Time management and work-life balance were listed as disadvantages of mobile learning in addition to concerns about tendency to expose the learner to more distractions when learning is taking place outside of the work place on mobile devices. One respondent listed device power as an issue in mobile learning suggesting that the phone battery power may not be long lasting enough to support longer periods of learning from the mobile device. Security issues were listed as a disadvantage of mobile learning with two respondents stating concerns about having company

information downloaded and stored on mobile devices. These respondents suggested that the issues could be overcome by using streaming video or access to websites to access the data. Two respondents stated that they could see mobile learning as advantageous as a learning delivery method only if used in conjunction with instructor lead training or web based learning and not as a replacement for other delivery methods.

### **3.3 Interview**

The interview session with Intuition provided insight into their views on mobile learning, their customers and the qualities that sets their company above their competitors. Intuition described mobile learning as the delivery of training via mobile devices. The company focuses on leveraging the strengths of the device but realise that mobile learning is not about the device but rather about the learner. The solutions offered recognise that smart phone usage fits into the following categories: 'bored now', where the user accesses their smart phone during free time, 'urgent now' where the user needs to access some information urgently and 'repetitive now' for example users checking stock prices and accessing Face Book on their smart phone. Sh: 27

Intuition released their first mobile application in March 2006. Currently there are over 500,000 smart phones running Intuition applications. When asked to list some of their customers, companies Merrill Lynch, Bank of America, Accenture, Barclays Capital, Deutsche Bank were listed. In describing one of these deliveries, Intuition described a solution for Merrill Lynch - delinquency in compliance training. As a first step a pilot of 3 courses was delivered to over two thousand investment bankers. This was important to receive executive buy-in. The areas of risk, compliance and IT were involved early in the project. Their results showed no degradation in learning effectiveness occurred and that training was completed twenty days ahead of deadline resulting in 4,100 hours of extra productivity. The delivery was fully integrated with the Learning Management System and was rolled out to 22,000 Merrill Lynch BlackBerry devices and subsequently to all 55,000 BlackBerry devices in Bank of America. This was the largest corporate app deployment in BlackBerry's history.

The content types provided include short eLearning courses, performance support and soft-skills, assessments, surveys, compliance/regulatory data, summaries and sales

briefings. At Intuition mobile learning is viewed as a complementary method of learning delivery and not as a replacement for eLearning. Regarding security, Intuition can remotely wipe the content from the user's device. Courses can be password protected. Additionally, connection to the server to download content is password protected. They designed an application as a shell to receive content as opposed to each course being delivered as a separate application thus utilizing device memory in the best possible way. Intuition provides rich learning and information, full progress tracking and reporting across iPhone, Blackberry and Windows mobile. An important future influencer for mobile learning was stated to be cloud computing, which could take a direction of zero infrastructure providing highly secure and scalable hosted solutions.

## 4. Discussion

This section includes an interpretation of the findings in this report and an examination of the research questions.

There was no indication from the literature review that mobile learning could not satisfy the requirements of the major accepted learning theories. Furthermore although instructional design has not yet encompassed mobile learning in their rules and guidelines, nothing presented caused concerns that mobile learning content could not be presented in a way that would enhance learning and the learning experience. I believe content available on the mobile device could certainly satisfy the lower levels of Blooms Cognitive Taxonomy – knowledge and comprehension. The variety of methods for deploying content to mobile devices available today, if utilised to potential by instructional designers, could cater for Gagne’s nine events of instruction. Scaffolding learning could be provided successfully to learners from their mobile device in the form of podcasts or structured content. Summary courses could allow learners meet Kolb’s reflecting stage of the learning cycle. Rosenberg stated that employees should have access to the information required to do their job “whenever and wherever it is required”. Mobile learning vendors like Intuition, and OutStart provide the functionality to create surveys, quizzes and assessments all of which can be tracked using their Learning Management Systems which could support Kirkpatrick’s model for training evaluation. In my opinion mobile learning is certainly a feasible method to meet Kolb’s criteria. As cited in the literature review “the learner must chose to learn; learning is a responsibility that cannot be shared” What better way to encourage learning but to provide the learner with multiple methods of accessing information. Masie wrote “People are not single method learners”. This is a similar sentiment expressed in the online survey where one respondent stated that mobile learning cannot replace other learning delivery methods but can certainly used to compliment them. It is clear that mobile learning can achieve many of the requirements of learning theorists and instructional design experts. Podcast, videos, RSS feeds and structured mobile learning courses, complete with options for multimedia, assessments and tracking could enhance a company’s learning strategy.

The literature review found clear evidence of a decade of discussions, published papers and funded projects around the area of mobile learning. During this time, academics and authors have speculated about when mobile learning would be an accepted delivery method for learning content and discussed the reasons for the lack of uptake in both the educational and company settings. Barriers to mobile learning such as small display area, poor battery life, insufficient phone memory and lack of standards across phone models and makes are all clearly stated. These are similar to the disadvantages stated by respondents of my survey. During the past decade companies dabbled in mobile learning but few successfully implemented this as a prevalent learning delivery method. *ala*

The online survey results indicated that a third of companies surveyed have started to make content available for their employees' mobile devices mainly in the form of podcasts and websites converted to mobile access. This result was higher than expected and the question remains open as to whether some of these respondents were including laptop computers in their classification of mobile devices despite my definition given in the survey introduction. Two thirds of respondents stated that mobile learning could be a useful delivery method for learning content in their company. The majority of respondents also reported that some or all employees in their company were provided with company mobile devices that have Internet access available. Interestingly more than half of the respondents use the internet for informal learning in their own time. The combination of the results from these questions indicates that employees themselves are ready to utilise the mobile device for learning. On analysis of the survey results, I believe a limitation of my survey may have been that the appropriate individuals within the companies in question were not targeted. Perhaps better insight could have been gained if training managers, senior technology and learning strategy decision makers had been targeted. These individuals may have given better insight into reason why mobile learning is not in widespread use within the organisation and also valid expectations regarding if and when mobile learning might be a feasible solution in their company.

From my review of existing literature, few real mobile learning deployments were evident, that is until 2009 and 2010. One thing is clear: in the past year there certainly is an explosion of applications and content types available for mobile devices. This year there has also been a rapid growth in smart phones availability. Many mobile phone

manufacturers are producing touch screen, Wi-Fi enabled, multimedia capable devices. The literature review showed that mobile phone penetration today is extremely high. In Ireland, on average, every person has at least one mobile device. This coupled with the rapid growth in the past year of smart phone availability and usage suggests to me that we are finally in a position from the perspective of the handheld device to embrace mobile learning as a learning delivery method.

With wide availability of smart phones, usability issues will most likely decline as screen size will become less variable than in feature phones. Phone memory and processing power concerns appear in the literature as a barrier to mobile learning. The same issue is stated by a respondent in my online survey. ABI Research predicted that “cloud computing will bring unprecedented sophistication to mobile applications”. The advances in cloud computing overcome the memory and processing power issues in handsets.

Security was stated as a disadvantage to mobile learning by two respondents in my online survey. This could be a concern for many companies worried that confidential information would be leaked if a mobile phone was lost. Intuition gave a clear answer to this problem stating that devices could be remotely wiped and all content access password protected. Streaming capabilities and wider internet access also overcomes security issues by allowing learners view the content through streaming without downloading confidential or sensitive information to their devices.

The extent of the mobile learning deployments detailed by Intuition indicates that there is indeed a market for mobile learning in the company setting. Additionally, the rapid growth in smart phone sales indicates that the time may now have arrived when mobile learning can finally become a feasible delivery method for learning in companies.

Perhaps Keegan was correct in saying that mobile learning would only move to mainstream when telecommunications operators accepted mobile learning as a satisfactory revenue stream. Today with the wide availability of internet access on mobile devices, perhaps that time has come. Changes this year to AT&T data-plans and the wider availability of WiFi should have some knock-on effects. Smart phones and thus mobile Internet access will be more available to users who were previously deterred by

the high cost plans. This year a Juniper Research report predicted that advertising was likely to form an increasing share of MLBS -related revenues over the next few years. With advertisers taking advantage of the functionalities available to mobile phones, perhaps it's time for companies to also focus more on how they can leverage the advances in mobile devices and location based services to determine how mobile learning can fit into their learning strategy.

Smartphones, particularly iPhones, drive higher capacity requirements in the supporting networks. Evidence of this was seen in late 2009 when operator O2's network in London became so congested that users were unable to make or receive calls using their mobile devices. Network providers are under pressure to build higher capacity networks to stay competitive. With the increased revenue network providers and phone manufacturers are making from smartphones, the question could be asked why they can't simply upgrade their existing networks to handle more traffic. Adding network capacity can take takes months or years to get planning permission required to build new transmission towers. And it's not only the transmission networks that require upgrading - entire networks require upgrades to handle such increases in data traffic. Eventually all carriers will move to faster 4G networks that are designed specifically for data traffic. But in reality these 4G systems probably won't be available fully for years as standards are not yet agreed and defined.

One question remains unanswered and this relates to feedback from one respondent regarding the affect mobile learning could potentially have on time management and work life balance. There is a possible a danger that mobile learning will put pressure on employees to use their own time to complete the available courses.

In conclusion, and in answer to my research questions the reasons that mobile learning is not embraced as a method for delivering learning content to employees in companies today is, in my opinion, because it is only as recently as this year that the phone capability allow development of effective learning content for deployment to mobile devices. Until recently, the options for mobile learning deployment were limited to BlackBerry devices and iPhones. Today, a wide range of mobile phone manufacturers are providing a smart phone solution. The barriers to the success of mobile learning as a

learning delivery method in companies today such as lack of standards in devices and screen size are quickly being overcome. This fact coupled with the number of companies now providing the infrastructure of LCMS and LMS systems with mobile support are also growing.

## **5. Future Perspectives**

This same research repeated two years from now time would be beneficial to determine if the recent growth in smartphone availability will influence companies towards the use of mobile learning as a learning content delivery method for their employees. The availability of cloud computing and 4G telecom networks could also provide unprecedented changes in how mobile devices could be utilized as learning devices.

In future research, I recommend targeting specialists responsible for the companies learning strategies in future survey's to gain a better understanding of the companies views on the scope of mobile learning to meet their needs. Focus should be given to how mobile learning can be used to enhance learning by complimenting the benefits of other learning delivery methods such as instructor led training and web based learning as opposed to viewing mobile learning as an isolated method for delivering content.

## References

- ABI Research (2009) "Cloud Computing" Will Radically Transform Mobile Applications' [online], available: <http://www.abiresearch.com/press/1450-%E2%80%9CCloud+Computing%E2%80%9D+Will+Radically+Transform+Mobile+Applications> [accessed 2 June 2010]
- ABIResearch (2010) 'Ripples from AT&T's New Data Plan Pricing' [online] available: [http://www.abiresearch.com/products/insight/Ripples\\_from\\_AT\\_26Ts\\_New\\_Data\\_Plan\\_Pricing/AI~?](http://www.abiresearch.com/products/insight/Ripples_from_AT_26Ts_New_Data_Plan_Pricing/AI~?) [accessed 10 Jun 2010]
- Allbusiness (2009) 'Smartphones Fill Med School Prescription; The University of Louisville School of Medicine finds that smartphones give students faster access to health information, and more face-time with patients' [online], available: <http://www.allbusiness.com/health-care/health-care-professionals-physicians-surgeons/13161277-1.html> [accessed 01 Jun 2010]
- Ally, M (2009) "Mobile Learning-Transforming the Delivery of Education and Training", in M. Ally (ed.) AU Press. Canada, pp279-281
- American Society for Training & Development (2010) *Case Study: Alcatel-Lucent University Surveys the Power of Mobile Technology* [online], available: [http://www.astd.org/LC/2009/0909\\_perry.htm](http://www.astd.org/LC/2009/0909_perry.htm) [accessed 29 May 2010].
- BlackBerry (2009) 'BlackBerry App World' [online], available: <http://appworld.blackberry.com/webstore/> [accessed 6 June 2010].
- Bloom, B.S. (1956) *Taxonomy of Educational Objectives Book 1 Cognitive Domain*, Longman, New York
- Buchmann, I. (2001) *Batteries in a portable world: A handbook on rechargeable batteries for non-engineers*, 2nd edn., Cadex.com, accessed 6 June 2010 from <http://www.buchmann.ca/Chap17-page6.asp>
- Budiu, R and Nielsen, J (2010) 'Usability of iPad Apps and Websites-First Research Findings', nngroup.com, accessed May 2, 2010, from <http://www.nngroup.com/reports/mobile/ipad>
- Caudill J. (2007) 'The Growth of m-Learning and the Growth of Mobile Computing: Parallel developments' *The International Review of Research in Open and Distance Learning*, vol.8, no2, viewed 10 Jun 2010, from: <http://www.irrodl.org/index.php/irrodl/article/view/348/873>
- Center for Global Health and Economic Development (2009) [online], available: [http://cghed.ei.columbia.edu/sitefiles/file/Mobile\\_Health\\_within\\_MVP%20\(1\).pdf](http://cghed.ei.columbia.edu/sitefiles/file/Mobile_Health_within_MVP%20(1).pdf) [accessed 15 May 2010]
- Certpoint (2010) 'Case Study: Why Black & Becker is using CERTPOINT's Mobile Learning' [online] available: <http://www.certpointsystems.com/resources/white-paper.html> [accessed 15 May 2010].
- CNN (2009) 'Bandwidth hogs - iPhone and other smartphones' [online], available: <http://tech.fortune.cnn.com/2009/08/28/bandwidth-hogs-iphone-and-other-smartphones/> [accessed 16 Jun 2010]

- Dey, A.K. (2001) 'Understanding and Using Context', *Personal and Ubiquitous Computing*, vol.5 no.1, pp.4-7, viewed 19 Jun 2010, from <http://www.springerlink.com/content/1d9grxkjvquhpwkw/>
- Dourish, P (2004) 'What we talk about when we talk about context', *Personal and Ubiquitous Computing*, vol8, no. 1, pp:19 - 30, viewed 31 May 2010, from <http://portal.acm.org/citation.cfm?id=970983.970985>
- Edirisingha, P (2009), 'Podcasting as a listening culture' in Steve Wheeler, (ed.), *Connected minds, emerging cultures: cybercultures in online learning*, Information Age Publishing, USA pp.29-42
- Ellis, E.S., Worthington, L.A., Larkin, M.J. (1994) '*Effective Teaching Principles and the Design of Quality Tools for Educators.*' Special Education Programs March 1994 pp5-6
- Enterprise Mobile Today (2010) AT&T Replaces Single Data Plan With Tiered Pricing Menu [online], available: <http://www.enterprisemobiletoday.com/news/article.php/3885596/ATT-Replaces-Single-Data-Plan-With-Tiered-Pricing-Menu.htm> [accessed 02 Jun 2010].
- Gartner (2010) *Gartner Highlights Key Predictions for IT Organizations and Users in 2010 and Beyond*, [online] available: <http://www.gartner.com/it/page.jsp?id=1278413> [accessed 05 May 2010].
- Gagne, R.M. (1985), *The Conditions of Learning*, Holt, Rinehart and Winston, New York
- Giunti Labs (2010) 'Giunti Labs at the Seriously Mobile Workshop' [online] available: <http://www.learnexact.com/news/index.php?setxt=&setxtch=&seyear=&secat=3&seord=2&seDIR=2&pidn=60> [accessed 19 Jun 2010]
- Google (2007) 'Industry Leaders Announce Open Platform for Mobile Devices' [online], available: [http://www.google.com/intl/en/press/pressrel/20071105\\_mobile\\_open.html](http://www.google.com/intl/en/press/pressrel/20071105_mobile_open.html) [accessed 15 May 2010]
- Gough, J. (1996) *Developing Learning Material*, Institute of Personnel Development, Great Britain
- Gregson, J. (2007) 'M-LEARNING: THE FIRST PIECE IN THE DISTANCE LEARNING JIGSAW?' mLearn 2007, Melbourne 16 -19 October 2007 pp.73-82 [online], available <http://dSPACE.edna.edu.au/dSPACE/bitstream/2150/42014/1/M-Learning.pdf> [accessed 01 Jun 2010].
- Home Entertainment Magazine (2008) 'iPhone Home Automation Control Apps - Power in your Pocket' [online] available: [http://www.hemagazine.com/iPhone\\_Home\\_Automation\\_Control\\_Apps](http://www.hemagazine.com/iPhone_Home_Automation_Control_Apps) [accessed 5 June 2010].
- Horizon Report (2010) [online], available at: <http://wp.nmc.org/horizon2010/> [accessed 5 Jun 2010].
- Illeris, K. (2008) *How we learn* Routledge, London & New York
- Keijzers, J., den Ouden, E and Lu, Y., 2008 'Usability Benchmark Study of Commercially Available Smart Phones: Cell Phone Type Platform, PDA Type Platform and

- PC Type Platform' *MobileHCI '08: Proceedings of the 10th international conference on Human computer interaction with mobile devices and services* pp. 265-272 viewed on 10 May 2010 from <http://portal.acm.org/results.cfm?coll=Portal&dl=Portal&CFID=91871297&CFTOKEN=18739414>
- IPCS Group (2007) 'IPCS Mobile Ticketing' [online], available: [http://www.ipcslive.com/pdf/IPCS\\_mticket.pdf](http://www.ipcslive.com/pdf/IPCS_mticket.pdf) [accessed 02 Jun 2010].
- Janson, A., Janson, R. (2009), 'Integrating Digital Learning Objects in the Classroom: A Need for Educational Leadership' *Innovate Journal of Online Education*, vol.5, no.3 viewed 3 Jun 2010, from [http://www.innovatconline.info/pdf/vol5\\_issue3/Integrating Digital Learning Objects in the Classroom- A Need for Educational Leadership.pdf](http://www.innovatconline.info/pdf/vol5_issue3/Integrating_Digital_Learning_Objects_in_the_Classroom- A_Need_for_Educational_Leadership.pdf)
- Juniper Research (2010) 'Press Release: Mobile Location-Based Services Market to exceed \$12bn by 2014 driven by Increased Apps Store Usage, Smartphone Adoption and New Hybrid Positioning Technologies, According to Juniper Research' [online], available: <http://www.juniperresearch.com/viewpressrelease.php?id=213&pr=180> accessed 03 Jun 2010]
- Keegan, D. (2002) 'The future of learning: From eLearning to mLearning', accessed 25 May 2010, from [http://learning.ericsson.net/mlearning2/project\\_one/book.html](http://learning.ericsson.net/mlearning2/project_one/book.html)
- Keegan, D (2005) 'The Incorporation Of Mobile Learning Into Mainstream Education And Training' *mLearn 2005 4th World conference on mLearning: Mobile technology: The future of learning in your hands*, Cape Town, SA, 25-28 October 2005, [online] available <http://www.mlearn.org.za/CD/papers/keegan1.pdf> [accessed: 15 May 2010]
- Keegan D (2006) 'Mobile learning, a Practical Guide' Published with assistance of Leonardo da Vinci programme of the European Commission
- Kramer, M.A.M (2009) 'The emergence of ubiquitous and pervasive learning cultures' in Steve Wheeler, (ed.), *Connected minds, emerging cultures: cybercultures in online learning*, Information Age Publishing, USA pp.43-52
- Kukulska-Hulme, A. (2005) 'Introduction' in A. Kukulska-hulme and J Traxler, (eds.), *Mobile LEARNING - a handbook for educators and trainers*, Routledge, UK, pp. 1-6
- Kukulska-Hulme, A. (2005) 'Mobile Usability and user experience' in A. Kukulska-hulme and J Traxler, (eds.), *Mobile LEARNING - a handbook for educators and trainers*, Routledge, UK, pp. 45-56
- Kukulska-Hulme, A (2007) 'Mobile Usability in Educational Contexts: What have we learnt?' *The International Review of Research in Open and Distance Learning*, 8, 2
- Light Reading Mobile (2010) 'Light Reading Mobile - IP & Convergence - MWC 2010: Ericsson Opens App Store - Telecom News Analysis' [online], available: [http://www.lightreading.com/document.asp?doc\\_id=187953&](http://www.lightreading.com/document.asp?doc_id=187953&) [accessed 02 Jun 2010]
- Loureiro, E, Ferreira,G.,Almeida,H.& Perkusich,A. (2007) 'Pervasive Computing: What is it Anyway?' in Miltiadis D. Lytras, M.D., Naeve, A (eds.) *Ubiquitous and*

- Pervasive Knowledge and Learning Management: Semantics, Social Networking and New Media to Their Full Potential*, IGI, USA, pp 1-34
- Masie, E. (2002) 'Blended Learning: The Magic is in the Mix' in A Rossett(ed.), *The ASTD e-learning handbook*, McGraw-Hill, USA, pp58-63
- Maise, E. (2010) 'The Masie Centre', *Learning in 2010*, [online], available: <http://www.masie.com/Research-Articles/learning-in-2010.htm> [accessed 10 Jun 2010].
- Maslow, A. H. (1943) A Theory of Human Motivation, *Psychological Review*, 50, pp370-396.
- Mayer, R.E., (2001) *Multimedia Learning*, Cambridge University Press, USA
- Metcalfe, D (2006) - *mLearning: Mobile Learning and Performance in the Palm of your Hand*, HRD Press, Massachusetts
- Mednick, S.A., Pollio, H, & Loftus E. (1964) *Learning*, Prentice-Hall, New Jersey.
- Microsoft (2010) *Microsoft Unveils Windows Phone 7 Series* [online] available: <http://www.microsoft.com/presspass/press/2010/feb10/02-15mwc10pr.mspx> [accessed 17 May 2010]
- MobileActive.org (2009) *Mobile Data*, [online] available: <http://mobileactive.org/countries/ireland> [accessed 05 May 2010].
- Morgan Stanley (2009) 'The Mobile Internet Report' [online] available: [http://www.morganstanley.com/institutional/techresearch/pdfs/mobile\\_internet\\_report.pdf](http://www.morganstanley.com/institutional/techresearch/pdfs/mobile_internet_report.pdf) [accessed 02 Jun 2010].
- MSNBC (2008) 'Cell phone battery life: The charge is yours', [online], available: <http://www.msnbc.msn.com/id/26945049/> [accessed 6 Jun 2010]
- Nash, S.S. (2007) 'Mobile Learning, Cognitive Architecture and the Study of Literature' *Issues in Informing Science and Information Technology*, Vol. 4, 2004 pp811-818
- New York Times (2010) 'App Makers Worry as Data Plans Are Capped' [online], available: <http://www.nytimes.com/2010/06/07/technology/07data.html?pagewanted=2&src=busln> [accessed 07 Jun 2010].
- Nielsen, J. (1994) 'Ten Usability Heuristics', useit.com, accessed 05 May 2010, from [http://www.useit.com/papers/heuristic/heuristic\\_list.html](http://www.useit.com/papers/heuristic/heuristic_list.html)
- Nielsen, J. (2009) *July 2009 Mobile Usability Test Findings*, useit.com, accessed May 2, 2010, from <http://www.useit.com/alertbox/mobile-usability.html>
- Novak, J.D., Gowin, D.B. (1984) *Learning How To Learn*, Cambridge University Press
- O'Loughlin, E.F.M. (2010) 'iClassroom – Opportunities for Touch Screen Hand-held Technologies in Learning and Teaching' in Eds: Donnelly, R, Harvey, J. & O'Rourke, K., *Critical Design and Effective Tools for E-Learning in Higher Education: Theory into Practice*, Dublin.
- O'Malley, C., Vavoula, G., Glew, J., Taylor, J., Sharples, M. and Lefrere, P. (2003) 'Guidelines for learning/teaching/tutoring in a mobile environment', mobilelearn.org accessed 5 May 2010, from [http://www.mobilelearn.org/download/results/public\\_deliverables/MOBILearn\\_D4.1\\_Final.pdf](http://www.mobilelearn.org/download/results/public_deliverables/MOBILearn_D4.1_Final.pdf)
- Outstart (2010) Hot Lava Mobile datasheet [online], available: <http://www.outstart.com/mobile-resources.htm> [accessed 01 June 2010]

- Peters, K. (2007) 'm-Learning: Positioning educators for a mobile, connected future' *The International Review of Research in Open and Distance Learning*, Vol.8, No.2, viewed 2 Jun 2010, from <http://www.irrodl.org/index.php/irrodl/article/view/350/894>
- Pieri, M, Diamantini D. (2009) 'From E-learning to Mobile Learning: New Opportunities' in M. Ally (ed.) *Mobile Learning Transforming the Delivery of Education and Training*, AU Press, Canada, pp.183-194
- Prensky, M. (2009) 'H. Sapiens Digital: From Digital Immigrants and Digital Natives to Digital Wisdom' *Innovate Journal of Online Education*, vol.5, no.3 viewed 3 Jun 2010, from [http://www.innovateonline.info/pdf/vol5\\_issue3/H. Sapiens Digital-From Digital Immigrants and Digital Natives to Digital Wisdom.pdf](http://www.innovateonline.info/pdf/vol5_issue3/H._Sapiens_Digital-From_Digital_Immigrants_and_Digital_Natives_to_Digital_Wisdom.pdf).
- Prensky, M. (2010) *Teaching Digital Natives: Partnering for Real Learning*, Corwin, USA
- Rainger, P. (2005) 'Accessibility and mobile learning' in *Mobile LEARNING - a handbook for educators and trainers*, Routledge, Great Britain pp58-59
- Richardson, W. (2009) *Blogs, Wikis, Podcasts and Other Powerful Web Tools for Classrooms*, Corwin Press, USA
- Rosenberg, M.J. (2001) *e-Learning* McGraw-Hill USA
- Rosenberg, M.J. (2006) *Beyond E-Learning*, Pfeiffer, USA
- RTE (2010) Smartphones lead mobile sales higher [online], available: <http://www.rte.ie/business/2010/05/19/mobile.html> [accessed 10 May 2010]
- Schilit, B.N., Adams, N., Want, R. (1994) 'Context-Aware Computing Applications' in *IEEE Workshop on Mobile Computing Systems and applications*, December 8-9 1994, Santa Cruz, USA, pp 85-90
- Schugurensky, D. (2007) 'This is our School of Citizenship' in Bekerman, Z, Burbules, N.C., Silberman-Keller, D. (eds.) *Learning in Places The informal Education Reader*, Peter Lang Publishing, New York. Pp 163-182
- Smith, C., Cook, J. (2009) 'Interaction Heuristics for Context-Sensitive Mobile Learning' in *3rd WLE Mobile Learning Symposium: Mobile Learning Cultures across Education, Work and Leisure* 27 March 2009, WLE Centre, IOE London, UK
- Skinner B.F. (1954) 'The Science of Learning and the Art of Teaching', *Harvard Educational Review*, vol. XXIV, no. 2, pp.86-97, viewed 20 May 2010, from [http://www.decolonizing.com/pdfs/Skinner\\_ScienceofLearning.pdf](http://www.decolonizing.com/pdfs/Skinner_ScienceofLearning.pdf)
- Sony Ericsson (2010), [online], 'PlayNow' available: <http://www.sonyericsson.com/fun/wxhtml/portal?cc=ie&lc=en#ts=1275925783075;promotionId=0;applstate=contentlisting;contentCategoryId=613;filterId=0;genreId=-1;startIndex=0;phoneId=11752;contentItemId=0> [accessed 02 Jun 2010].
- Sweller, J. (2002) Visualisation and Instructional Design, In Proceedings of the International Workshop on Dynamic Visualizations and Learning (Tübingen, Germany, July 18--19, 2002). Knowledge Media Research Center, Tübingen, 2002, pp 1501-1510.
- Techspot (2010) Everything You Need To Know About 4G Wireless Technology [online], available: <http://www.techspot.com/guides/272-everything-about-4g/> [accesses 15 Jun 2010]

- Telegraph.co.uk (2009) O2 apologises for iPhone network failure [online], available: <http://www.telegraph.co.uk/technology/news/6904792/The-head-of-mobile-phone-operator-O2-has-apologised-to-customers-who-were-unable-to-make-calls-after-the-groups-network-was-swamped-by-people-using-smartphones.html> [accessed 04 June 2010].
- Truelove, S. (2007) *Training in Practice*, CIPD, London
- The Millennium Development Goals Indicator (2008) *The Millennium Development Goals Report (2008)* [online] available: [http://mdgs.un.org/unsd/mdg/Resources/Static/Products/Progress2008/MDG\\_Report\\_2008\\_En.pdf#page=29](http://mdgs.un.org/unsd/mdg/Resources/Static/Products/Progress2008/MDG_Report_2008_En.pdf#page=29) [accessed 17 May 2010]
- Worktrack (2009) "*Construction and Crews*" [online], available: <http://www.worktrack.com/Construction/default.aspx> [accessed 02 Jun 2010].

***Appendix A: PRELIMINARY QUESTIONNAIRE***

I am currently completing an MSc in Learning Technologies at National College of Ireland. For my thesis, I am researching Mobile Learning in organisations.

Please answer the following questions in relation to your current company or some company that you have worked for in the past that may be more applicable. No data will be published or shared.

In the following eLearning includes Computer Based Training (CBT), Web-Based Learning (WBL), Internet Training courses etc or any learning that is completed by the learner on their computer or laptop.

Mobile Learning (mLearning) refers to any learning completed by the learner on their hand-held mobile device. These devices might include the Mobile Phone (Cell Phone), PDA (Personal Digital Assistant), Smart Phone, the Blackberry etc.

Please pick an answer that applies or type your answer below. Be as brief or as lengthy as you please.

1. Does your company use eLearning courses to deliver training
  - (a) internally to company employees
  - (b) externally to your customers/clients
  - (c) a combination of both (a) and (b)
  - (d) not at all

**Answer:**

2. If yes, are these eLearning courses
  - (a) designed in-house by developers at your company
  - (b) designed by external developers at your company's request
  - (c) purchased "off the shelf" to meet your company's needs
  - (d) a combination of all 3 of the above

**Answer:**

3. Does your company provide all employees or certain groups within organization with Mobile Phones or PDAs?

**Answer:**

## APPENDIX A: PRELIMINARY QUESTIONNAIRE

---

4. What type of devices are these?

**Answer:**

5. Does your company use Mobile Learning, Podcasts, RSS-feeds to deliver learning material to employees?

**Answer:**

6. If yes to Q5, what type of learning material is made available to the employee via mobile device (e.g. short summary of instructor led training/new product feature/tips & tricks/company news etc)?

**Answer:**

7. If yes, in what format is learning material made available to the employee via mobile device (e.g. Podcasts/RSS Feeds/ mobile applications/eBooks)?

**Answer:**

8. At what frequency do you receive learning material to your mobile device (e.g. daily/weekly/monthly)?

**Answer:**

9. How is the mobile content deployed to the mobile phone? Does your employer **push** the content to your device or must you find and download the content from an appropriate server?

**Answer:**

10. Is your Mobile Learning connected to a Learning Management System (LMS) that tracks uptake/completion of content? If yes, which LMS?

**Answer:**

11. Do you know any companies that use mobile learning widely? If so, which company?

**Answer:**

## APPENDIX A: PRELIMINARY QUESTIONNAIRE

---

12. Do you think mobile learning would be a useful learning delivery method in your organisation?

**Answer:**

13. If you already partake in Mobile Learning what do you consider the main advantages and disadvantages of mobile learning?

If you have not been exposed to mobile learning, what would you expect to be main advantages and disadvantages?

**Answer:**

## Appendix B: ONLINE SURVEY



### Mobile Learning Questionnaire 1

Answers marked with a \* are required.

#### Mobile Learning: Section 1/3 The Workplace

My name is Anne O'Connell.

I am currently completing my Thesis for an MSc in Learning Technologies at National College of Ireland.

This survey is to enable me to gather qualitative data for analysis.

In this questionnaire, Mobile Learning (m-Learning) refers to any learning completed on the learners hand-held mobile device (feature phones, smart phones etc.).

Any information you provide will be treated confidentially.

No respondent names or company details will be published in my thesis or shared with any other sources.

Thank you for your time in completing this survey!

#### 1. Please provide the following information:

Your details (name/company name) will be treated with confidentiality.

Your Name (optional)

Job Title

Company Name (optional)

#### 2. How many employees are in your organization worldwide?

#### 3. Which best describes your industry?

#### 4. Does your company use eLearning courses to deliver training ...

- internally to company employees
- externally to your customers/clients
- a combination of both
- not at all

#### 5. If yes to Question 4, are these eLearning courses...

Select multiple answers if applicable.

- designed in-house by developers at your company
- designed by external developers at your company's request
- purchased 'off the shelf' to meet your company's needs

6. Does your company provide employees with Mobile Phones?

- All     Most     Some     Few     None

7. Which category best describes these phones?

- Feature Phone  
 Smart Phone  
 Combination of phone types  
 N/A

8. If your company provides mobile phones to employees, please select the make of phone that best describes the most dominant phone provided.

9. If your company uses Mobile Learning, what type of Mobile Learning is used to deliver learning material (formal or informal) to employees?

(Please select multiple answers if applicable)

- Structured Mobile Learning Course  
 Podcasts  
 Video Podcasts (Vodcasts)  
 RSS-feeds  
 eBooks  
 Other (Please Specify)

10. What type of Learning Material is made available to employees via mobile devices?  
Please select multiple answers if applicable.

- short summary of instructor led training  
 new product features & functions  
 tips & tricks  
 company news  
 Other (Please Specify)

11. At what frequency do you receive learning material to your mobile device?

- daily
- weekly
- monthly
- a few times a year
- never

12. How is the mobile content deployed to the mobile phone?

- My company sends the content to my phone
- I find & download the content
- Combination of both

13. Is your Mobile Learning connected to a Learning Management System (LMS) that tracks use/completion of content?

- Yes
- No
- Sometimes
- I don't know

Out

Next



**Mobile Learning Questionnaire 1**

Answers marked with a \* are required.

**Section 2.3: Your Personal Experiences**

1. Does your mobile phone provide Internet access?

- Yes
- No

2. Do you access the Internet for informal learning in your own time e.g. for research, DIY tips, How-to videos etc. using your mobile phone?

- Yes
- No

3. How often do you use you mobile phone for Internet access?

- daily
- weekly
- once a month or less
- never
- Internet access is not available on my phone

4. Which websites do you most often visit using your mobile phone?

Please select all that apply and use the "other" field to add additional information.

- Social Networking e.g. Facebook, Twitter
- News
- Email
- Videos/Podcasts e.g. YouTube
- Shopping
- Banking
- Work related sites
- Other (Please Specify)

5. Have you ever viewed or downloaded a Podcast/Vodcast on your phone?

Yes

No

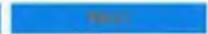
6. If you answered Yes to Q.5, please give a brief description of the type of Podcasts/Vodcasts viewed/downloaded. For example, were these mostly for entertainment, informal learning, formal learning etc?

7. Have you ever received RSS feeds to your mobile phone?

Yes

No

8. If you answered Yes to Q7, please describe the type of RSS feeds received? For example, mention the type of content e.g. news/educational/product updates/sport updates etc.





**Mobile Learning Questionnaire 1**

Answers marked with a \* are required.

**SECTION 3/3: Your views**

1. Do you know any companies that use Mobile Learning?

Yes

No

2. If yes to Q1, can you provide the name of the company/companies?

3. Do you think that Mobile Learning would be a useful learning delivery method in your organisation in conjunction with Instructor Led Training and eLearning?

Yes

No

4. If you already use Mobile Learning, what do you consider the main advantages and disadvantages of this delivery method for learning?

If you have not been exposed to Mobile Learning, what would you expect to be the main advantages and disadvantages of this delivery method?

Start

Back

Stop/quit

*Appendix C: RESULTS OF PRELIMINARY QUESTIONNAIRE*

**Respondent 1**

Does your company use eLearning courses to deliver training

- (a) internally to company employees
- (b) externally to your customers/clients
- (c) a combination of both (a) and (b)
- (d) not at all

**Answer: C. Here, we have internal course that are mostly compliance based and linked to NA driven policies (e.g. insider trading, racial abuse, tax). Externally we have eLearning modules for our community, mostly geared at large sellers on the site. They are basically information packs aimed at given sellers advice on complex topics (e.g. tips how to scale your seller business)**

If yes, are these eLearning courses

- (a) designed in-house by developers at your company
- (b) designed by external developers at your company's request
- (c) purchased "off the shelf" to meet your company's needs
- (d) a combination of all 3 of the above

**Answer: D, the internal policy training would be in-house content but externally developed. The external, customer facing piece would be internally developed.**

Does your company provide all employees or certain groups within organization with Mobile Phones or PDAs?

**Answer: Certain groups, mid level managers up get blackberries\iphones.**

What type of devices are these?

**Answer: Blackberries around 80% and Iphones around 20%, depends on the site.**

Does your company use Mobile Learning, Podcasts, RSS-feeds to deliver learning material to employees?

**Answer: No, all learning would be online.**

If yes, what type of learning material is made available to the employee via mobile device (e.g. short summary of instructor led training/new product feature/tips & tricks/company news etc)?

**Answer: N/A**

If yes, in what format is learning material made available to the employee via mobile device (e.g. Podcasts/RSS Feeds/ mobile applications/ebooks)?

## APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

**Answer: N/A**

At what frequency do you receive learning material to your mobile device (e.g. daily/weekly/monthly)?

**Answer: N/A**

How is the mobile content deployed to the mobile phone? Does your employer **push** the content to your device or must you find and download the content from an appropriate server?

**Answer: N/A**

Is your Mobile Learning connected to a Learning Management System (LMS) that tracks uptake/completion of content? If yes, which LMS?

**Answer: N/A**

Do you know any companies that use mobile learning widely? If so, which companies?

**Answer: N/A**

Do you think mobile learning would be a useful learning delivery method in your organisation?

**Answer: I think we are somewhat restricting the potential reach of mlearning given we have a policy which restricts mobile usage. Lower down the organisation is where the real learning potential could be. I could see use cases in training front line people who are interacting with customers and given the rate of change in our business it would be a useful tool to keep on top of changes. If you move up the organisation there is probably more scope to leverage mobile feeds as a communication tool and less about Learning. We are an organisation heavily dependent on email, which isn't the most effective communication mechanism so opportunity here that could build out an efficient comms machine! If your focus is on mobile learning specifically, the real opportunity would be in organisations that are compliance heavy like financial institutions (where employees are forced to pass compliance each quarter)**

If you already partake in Mobile Learning what do you consider the main advantages and disadvantages of mobile learning?

**N/A**

If you have not been exposed to mobile learning, what would you expect to be main advantages and disadvantages?

**Advantages: Speed, good while on the road**

**Disadvantages: elearning reach is not significant enough in ecommerce orgs. Mobiles not yet there in terms of UI/Software to run initiative programmes that would require medium periods of interaction**

APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

---

**Respondent 2**

Does your company use eLearning courses to deliver training

- (a) internally to company employees
- (b) externally to your customers/clients
- (c) a combination of both (a) and (b)
- (d) not at all

**Answer: a**

If yes, are these eLearning courses

- (a) designed in-house by developers at your company
- (b) designed by external developers at your company's request
- (c) purchased "off the shelf" to meet your company's needs
- (d) a combination of all 3 of the above

**Answer: d I guess but only b and c. Have used off the shelf and something written for us by an external co. Nothing was done internally**

Does your company provide all employees or certain groups within organization with Mobile Phones or PDAs?

**Answer: certain groups, execs, sr management or those on call**

What type of devices are these?

**Answer: Blackberries**

Does your company use Mobile Learning, Podcasts, RSS-feeds to deliver learning material to employees?

**Answer: no**

If yes, what type of learning material is made available to the employee via mobile device (e.g. short summary of instructor led training/new product feature/tips & tricks/company news etc)?

**Answer: n/a**

If yes, in what format is learning material made available to the employee via mobile device (e.g. Podcasts/RSS Feeds/ mobile applications/ebooks)?

**Answer: n/a**

At what frequency do you receive learning material to your mobile device (e.g. daily/weekly/monthly)?

**Answer: n/a**

## APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

---

How is the mobile content deployed to the mobile phone? Does your employer **push** the content to your device or must you find and download the content from an appropriate server?

**Answer: n/a**

Is your Mobile Learning connected to a Learning Management System (LMS) that tracks uptake/completion of content? If yes, which LMS?

**Answer: n/a**

Do you know any companies that use mobile learning widely? If so, which companies?

**Answer: no**

Do you think mobile learning would be a useful learning delivery method in your organisation?

**Answer: I wouldn't see a need for it. Web based learning is sometimes difficult to focus on and in my opinion, not a replacement for classroom learning. Mobile learning would be even more difficult to focus on given the limited real-estate on screen**

If you already partake in Mobile Learning what do you consider the main advantages and disadvantages of mobile learning?

If you have not been exposed to mobile learning, what would you expect to be main advantages and disadvantages?

**Answer: See previous answer. I don't see any advantage of bringing the teaching experience to phones/PDAs**

APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

**Respondent 3**

Does your company use eLearning courses to deliver training

- (a) internally to company employees
- (b) externally to your customers/clients
- (c) a combination of both (a) and (b)
- (d) not at all

**Answer: (a) internally to company employees**

If yes, are these eLearning courses

- (a) designed in-house by developers at your company
- (b) designed by external developers at your company's request
- (c) purchased "off the shelf" to meet your company's needs
- (d) a combination of all 3 of the above

**Answer: (d) a combination of all 3 of the above**

Does your company provide all employees or certain groups within organization with Mobile Phones or PDAs?

**Answer: ONLY A FEW - Salesmen, IS and Frequent travelers**

What type of devices are these?

**Answer: Blackberry and iPhone**

Does your company use Mobile Learning, Podcasts, RSS-feeds to deliver learning material to employees?

**Answer: NO**

If yes, what type of learning material is made available to the employee via mobile device (e.g. short summary of instructor led training/new product feature/tips & tricks/company news etc)?

**Answer:**

If yes, in what format is learning material made available to the employee via mobile device (e.g. Podcasts/RSS Feeds/ mobile applications/ebooks)?

**Answer:**

At what frequency do you receive learning material to your mobile device (e.g. daily/weekly/monthly)?

**Answer:**

How is the mobile content deployed to the mobile phone? Does your employer **push** the content to your device or must you find and download the content from an appropriate server?

**Answer:**

Is your Mobile Learning connected to a Learning Management System (LMS) that tracks uptake/completion of content? If yes, which LMS?

APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

---

**Answer:**

Do you know any companies that use mobile learning widely? If so, which companies?

**Answer: Not Really**

Do you think mobile learning would be a useful learning delivery method in your organization?

**Answer: Not necessary at the moment. Enough access to company network for learning**

If you already partake in Mobile Learning what do you consider the main advantages and disadvantages of mobile learning?

If you have not been exposed to mobile learning, what would you expect to be main advantages and disadvantages?

**Answer:**

APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

---

**Respondent 4**

Does your company use eLearning courses to deliver training

- (a) internally to company employees
- (b) externally to your customers/clients
- (c) a combination of both (a) and (b)
- (d) not at all

**Answer: c**

If yes, are these eLearning courses

- (a) designed in-house by developers at your company
- (b) designed by external developers at your company's request
- (c) purchased "off the shelf" to meet your company's needs
- (d) a combination of all 3 of the above

**Answer: c**

Does your company provide all employees or certain groups within organization with Mobile Phones or PDAs?

**Answer: Yes**

What type of devices are these?

**Answer: Blackberry PDA/phones**

Does your company use Mobile Learning, Podcasts, RSS-feeds to deliver learning material to employees?

**Answer: No**

If yes, what type of learning material is made available to the employee via mobile device (e.g. short summary of instructor led training/new product feature/tips & tricks/company news etc)?

**Answer: --**

If yes, in what format is learning material made available to the employee via mobile device (e.g. Podcasts/RSS Feeds/ mobile applications/ebooks)?

**Answer:--**

At what frequency do you receive learning material to your mobile device (e.g. daily/weekly/monthly)?

**Answer: --**

How is the mobile content deployed to the mobile phone? Does your employer **push** the content to your device or must you find and download the content from an appropriate server?

**Answer: --**

Is your Mobile Learning connected to a Learning Management System (LMS) that tracks uptake/completion of content? If yes, which LMS?

## APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

---

**Answer: --**

Do you know any companies that use mobile learning widely? If so, which companies?

**Answer: None come to mind**

Do you think mobile learning would be a useful learning delivery method in your organisation?

**Answer: Yes**

If you already partake in Mobile Learning what do you consider the main advantages and disadvantages of mobile learning?

If you have not been exposed to mobile learning, what would you expect to be main advantages and disadvantages?

**Answer: Since we have not used Mobile learning I can only guess at the advantages. I would assume that the time saved from pulling sales professionals from the field to learn at a computer station would be beneficial. Also, I believe easier access at home would be advantageous.**

APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

---

**Respondent 5**

Does your company use eLearning courses to deliver training

- (a) internally to company employees
- (b) externally to your customers/clients
- (c) a combination of both (a) and (b)
- (d) not at all

**Answer: (c) a combination of both (a) and (b)**

If yes, are these eLearning courses

- (a) designed in-house by developers at your company
- (b) designed by external developers at your company's request
- (c) purchased "off the shelf" to meet your company's needs
- (d) a combination of all 3 of the above

**Answer: For the most part – Designed in-house by SMEs, Instructional Designers and/or Trainer; we do have that the company has taken from external company or purchased off the shelf**

Does your company provide all employees or certain groups within organization with Mobile Phones or PDAs?

**Answer: For the most part Director's and above plus sales and presales groups and they mostly company provided blackberry's. A few resources have had their iphone's approved**

What type of devices are these?

**Answer: see above**

Does your company use Mobile Learning, Podcasts, RSS-feeds to deliver learning material to employees?

**Answer: not like we should...podcasts yes could probably do more – we should move more to mlearning. I have not seen any RSS-feeds**

If yes, what type of learning material is made available to the employee via mobile device (e.g. short summary of instructor led training/new product feature/tips & tricks/company news etc)?

**Answer: no on the short summary's but you gave me an idea...**

If yes, in what format is learning material made available to the employee via mobile device (e.g. Podcasts/RSS Feeds/ mobile applications/ebooks)?

**Answer: see above**

At what frequency do you receive learning material to your mobile device (e.g. daily/weekly/monthly)?

**Answer: I'm not sure the frequency podcasts are made available – these are delivered from marketing rather than education/training**

## APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

How is the mobile content deployed to the mobile phone? Does your employer push the content to your device or must you find and download the content from an appropriate server?

**Answer: to my knowledge download from a server**

Is your Mobile Learning connected to a Learning Management System (LMS) that tracks uptake/completion of content? If yes, which LMS?

**Answer: No and it should be – the LMS we use is an in-company product and that functionality is not available (at this time)**

Do you know any companies that use mobile learning widely? If so, which companies?

**Answer: I had a conference call with someone from Motorola and I know they use MTube (their version of utube) and Motmot – version of twitter. Both could be viewed from mobile if I recall**

Do you think mobile learning would be a useful learning delivery method in your organisation?

**Answer: yes – it's not a phase 1 in what we are working on now but I see so much potential**

If you already partake in Mobile Learning what do you consider the main advantages and disadvantages of mobile learning?

If you have not been exposed to mobile learning, what would you expect to be main advantages and disadvantages?

**Answer: For our company – it's a change – we've had difficulty moving some products to elearning. Also with anything it's the right content – those products that had elearning some of it (not all) was really bad so people dismissed it. It will be the same with mlearning – make sure it's relevant and focused so we can obtain buy-in. I've heard of applications that can be downloaded from LMS to iphone –but not a blackberry so I'm curious to see what has really worked on blackberry's. With the blackberry I have now it is much better than my old one so I just have to play with courses.  
Main advantages – allowing more people who travel – i.e. Sales access to learning at all times. While they wait at the airport – taxi cab ride – or anywhere. However for this to really work we will need to track it, test their knowledge and have them apply it to ensure it works.**

**Respondent 6**

Does your company use eLearning courses to deliver training

- (a) internally to company employees
- (b) externally to your customers/clients
- (c) a combination of both (a) and (b)
- (d) not at all

**Answer: C**

If yes, are these eLearning courses

- (a) designed in-house by developers at your company
- (b) designed by external developers at your company's request
- (c) purchased "off the shelf" to meet your company's needs
- (d) a combination of all 3 of the above

**Answer: combination of a and b**

Does your company provide all employees or certain groups within organization with Mobile Phones or PDAs?

**Answer: Depends on level whether phone bill paid for by company**

What **type** of devices are these?

**Answer: Android Nexus Phones**

Does your company use Mobile Learning, Podcasts, RSS-feeds to deliver learning material to employees?

**Answer: Pilots taking place in certain regions but globally across company.**

If yes, what type of learning material is made available to the employee via mobile device (e.g. short summary of instructor led training/new product feature/tips & tricks/company news etc)?

**Answer: All kinds of sales tips, products updates and eng material**

If yes, in what format is learning material made available to the employee via mobile device (e.g. Podcasts/RSS Feeds/ mobile applications/ebooks)?

**Answer: Approach taken is usually m-learning on nexus phone using text based web sites designed specifically for mobile, videos, presentations. Not rss or podcasts. All internal sites, docs are available through phone also.**

At what frequency do you receive learning material to your mobile device (e.g. daily/weekly/monthly)?

**Answer: Since it's mostly site driven, content is updated whenever new information is available. Users can access the site on their mobile or when in work on the laptop. Depends on the content update cycle rather than a set 'push' date that we have for m-learning.**

How is the mobile content deployed to the mobile phone? Does your employer push the content to your device or must you find and download the content from an appropriate server?

**Answer: As above, no push, just sites, content is updated on the cloud and users can access it over 3G network or WiFi.**

## APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

---

Is your Mobile Learning connected to a Learning Management System (LMS) that tracks uptake/completion of content? If yes, which LMS?

**Answer: No.**

Do you know any companies that use mobile learning widely? If so, which companies?

**Answer: No**

Do you think mobile learning would be a useful learning delivery method in your organisation?

**Answer: Yes, although I see m-learning as an extension of our online learning offerings that allows users to access information on whichever device they choose depending on their location. I've yet to see many real use-cases where m-learning is the 'only' solution to solve a learning problem.**

If you already partake in Mobile Learning what do you consider the main advantages and disadvantages of mobile learning?

if you have not been exposed to mobile learning, what would you expect to be main advantages and disadvantages?

**Advantages:**

- Offers learners on the go alternative options to access information
- Offers learners on the go opportunities to learn when they actually need the information e.g. in museum can read about painting when actually viewing the picture. in our workplace, we don't have too many of those 'use-cases though.

**Disadvantages:**

- Sometimes security risks depending on how the data is pushed to users
- Content is not always suitable for mobile devices so altering sites, movies etc for mobile devices is tedious

APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

---

**Respondent 7**

Does your company use eLearning courses to deliver training

- (a) internally to company employees
- (b) externally to your customers/clients
- (c) a combination of both (a) and (b)
- (d) not at all

**Answer: D**

If yes, are these eLearning courses

- (a) designed in-house by developers at your company
- (b) designed by external developers at your company's request
- (c) purchased "off the shelf" to meet your company's needs
- (d) a combination of all 3 of the above

**Answer: N/A**

Does your company provide all employees or certain groups within organization with Mobile Phones or PDAs?

**Answer: No**

What type of devices are these?

**Answer: N/A**

Does your company use Mobile Learning, Podcasts, RSS-feeds to deliver learning material to employees?

**Answer: No**

If yes, what type of learning material is made available to the employee via mobile device (e.g. short summary of instructor led training/new product feature/tips & tricks/company news etc)?

**Answer: N/A**

If yes, in what format is learning material made available to the employee via mobile device (e.g. Podcasts/RSS Feeds/ mobile applications/ebooks)?

**Answer: N/A**

At what frequency do you receive learning material to your mobile device (e.g. daily/weekly/monthly)?

**Answer: N/A**

How is the mobile content deployed to the mobile phone? Does your employer push the content to your device or must you find and download the content from an appropriate server?

**Answer:**

## APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

---

Is your Mobile Learning connected to a Learning Management System (LMS) that tracks uptake/completion of content? If yes, which LMS?

**Answer:**

Do you know any companies that use mobile learning widely? If so, which companies?

**Answer: No**

Do you think mobile learning would be a useful learning delivery method in your organisation?

**Answer:**

**Not really – as we don't have company phones, it wouldn't be feasible**

If you already partake in Mobile Learning what do you consider the main advantages and disadvantages of mobile learning?

If you have not been exposed to mobile learning, what would you expect to be main advantages and disadvantages?

**Answer: Access to courses while travelling or waiting in airports could be an advantage as well as the availability of information to engineers working on specialised equipment requiring product information or service instructions.**

APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

**Respondent 8**

Does your company use eLearning courses to deliver training

- (a) internally to company employees
- (b) externally to your customers/clients
- (c) a combination of both (a) and (b)
- (d) not at all

**Answer: B**

If yes, are these eLearning courses

- (a) designed in-house by developers at your company
- (b) designed by external developers at your company's request
- (c) purchased "off the shelf" to meet your company's needs
- (d) a combination of all 3 of the above

**Answer: B**

Does your company provide all employees or certain groups within organization with Mobile Phones or PDAs?

**Answer: MOST EMPLOYEES**

What type of devices are these?

**Answer: SONY ERICSSON**

Does your company use Mobile Learning, Podcasts, RSS-feeds to deliver learning material to employees?

**Answer: NO**

If yes, what type of learning material is made available to the employee via mobile device (e.g. short summary of instructor led training/new product feature/tips & tricks/company news etc)?

**Answer:**

If yes, in what format is learning material made available to the employee via mobile device (e.g. Podcasts/RSS Feeds/ mobile applications/ebooks)?

**Answer:**

At what frequency do you receive learning material to your mobile device (e.g. daily/weekly/monthly)?

**Answer:**

How is the mobile content deployed to the mobile phone? Does your employer push the content to your device or must you find and download the content from an appropriate server?

**Answer:**

## APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

---

Is your Mobile Learning connected to a Learning Management System (LMS) that tracks uptake/completion of content? If yes, which LMS?

**Answer:**

Do you know any companies that use mobile learning widely? If so, which companies?

**Answer:**

Do you think mobile learning would be a useful learning delivery method in your organisation?

**Answer:**

If you already partake in Mobile Learning what do you consider the main advantages and disadvantages of mobile learning?

If you have not been exposed to mobile learning, what would you expect to be main advantages and disadvantages?

**Answer:**

APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

---

**Respondent 9**

Does your company use eLearning courses to deliver training

- (a) internally to company employees
- (b) externally to your customers/clients
- (c) a combination of both (a) and (b)
- (d) not at all

**Answer: c**

If yes, are these eLearning courses

- (a) designed in-house by developers at your company
- (b) designed by external developers at your company's request
- (c) purchased "off the shelf" to meet your company's needs
- (d) a combination of all 3 of the above

**Answer: a**

Does your company provide all employees or certain groups within organization with Mobile Phones or PDAs?

**Answer: yes**

What type of devices are these?

**Answer: Nokia**

Does your company use Mobile Learning, Podcasts, RSS-feeds to deliver learning material to employees?

**Answer: no**

If yes, what type of learning material is made available to the employee via mobile device (e.g. short summary of instructor led training/new product feature/tips & tricks/company news etc)?

**Answer:**

If yes, in what format is learning material made available to the employee via mobile device (e.g. Podcasts/RSS Feeds/ mobile applications/ebooks)?

**Answer:**

At what frequency do you receive learning material to your mobile device (e.g. daily/weekly/monthly)?

**Answer:**

How is the mobile content deployed to the mobile phone? Does your employer push the content to your device or must you find and download the content from an appropriate server?

**Answer:**

## APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

---

Is your Mobile Learning connected to a Learning Management System (LMS) that tracks uptake/completion of content? If yes, which LMS?

**Answer: We do use a learning management system to track scores on our elearning courses within the company so if my company ever decide to use mobile learning, I'd assume we track that also.**

Do you know any companies that use mobile learning widely? If so, which companies?

**Answer: I would expect the phone operators like Vodafone and O2 but I don't know for sure.**

Do you think mobile learning would be a useful learning delivery method in your organisation?

**Answer: I'm not sure if it's just a fad. I'd have to see some good examples to be convinced of the usefulness.**

If you already partake in Mobile Learning what do you consider the main advantages and disadvantages of mobile learning?

If you have not been exposed to mobile learning, what would you expect to be main advantages and disadvantages?

**Answer: I think some people would find reading from the small screen too difficult. I'm not sure that all employees are skilled enough at using advanced features on phones.**

APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

**Respondent 10**

Does your company use eLearning courses to deliver training

- (a) internally to company employees
- (b) externally to your customers/clients
- (c) a combination of both (a) and (b)
- (d) not at all

**Answer: c**

If yes, are these eLearning courses

- (a) designed in-house by developers at your company
- (b) designed by external developers at your company's request
- (c) purchased "off the shelf" to meet your company's needs
- (d) a combination of all 3 of the above

**Answer: d**

Does your company provide all employees or certain groups within organization with Mobile Phones or PDAs?

**Answer: yes**

What type of devices are these?

**Answer: iPhones**

Does your company use Mobile Learning, Podcasts, RSS-feeds to deliver learning material to employees?

**Answer: yes**

If yes, what type of learning material is made available to the employee via mobile device (e.g. short summary of instructor led training/new product feature/tips & tricks/company news etc)?

**Answer: tips and tricks**

If yes, in what format is learning material made available to the employee via mobile device (e.g. Podcasts/RSS Feeds/ mobile applications/ebooks)?

**Answer: podcasts**

At what frequency do you receive learning material to your mobile device (e.g. daily/weekly/monthly)?

**Answer: weekly**

How is the mobile content deployed to the mobile phone? Does your employer push the content to your device or must you find and download the content from an appropriate server?

**Answer: We find and download the content**

## APPENDIX C: RESULTS OF PRELIMINARY QUESTIONNAIRE

---

Is your Mobile Learning connected to a Learning Management System (LMS) that tracks uptake/completion of content? If yes, which LMS?

**Answer: n/a**

Do you know any companies that use mobile learning widely? If so, which companies?

**Answer:**

Do you think mobile learning would be a useful learning delivery method in your organisation?

**Answer:**

If you already partake in Mobile Learning what do you consider the main advantages and disadvantages of mobile learning?  
If you have not been exposed to mobile learning, what would you expect to be main advantages and disadvantages?

**Answer: For some it's a convenience to have the content on their phone. Overall I think access to the information with a laptop is a better solution all around.**

***Appendix D: RESULTS OF ONLINE SURVEY***

**Mobile Learning: Section 1/3 The Workplace**

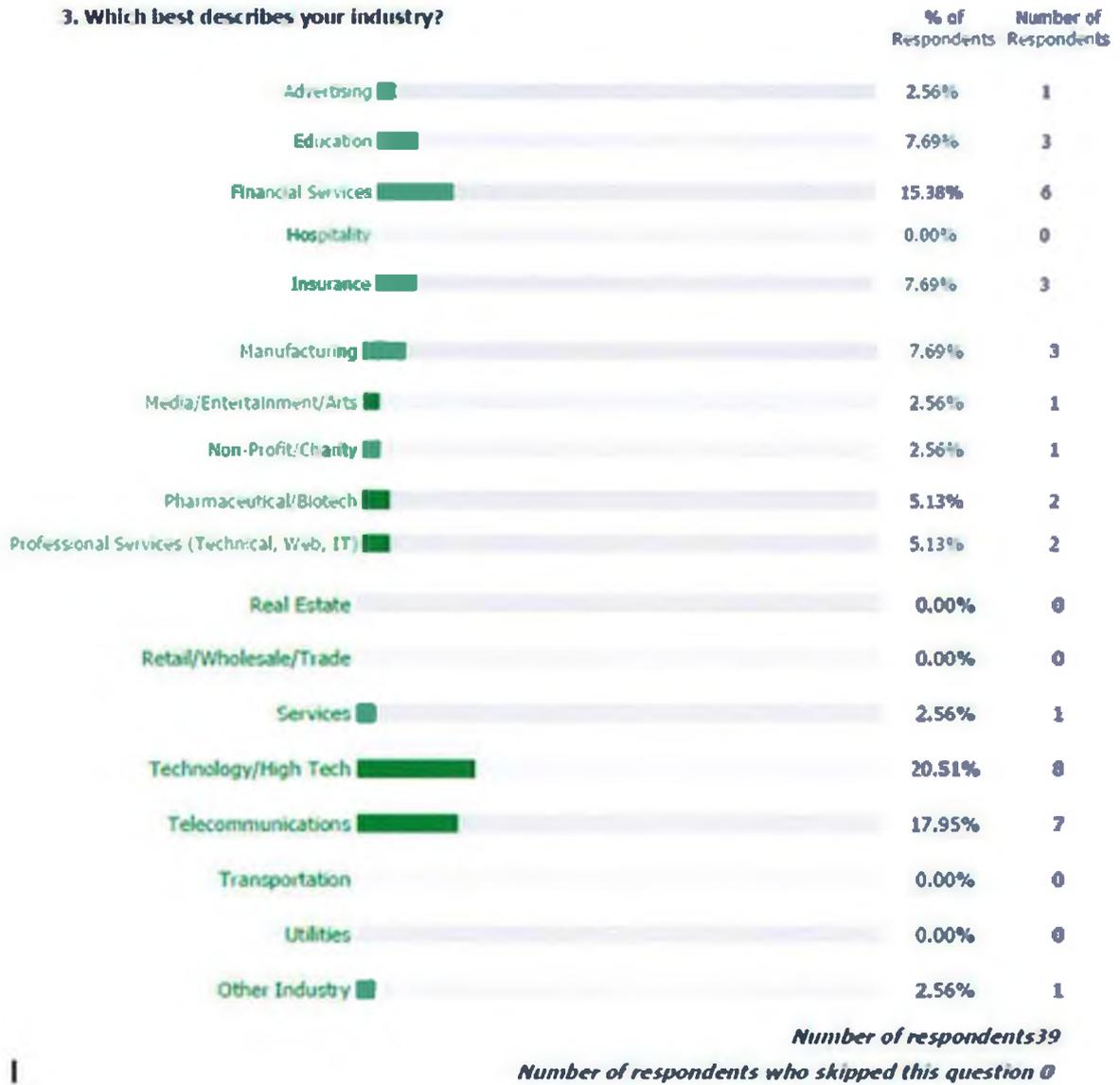
**1. Please provide the following information:**  
**Your details (name/company name) will be treated with confidentiality.**

In order to preserve confidentiality as agreed in the survey, respondents' names and company details are not included in this report.

**2. How many employees are in your organization worldwide?**



APPENDIX D: RESULTS OF ONLINE SURVEY



APPENDIX D: RESULTS OF ONLINE SURVEY

**5. If yes to Question 4, are these eLearning courses...  
Select multiple answers if applicable.**

	% of Respondents	Number of Respondents
designed in-house by developers at your company	43.14%	22
designed by external developers at your company's request	41.18%	21
purchased "off the shelf" to meet your company's needs	15.69%	8
<i>Number of respondents</i>		<b>29</b>
<i>Number of respondents who skipped this question</i>		<b>10</b>

**6. Does your company provide employees with Mobile Phones?**

	% of Respondents	Number of Respondents
All	15.38%	6
Most	15.38%	6
Some	46.15%	18
Few	12.82%	5
None	10.26%	4
<i>Number of respondents</i>		<b>39</b>
<i>Number of respondents who skipped this question</i>		<b>0</b>

**7. Which category best describes these phones?**

	% of Respondents	Number of Respondents
Feature Phone	12.50%	5
Smart Phone	35.00%	14
Combination of phone types	47.50%	19
N/A	5.00%	2
<i>Number of respondents</i>		<b>38</b>
<i>Number of respondents who skipped this question</i>		<b>1</b>

APPENDIX D: RESULTS OF ONLINE SURVEY

8. If your company provides mobile phones to employees, please select the make of phone that best describes the most dominant phone provided.

	% of Respondents	Number of Respondents
Apple iPhone	11.43%	4
HTC	2.86%	1
Motorola	2.86%	1
Nokia	31.43%	11
Palm	2.86%	1
RiM Blackberry	25.71%	9
Samsung	0.00%	0
Sony Ericsson	8.57%	3
Other	14.29%	5
<i>Number of respondents</i>		<b>35</b>
<i>Number of respondents who skipped this question</i>		<b>4</b>

9. If your company uses Mobile Learning, what type of Mobile Learning is used to deliver learning material (formal or informal) to employees? (Please select multiple answers if applicable)

	% of Respondents	Number of Respondents
Structured Mobile Learning Course	29.03%	9
Podcasts	22.58%	7
Video Podcasts (Vodcasts)	25.81%	8
RSS-feeds	6.45%	2
eBooks	3.23%	1
Simple web site (online) training often with embedded video. Generally use streaming content rather than content downloaded.	3.23%	1
Online courses	3.23%	1
Mobile learning has only really been used on a trial basis (proof of concept) in my company	3.23%	1
elearning provided by web via PC/laptop only, not via phone.	3.23%	1
<i>Number of respondents</i>		<b>15</b>
<i>Number of respondents who skipped this question</i>		<b>24</b>

APPENDIX D: RESULTS OF ONLINE SURVEY

**10. What type of Learning Material is made available to employees via mobile devices?**

Please select multiple answers if applicable.

	% of Respondents	Number of Respondents
short summary of instructor led training	10.00%	3
new product features & functions	26.67%	8
tips & tricks	10.00%	3
company news	23.33%	7
Product and Sales Training. But we're only starting here so check again in 6 months time.	3.33%	1
pdf / email / web	3.33%	1
None	3.33%	1
Access to a library of 100's of e-learning training courses that can be accessed via smart phones	3.33%	1
All internal sites and docs, from google apps suite of products. Since this content is on the cloud it can be accessed from any device.	3.33%	1
most elearning content is available for mobile access	3.33%	1
none	3.33%	1
All types	3.33%	1
I dont know	3.33%	1
	<b>Number of respondents</b>	<b>18</b>
	<b>Number of respondents who skipped this question</b>	<b>21</b>

**11. At what frequency do you receive learning material to your mobile device?**

	% of Respondents	Number of Respondents
daily	9.68%	3
weekly	9.68%	3
monthly	3.23%	1
a few times a year	16.13%	5
never	61.29%	19
	<b>Number of respondents</b>	<b>31</b>
	<b>Number of respondents who skipped this question</b>	<b>8</b>

APPENDIX D: RESULTS OF ONLINE SURVEY



APPENDIX D: RESULTS OF ONLINE SURVEY

**Section 2/3: Your Personal Experiences**

**1. Does your mobile phone provide Internet access?**

	% of Respondents	Number of Respondents
Yes 	87.16%	34
No 	12.82%	5
<b>Number of respondents</b>		<b>39</b>
<b>Number of respondents who skipped this question</b>		<b>0</b>

**2. Do you access the Internet for informal learning in your own time e.g. for research, DIY tips, How-to videos etc. using your mobile phone?**

	% of Respondents	Number of Respondents
Yes: 	51.28%	20
No 	48.72%	19
<b>Number of respondents</b>		<b>39</b>
<b>Number of respondents who skipped this question</b>		<b>0</b>

**3. How often do you use you mobile phone for Internet access?**

	% of Respondents	Number of Respondents
daily 	43.59%	17
weekly 	20.51%	8
once a month or less 	12.82%	5
never 	17.95%	7
Internet access is not available on my phone 	5.13%	2
<b>Number of respondents</b>		<b>39</b>
<b>Number of respondents who skipped this question</b>		<b>0</b>

APPENDIX D: RESULTS OF ONLINE SURVEY

**4. Which websites do you most often visit using your mobile phone?**  
Please select all that apply and use the "other" field to add additional information.

	% of Respondents	Number of Respondents
Social Networking e.g. Facebook, Twitter	15.79%	18
News	23.68%	27
Email	21.93%	25
Videos/Podcasts e.g. YouTube	8.77%	10
Shopping	4.39%	5
Banking	7.02%	8
Work related sites	11.40%	13
podcasts, rss feeds, google search.	0.88%	1
None	0.88%	1
General web browsing.	0.88%	1
www.teamtalk.com BBC sports www.europeantour.com	0.88%	1
Sports	0.88%	1
Travel research	0.88%	1
search engines	0.88%	1
Forums for hobbies (video games, etc) Weather	0.88%	1
	<b>Number of respondents</b>	<b>32</b>
	<b>Number of respondents who skipped this question</b>	<b>7</b>

**5. Have you ever viewed or downloaded a Podcast/Vodcast on your phone?**

	% of Respondents	Number of Respondents
Yes	33.33%	13
No	66.67%	26
	<b>Number of respondents</b>	<b>39</b>
	<b>Number of respondents who skipped this question</b>	<b>0</b>

APPENDIX D: RESULTS OF ONLINE SURVEY

**6. If you answered Yes to Q.5, please give a brief description of the type of Podcasts/Vodcasts viewed/downloaded. For example, were these mostly for entertainment, informal learning, formal learning etc?**

1. Entertainment and informal learning
2. News, magazines, Radio broadcasts, informal learning, entertainment
3. Discussion, comedy, news, technical talks career related. More for entertainment, informal learning.
4. Entertainment
5. Access youtube on regular basis. Many internal sites embed videos on them which are also available to stream online. never really download them to phone as this has more security implications, generally stream the content.
6. Informal learning
7. Formal learning. Product Updates
8. learning (photoshop user/power mac user) and recreational radio pod casts today fm.
9. company broadcasts; formal learning
10. Formal Learning Vodcast from the LIA website - a "webinar" for formal learning for QFA designation (Qualified Financial Advisor).
11. Entertainment
12. Oracle internal
13. Weekly one to one

*Number of Respondents 13*

*Number of respondents who skipped this question 26*

**7. Have you ever received RSS feeds to your mobile phone?**



*Number of respondents 39*

*Number of respondents who skipped this question 0*

**8. If you answered Yes to Q7, please describe the type of RSS feeds received? For example, mention the type of content e.g. news/educational/product updates/sport updates etc.**

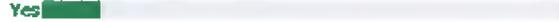
1. news
2. news related
3. News
4. News feeds mostly, both internal and external news feeds.
5. news, shopping (gumtree)
6. Not yet.
7. Telkom phones update
8. I'm actually not sure and I don't use my blackberry for internet access because it is TERRIBLE!!!! I hate it and can't wait to get an iphone.
9. News

*Number of Respondents 9*

*Number of respondents who skipped this question 30*

**SECTION 3/3: Your views**

**1. Do you know any companies that use Mobile Learning?**

	% of Respondents	Number of Respondents
Yes 	10.53%	4
No 	89.47%	34
<i>Number of respondents</i>		<b>38</b>
<i>Number of respondents who skipped this question</i>		<b>1</b>

**2. If yes to Q1, can you provide the name of the company/companies?**

1. <http://www.intuition.com/>
2. IBM
3. voda/O2
4. No one is really using mobile learning in a really effective way that I know of.
5. Google,
6. BT

*Number of Respondents* **6**  
*Number of respondents who skipped this question* **33**

**3. Do you think that Mobile Learning would be a useful learning delivery method in your organisation in conjunction with Instructor Led Training and eLearning?**

	% of Respondents	Number of Respondents
Yes 	64.10%	25
No 	35.90%	14
<i>Number of respondents</i>		<b>39</b>
<i>Number of respondents who skipped this question</i>		<b>0</b>

**4. If you already use Mobile Learning, what do you consider the main advantages and disadvantages of this delivery method for learning?**

**If you have not been exposed to Mobile Learning, what would you expect to be the main advantages and disadvantages of this delivery method?**

- Advantage: Flexibility for the learner regarding when they access the content. Access to Information for field engineers while on site. Disadvantages: Devices change so rapidly and the interfaces vary so much, I think it might be difficult to design content that would fit many different devices.
1. Advantages - convenient, portable, can be made available to a large number of people Disadvantages - small screen size, dedicated time not given to learning,
  2. Advantages: Content and training material can be viewed and read at the users discretion on the go. (i.e. bus, rail journeys). Completion of training without the need for pc's or laptops. Disadvantages: Not all content may be presented well on mobile devices. (i.e. video streaming may not be supported). More inclined to be individual training (one-one) than group based training via mobiles. Limited ability to be able to do practicals, lab work as part of the training. Mainly usefull for just training courses involving reading the content.
  3. Disadvantages: Coverage Issues; IT Literacy levels; Many colleagues IT skills are v limited & would not be open to Mobile Learning Advantages: Available for completion when I'm free; no travel required (time, costs, inconvenience); low cost solution to an organisation
  4. Access to mobile learning to an employee at a time when they might not have an opportunity to access it otherwise would be an advantage. An disadvantage might be the device screen size or broadband coverage.
  5. available, ease of access from anywhere
  - 6.

- Disadvantages: [1] Time management and work/life balance: In general, especially for the typical office worker, times where mobile learning would seem to be a technical solution are also times when the user is likely either to be concentrating on driving or accustomed to an interlude from intensive work-related tasks, e.g. they are away from their desk, including at home, driving, travelling by other means, eating or at home. Courses tend to require defined study sessions of a certain length -- the length of journeys or other out-of-office time might not coincide conveniently with these parameters. If they are on a plane or train, a laptop would seem to be a better medium. I find it hard to specify a time when the mobile would be the most technically appropriate medium and the occasion also suitable and agreeable for study. [2] The above brings a specific potential commercial disadvantage: insurance. If employees are going to be expected to access courses while on the move, especially where they could be driving, I suspect that it could lead to increased insurance costs, even if appropriate rules and procedures were in place. [3] The usual objections to the limitations of the display on devices. Built-in laser projectors may overcome the screen-size problem, but depend on availability of a suitable surface and in any case are not likely to be common or standard for at least 2 years. [4] Power supply -- a course would be the equivalent of a substantial telephone call or video. Advantages: [1] Exception to [1] above: Certain occupations could benefit from mobile instruction, e.g. those where the portability of the mobile device coincided with a strong need for mobile instruction. Workers on some hazardous sites might be able to work from step-by-step instructions provided via a mobile phone or head-up display. Players of some sports such as golf might value the portability highly. People in remote areas such as rural Africa might benefit, although there would be a power issue as stated above unless they could hook up to a generator. Young, active students approaching exams might benefit from short revision courses while outdoors, obviating the need for a laptop or wads of notes. [2] Audio learning: Listening to something on the mobile, as on the radio while doing something else, could be productive in certain cases, e.g. on large open sites to provide update/refresher training on specific issues for plant personnel as they work. E.g. a new machine/vehicle has come into use on the site and employees need to be told or reminded about some specific issues or procedures connected with its introduction. A salesperson on the way to a meeting with a prospect arranged at short notice and unfamiliar with the prospect's business could receive a crash course while travelling, but note disadvantage [1] above. I am not sure whether in practice such communications would really fall into the category of mobile learning.
- 7.

## APPENDIX D: RESULTS OF ONLINE SURVEY

- Advantages: Its portable so in particular for podcasts you can listen to them when on the move e.g. commuting so users can make efficient use of time. Disadvantage: Screen size is too small generally for presentations to be useful - I think if the user has the option to use a full size screen they will take it - with the advent of mobile broadband this is more easily done than previously. Most mobile learning that we use is not specifically targeted for mobile user it is just up to the user to download and use on a mobile device. It is already I find I am less likely to use mobile learning if there is a visual part involved as generally I am driving or running when listening to podcasts, maybe in more urban areas where a user is more likely to be commuting on public transport they will use them.
8. ease of access for staff - both from the end user who receives the information and the sender. Staff can be kept up to date on latest company news or products/services updates no matter where that are based geographically
9. Content has to be short and snappy Video is a good medium Quick downloading is crucial There has to be a real training need in order for people to learn via their phones. Excellent for reinforcement of training messages Excellent for product updates for people who travel frequently
- Advantages include being able to access content and information whenever you need it. The latest Nexus phone means that reading content on the phone is quite easy, streaming video and radio is good quality and enjoyable. Disadvantages include more security implications for the company. Also the idea that m-learning is dealt with separately and offered as a separate mode of learning is not the future of m-learning. Online content exists, how users want to view this should be a choice they take depending on the technology available to them at the time, whether it's from a mobile device, an iPad, a laptop or a desktop etc. Pushing an m-learning format onto people is not the way to go. It should be offered as an alternative way of accessing content, not the only way.
10. There are several barriers to the implementation of mobile learning. The first one is access. In our organisation, every employee has a computer or laptop or both. Assuming the employee has one of these devices is a safe assumption. Mobile phones and data access plans, on the other hand, are not always provided. Another one is consistency. Since it is hard to control what type of device is accessing e-learning, the design must be platform-agnostic. While this is possible, it means the infrastructure and engineering effort must be higher. Learning management system integration may be another hurdle. If the LMSs are not accessible over the Internet, VPN connections may increase complexity. Confidentiality is another problem. Training material considered to be a competitive advantage should not be downloadable to portable devices if possible. Limiting access to streaming is an expensive proposition, unless the material lacks video and audio, which would raise doubts about how engaging and effective it can be. There are other considerations such as static versus live remote instructor delivery and how to enable quality interactivity with the remote instructor with a mobile device.
11. 12. Advantages: flexibility, currency, accessibility Disadvantages: visual quality
- 13.

## APPENDIX D: RESULTS OF ONLINE SURVEY

- Not good as a main delivery method. Good as an addition to e.g. classroom training. Definitely not good for taking notes/recording anything - typing is waaay to slow. I use my phone only on wifi, not 3G - and when I'm on wifi I have my laptop on me also - so I always prioritise laptop. The phone's screen is too small.
14. Audio and video doesn't work for everyone, doesn't work for me. However I am happy to read the web on my phone - and I'd use Internet for informal learning. I don't think there is a need for fancy m-learning courses, an optimised website can be as good.
15. I think Mobile Learning would be useful to provide summary information to students after Instructor Led Training to reinforce learning. It would also allow the learner to access the content while commuting or waiting at airports etc
16. It is not often that we as employees do not have access to a workstation or laptop. Courses can also span days, a mobile device screen is too small to use over long periods of time.
17. Disadvantages: small screen, not instructor led, no class interaction, costs. Advantages: available anywhere. The most obvious advantage is its mobility which allows unbounded accessibility in terms of any time, any place, any where. However, within this advantage lies, in my opinion, the main disadvantages. Mobility indicates that learning would take place in public areas at non-scheduled times and perhaps sporadically. Consequently, this might subject the learner to repeated distractions by noise at environmental and (even) psychological levels. As a result, effective learning is interfered with. What is more, screen size dictates diminutive presentation of visual output, and thus, prolonged use may lead to eye strain and induce stress and this, in turn, could hinder learner engagement, and ultimately, deter further take-up of 'mlearning'. I would say that learning via small mobile devices may be useful in terms of memory jots and quick word/terminology dictionaries etc. Therefore, I see it more as a quick provider of small chunks of superficial information rather than a useful vehicle for the delivery of substantial and profound learning.
18. I have never used Mobile Learning. I feel it would be difficult to read learning material via a mobile device given the screen size. I do think it would be useful to view podcasts of a missed meeting or short presentation via mobile. As wifi is widely available now and most people in my industry carry laptops I feel e-learning is more useful than mobile learning for us.
19. I have never used Mobile Learning. I feel it would be difficult to read learning material via a mobile device given the screen size. I do think it would be useful to view podcasts of a missed meeting or short presentation via mobile. As wifi is widely available now and most people in my industry carry laptops I feel e-learning is more useful than mobile learning for us.
20. I have tried a couple of PC-based learning courses along with a Webcast training session. So far my experiences fall far short of the knowledge gained from classroom-based instructor-led training.
21. 1) Convenient 2) Flexible - can use when commuting etc. 3) Usually well-constructed/ designed i.e. bite-size lessons to optimise learning
22. The phone needs to be a smart phone that can provide lots of content at a time (e.g. BBerry) mobile specialised on site/in a situation deliverable "know how". Audio / video output capability. Audio / video input capability. Disadvantages. Large mobile learning software can be large and time-consuming to download.
23. Sometime phone with interface
24. Mobile learning would be convenient if the employment force is mobile. However, for the most part in my company, employees can access learning materials via a wide range of options and I believe Mobile Learning may prove to be limiting... distractions, visibility of information, etc
- 25.

*Number of Respondents 25*

*Number of respondents who skipped this question 14*