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Mobile learning: the latest development of distance learning

by

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Mobile learning has arrived!

The justification for this statement is the hundreds of thousands of administrative SMS messages that have been send out by universities and training organisations in different parts of the world to their students' mobile phones.

A further justification is the tens of thousands of academic SMSs that have been sent out to students' mobile phones by universities and training organisations throughout the world dealing with academic problems, clarification of difficult parts of courses, aid with an assignment, or preparation for an exam.

Definition

Mobile learning is defined as the provision of education and training on mobile devices: Personal Digital Assistants (PDAs), smartphones and mobile phones.

In defining mobile learning one confronts tensions between functionality and mobility. There is a continuum form the point of view of functionality in the devices used for e-learning and m-learning. This continuum goes from desktop computers to laptop computers to PDAs or handhelds or palmtops to smartphones to mobile phones. There are many, especially in the United States of America who include laptop computers in their definition of mobile learning.

I disagree. I feel that in the definition of *mobile* learning the focus should be on mobility. Mobile learning should be restricted to learning on devices which a lady can carry in her handbag or a gentleman can carry in his pocket. I therefore define mobile learning as 'the provision of education and training on PDAs/palmtops/handhelds, smartphones and mobile phones.'

<u>FUNCTIONALITY</u>		<u>MOBILITY</u>		
Computers	Laptop Computers	PDA'S Handhelds Palmtops	Smartphones	Mobile Phones
← E-LEARNING ← →		← M-LEARNING ← →		

One of the characteristics of mobile learning is that it uses devices which citizens are used to carrying everywhere with them, which they regard as friendly and personal devices, which are cheap and easy to use, which they use constantly in all walks of life and in a variety of different settings, except education.

Statistics

The justification of mobile learning comes from the 'law' of distance education research which states that 'It is not technologies with inherent pedagogical qualities that are successful in distance education, but technologies that are generally available to citizens'.

A typical example is the 12" laser discs of the early 1990s. These laser discs had excellent pedagogical possibilities and excellent courses were developed for them especially in the field of ESL (English as a Second Language), but they were not successful because not enough people owned one.

Never in the history of the use of technology in education has there been a technology that was as available to citizens as mobile telephony. The statistics are stunning:

In July 2005 Ericsson announced that the number of mobile devices in the world had topped 2 billion for the first time. They forecast ownership of 3 billion mobile phones as early as 2010 – and this for a world population of somewhat over 6.5 billion. Today the figure stands at 2.5 billion.

Recent research on audience characteristics published by the BBC in Britain shows the ubiquity of mobile devices especially in the 16-24 age group, the university age group. The BBC research in this group shows that it characterises a mobile phone as a 'necessity' and not a 'luxury'.

Thus it can be taken as a given that all students in all European further and higher education institutions in all countries in Europe possess one.

Penetration of ownership of mobile devices in most counties in Europe, including Ireland, is now over 100%. These are the figures:

Country	Mobile Phone Penetration	Country	Mobile Phone Penetration
Austria	103%	Latvia	96%
Belgium	88%	Lithuania	96%
Cyprus	107%	Luxembourg	107%
Czech Republic	111%	Malta	107%
Denmark	101%	Netherlands	102%
Estonia	96%	Norway	106%
Finland	102%	Poland	71%
France	79%	Portugal	99%
Germany	91%	Slovak Republic	85%
Greece	100%	Slovenia	44%
Hungary	92%	Spain	94%
Ireland	101%	Sweden	113%
Italy	111%	UK	108%

Data sources: WCIS (World Cellular Information Service) and Ovum. Valid at end of December 2005

Projects

The European Commission has played an important role in bringing about the arrival of mobile learning. It has funded 3 Leonardo da Vinci projects and 2 IST research projects in the field. We will take a brief look at the work of these projects.

Programme	Project leader	Title
Leonardo da Vinci	Ericsson Education Dublin	From e-learning to m-learning
Leonardo da Vinci	Ericsson Education Dublin	Mobile learning: The next generation of learning
IST FP5	LSDA UK	The m-learning project
IST FP5	Giunti Ricerca Italy	The MOBILearn project
Leonardo da Vinci	Ericsson Education Dublin	The incorporation of mobile Learning into mainstream Education and training

Brief descriptions of these projects are:

1. The Leonardo da Vinci *From e-learning to m-learning* project, led by Ericsson Education Ireland, addressed the development of courseware for mobile phones, smartphones and PDAs.

The developments from distance learning to elearning to mobile learning were highlighted by this project. The project accepted that today elearning is the state of the art for distance education. But the project asks: what comes next? What is the next development after elearning? What does the future hold?

What was important about this project was that the main pedagogical problems of developing mobile learning for PDAs were solved in the project in which a comfortable didactic environment was created by using Microsoft Reader Works, providing each student with Microsoft Reader software to display the content and which was adjudged highly satisfactory by surveys of students who had studied a full course by mobile learning on a PDA. As the major objection raised against mobile learning is screen size, it was important that this problem was solved and by-passed at the outset.

The full course of text and readings measured 1000 A4 pages and was easily held by the memory of a standard PDA like the HP Compaq iPaq 5000 series.

2. The Leonardo da Vinci project *Mobile learning: the next generation of learning* led by Ericsson Education Dublin.

Again the link with distance learning is highlighted here by saying that the next generation of learning is mobile learning and that it follows on from distance learning and elearning.

The main activities to achieve the production of acceptable courseware for smartphones in this project were:

- installing a web-authoring tool like Macromedia Dreamweaver
- installing a desk-top browser like Opera that has page rendering characteristics similar to a mobile phone,
- using XHTML to code the web pages,
- using Cascading Style Sheets (CSS) to separate presentation style from document content
- arranging each course page as a vertical column of content of at most 208 pixels
- designing concise neat diagrams to fit the small screen.

Also in this project the next generation of mobile learning course development was based on FlashLite. FlashLite is a toned down version of Flash designed for mobile devices.

Progress was also made in the development of courseware for PDAs with one of the partners, NKI from Bekkestua, Norway announcing that by developing server-side code for their system, they had produced mobile learning versions of all 400 of their e-learning courses and were offering them to their mainline students.

3. The IST project *M-Learning* led by the United Kingdom government Learning and Skills Development Agency (LSDA)

This €4.500.000 project had an important social dimension. It recognised that there were in the United Kingdom many 16 to 20 year old youths who were unemployed and had urgent needs for additional training, but who refused to attend a training centre or college. They were unemployable and refused to attend training. They all had, however, a mobile phone which they used constantly. The project, therefore, set out to develop courses for them on their mobile phones in the fields of literacy, numeracy and social skills. The focus of the project was on mobile phones, as this type of student did not possess either smartphones or PDAs.

4. The IST project *MOBILearn* led by Giunti Ricerca of Genoa, Italy.

This was a very large project led from Italy and counting a wide range of at least 20 European universities among its members with funding of €8.000.000. The objectives of this project were: the definition of theoretically-supported and empirically-validated models for effective learning/teaching/tutoring in a mobile environment.

5. The fifth project is called 'The incorporation of mobile learning into mainstream education and training.' The thesis of this project is quite different from that of the previous projects. The thesis is that it is now time for mobile learning to emerge from its project status and enter into mainstream education and training – as the related fields of distance education and e-learning have done before it.

The trouble with projects is that they tend to collapse and disappear when the project funding is discontinued. What usually happens is that the project group is dispersed, staff contracted in for the project are let go, other staff discontinue their work and move to other tasks, the expertise built up by the project group is dissipated and not maintained.

For the first time a mobile learning project is focusing on the field as a whole and not on the development of mobile learning for an institution or a group of institutions.

'The incorporation of mobile learning into mainstream education and training' project is contributing to the development of mobile learning in colleges and universities in 4 ways:

1. Development of a mobile learning academic administration kit.
2. Production of a book *An introduction to mobile learning*
3. Development of a series of 5-6 screen mobile learning academic supports for students
4. Development of a number of mobile learning course modules.

1. *Development of a mobile learning academic administration kit.*

This will be a hands-on, how-to-do-it guide on how to set up an SMS gateway and send out SMS messages on administrative matters to the mobile phones of some or all students.

It will be distributed free-of-charge to all universities and institutes of higher education in the partner countries: Ireland, Norway, France and Hungary.

The need for this seems obvious.

Isn't it strange that all students enrolled in all higher and further education institutions today have frequent needs for information from their institutions about timetable changes, assessment deadlines, feedback from tutors and other urgent administrative details? Nearly all of these students carry a sophisticated communications device which they use constantly in all walks of life, except in their education or training programme.

Isn't it equally strange that all higher and further education institutions today have frequent needs for providing information to their students about timetable changes, assessment deadlines, feedback from tutors and other urgent administrative details? Nearly all of their students carry a sophisticated communications device which they use constantly in all walks of life, except in their education or training programme.

SMS messages can be sent in this way either to the whole student body, or to students of a faculty, or a department or a class grouping. Hundreds of thousands of these administrative SMS messages have been sent out to students' mobile phones by universities throughout the world.

2. *Production of a book* An introduction to mobile learning

This is a guide to the implementation of mobile learning for training institutions throughout the world.

It has about 150 pages. It will be distributed free-of-charge to all universities and institutes of higher education in the target countries: Ireland, Norway, France and Hungary. It will be available on the project website (<http://www.ericsson.com/mlearning3>) for free download by training institutions in the other European countries and around the world.

The content is divided into 5 sections:

1. The use of mobile learning in academic administration – this will be similar to what was described in the previous section.
2. The use of mobile learning in academic education. This will deal with the use of mobile learning in teaching and learning and will include technologies like J2ME and podcasting.
3. The use of SMS messages in academic education. This will deal with the use of SMSs sent to students' phones for teaching and learning.
4. The goals of mobile learning. These are the goals that mobile learning needs to reach to achieve its incorporation into mainstream education and training.
5. Mobile learning successes. Examples of successful mobile learning which have already been incorporated in the mainstream.

3. *Development of a series of 5-6 screen mobile learning academic supports for students*

This is the sending out of 5-6 screens of academic material to students' PDAs, smartphones or mobile phones. These academic supports can be course summaries; help with particularly difficult parts of a course that have caused difficulty to students in the past; assignment guidance; examination preparation and so on. Every one agrees that this is a feasible way to use mobile learning and tens of thousands of these supports have been sent to students' phones by universities around the world.

Their presence in the project is twofold: to act as models for other institutions who wish to develop mobile learning and for use by the project partners with real students in real study situations.

4. *Development of a number of mobile learning course modules.*

Again the purpose is twofold: to act as a model for other institutions and for use by the partners with real students in real study situations.

Not all experts in the field agree that it is possible to develop course modules for mobile learning for PDAs, smartphones and mobile phones. The difficulties usually cited are screen size and text input by students.

I am encouraged by the total success of the Norwegian institution, NKI, in developing course material for PDAs. It is considered that all the problems of presenting courses on PDAs were solved by NKI. By using Microsoft Reader Works a pleasant study environment was designed and this was favourably commented on in surveys and questionnaires by the students who had studied the course. Students stated that they were comfortable studying from the screen of a PDA.

My view is that the success of mobile learning courses on PDAs, and on smartphones and mobile phones depends on the size of the carrot. If students, who commute an hour each way to work by train or underground each day, are told that they will get their MBA from studying by mobile learning, I think they will do it.

Examples of success in mobile learning

4 examples of mobile learning have been chosen for presentation in this paper here today. These are:

1. University of Pretoria, South Africa
2. University of Ulster, Magee College, Northern Ireland
3. Institute of Technology Sligo
4. NKI, Bekkestua, Norway

1. *University of Pretoria, South Africa*

It may come as something of a shock to some members of today's audience to learn that the world leaders of mobile learning come from Africa. But it is an undeniable fact. I always say that if mobile learning can be done successfully in the back end of Africa, it can certainly be done in Europe.

In its faculty of education in the year 2002 the University of Pretoria had hundreds of students enrolled in the equivalent of a Higher Diploma in Education by distance education.

None of the students had email or could avail of e-learning but all had a mobile phone. All were full-time teachers employed in rural schools.

The university used m-learning highly successfully for university administration, achieving almost immediate communication by SMS messaging in an area where email was unavailable and post took 5 to 15 days.

The University of Pretoria started using mobile phone support during 2002 in three paper-based distance education programmes because more than 99% of the "rural students" had mobile phones. This is still the case.

The profile of the students in 2002 was as follows:

- The majority live in rural areas
- 100% are full-time employees (teaching)
- 77.4% are English second language speakers
- 83.8% are between the age of 31 and 50
- 66.4% are women
- 0.4% have access to e-mail
- 99.4% have a mobile phone

The majority of these learners live in deep rural areas with little or no fixed line telecom infrastructure

Mobile phone support to these rural distance learning students entails sending bulk, pre-planned SMSs to:

- all students;
- students of a specific programme for general administrative support as well as motivational support;
- specific groups of students extracted from the data-base for specific administrative support (customised group SMS); and
- small group or individual SMSs to specific students extracted from the data-base on an individual basis for specific administrative support.

The advantages and successes have already been significant.

- In response to a reminder for registration for contact sessions, 58% of the learners registered before the closing date compared to the normal expected percentage of below 40%.
- In response to a reminder of the contact session dates, 95% of the learners that registered for the contact sessions, attended.

- Learners respond in mass and almost immediately on information provided in SMS-messages.

From a logistical and financial point of view, the successes are also significant.

- Using print and the postal service to distribute the necessary information to learners would have been more than 20 times the cost of the bulk SMSs.
- While the SMSs provide immediate and JIT (just-in-time) information, the posted information would have taken between 3 and 18 days (depending on the remoteness of the learner) to reach all the learners.

If it can be done successfully in rural Africa it can certainly be done successfully in Europe.

2. *University of Ulster, Magee College, Northern Ireland*

Just down the road from here, in Derry, the University of Ulster in Northern Ireland has had great success in the use of SMS messaging for the reduction of student drop-out.

Government decisions in a number of European countries have heightened the importance of the reduction of the drop out rate in universities and colleges. In some instances subsidies can be reduced if the drop out rate is not reduced. The avoidance of avoidable drop-out has been an intractable problem in higher education for years and often costly methods, like increased counselling and mentoring, have been introduced to combat the phenomenon.

The University of Ulster has found that the sending of SMS messages to students who have been identified as being at risk, has been a very successful approach for keeping students in the system and for maintaining the government *per capita* grant.

The University of Ulster sent out messages to students of the type 'Sorry, we missed you today'. The university feared that this might be intrusive. On the contrary the students did not find it intrusive at all. The students loved it and wanted the university to expand the service to other areas – like assignment deadlines.

The University considers that speed is essential in dealing with drop-outs: 'Two weeks and they are gone'. Other methods of dealing with drop-out have a lag time of several weeks. The University regards drop-out as a duty of care. They feel that a frequent cause of drop-out is that 'Nobody cares'. Groups of 4.500 students can be alienating. The personal touch of a message on a mobile phone can be an answer.

3. *Institute of Technology Sligo*

A few weeks ago IT Sligo hit the national TV, radio and press headlines with a report on mobile learning. The reference was to video podcasting which was being used to send lectures which a student had missed to the students'

mobile phones. The lectures can be sent to students' iPods, MP3 players or mobile phones which have a video display. 'Sligo Institute launches mobile learning' was the headline.

4. *NKI, Bekkestua, Norway, a prominent member of EADL*

NKI is based in Bekkestua, an outlying suburb of Oslo in Norway and has been for many decades a leading European provider of distance education and e-learning.

As already discussed, NKI was a partner in the Ericsson, Ireland led *From e-learning to m-learning* project during which they solved all the problems of presenting full courses on PDAs. The study environment created was judged comfortable by the students in questionnaires filled in after they completed the mobile learning course. As screen size is often cited as a major objection to mobile learning and as it is often said that you cannot put full courses on mobile devices this was an important achievement.

NKI has no fewer than 400 e-learning courses, one of the largest e-learning portfolios in Europe. In the second Ericsson-led mobile learning project *Mobilelearning: the next generation of learning* they announced that by writing server-side code to their LMS/VLE they had produced mobile learning versions of all 400 of their e-learning courses. This was a world first and represented a massive transfer of mobile learning into the mainstream.

The future

A future for mobile learning has been mapped out in this presentation.

It is recommended that universities and colleges who wish to enter the field of mobile learning, follow the leadership of the University of Pretoria in South Africa and adopt a three stage approach:

- Stage 1. The use of mobile devices in university administration.
- Stage 2. The use of 5-6 screen shots for academic support.
- Stage 3. The provision of full course modules on mobile devices.

The goal of this three-stage approach to the introduction of mobile learning into a university or higher education institution is the incorporation of mobile learning into mainstream education and training.

There are four criteria for the inclusion of mobile learning in mainstream education and training. These are:

Enrolment of mobile learning students in courses on the institution's official prospectus. This is essential for incorporating mobile learning into the mainstream. If the mobile learning course is not included in the institution's prospectus and listed as available for student enrolment it remains peripheral with the status of a research project and cannot be considered as part of mainstream provision.

Enrolment of mobile learning students into fee-paying courses. This is essential for incorporating mobile learning into the mainstream. This is applicable to countries in which fees are payable for enrolment in further and higher education courses. If the mobile learning course is not included in the institution's fee-paying courses and is not listed as available for paid student enrolment it remains peripheral with the status of a research project and cannot be considered as part of mainstream provision.

Enrolment of mobile learning students into assessed courses. This is essential for incorporating mobile learning into the mainstream. . If the mobile learning course is not assessed with the same rigour and procedures as other courses offered by the institution it remains peripheral with the status of a research project and cannot be considered as part of mainstream provision.

Enrolment of mobile learning students into accredited courses. This is essential for incorporating mobile learning into the mainstream. As happened in the field of distance education and then in e-learning, the achievement of accreditation for mobile learning is an indication that the sector has entered into the mainstream. The awarding of assessment at university level in distance education was a lengthy process lasting nearly 100 years and was not fully accepted until the foundation of the Open Universities in the 1970s; in elearning it was achieved much more quickly.

Conclusion

Mobile learning is the next generation of learning. It is the latest development in the field of distance education. It shares many of the characteristics and laws of distance education and electronic distance education (usually referred to as e-learning).

Distance education

The wondrous developments of technology during the Industrial Revolution brought about, for the first time in history, the possibility of distance education.

These developments were particularly important in transport and communication. It was no coincidence, writes the German scholar Peters (1973), that the first trains, the first postal systems and the first correspondence courses commenced at the same time.

What the first distance educators did was that they broke with the 2000-year history of education taking place in the learning group, by interpersonal communication, between the teacher and the taught and they

- separated the teacher and the learner
- separated the learner from the learning group
- used an apersonal form of communication mediated by technology

and still claimed that the essence of the education process was maintained intact.

The benefits of distance education

Distance learning brought great benefits to society.

It freed up learners so that they could study at any time and in any place and in structures suited to their employment and family commitments.

Most of the goals that today characterise just-in-time learning, or life-long learning, were anticipated by distance learning.

Above all it freed up learners from the learning group in a university or training centre: the obligation to join a learning group, at a fixed time, at a fixed place, for a fixed period of time, in order to learn.

It made possible:

- Training when it is needed
- Training at any time
- Training at any place
- Learner-centered content
- Training for taxpayers, and those fully occupied during university lectures and sessions at training centres

History of distance education

In spite of these benefits that distance education brought to society the first 100 years of distance training were marked by criticism.

The correspondence image was disliked, governments largely ignored distance training, university professors scoffed at it, corporate trainers focused on ILT.

It is best to see the history of distance education in three phases:

- From 1870-1970
- From 1970 to the present day.
- Triumph in the 1990s

The first 100 years of distance education were characterised by criticism, lack of status and lack of accreditation of degrees.

A major breakthrough in both the quality and quantity of provision came in the 1970s with the foundation of the European open universities, notably the Open University of the United Kingdom at Milton Keynes, the Universidad Nacional de Educación a Distancia at Madrid, and the FernUniversität in Hagen, Germany, which were followed by other open universities all over the world.

Distance education today

Today distance education is a rich form of provision with five main subdivisions as follows:

- Distance education – the provision of education and training at a distance by Open Universities, distance education institutions and distance education departments of conventional institutions
- E-learning.
- Synchronous e-learning systems
- The use of the WWW for the provision of education and training on university and college campuses
- Mobile learning – the provision of education and training on PDAs (including palmtops and handhelds), smartphones and mobile phones.

Distance education

Distance education today is the provision of education and training at a distance by open universities, distance education institutions and distance education departments of conventional institutions. This is the central meaning of the term 'distance learning' today. The courseware is usually multi-media packages: print, CD Roms, audio, video and internet.

e-learning

E-learning is electronic learning – the provision of education and training electronically, via the WWW for students who study mainly as individuals using LMSs (or VLEs) developed by companies like WebCT and Blackboard. Since its beginnings in 1995, elearning has quickly won acceptance and has rapidly become a multi-billion euro/dollar training industry, both in the corporate and academic world.

Synchronous e-learning

I find in Europe a great lack of knowledge of and use of the synchronous e-learning systems, which are widely used, especially in corporate training, in the USA – these are the provision of education and training on the WWW to students who study in groups using LMSs like Centra or Horizon Wimba. In these systems the teacher or trainer and the students are assembled in a class electronically at the same time from all over the world, and the teacher teaches the class, with a series of icons to indicate agreement, disagreement, raising one's hand, laughter or applause. Although little known in Europe the DEIS department of the CIT has installed a Horizon Wimba system.

Use of the WWW on-campus

The growing use of the WWW for the provision of education and training on university and college campuses as a supplement to lectures given on campus or, alternatively, as a substitute for lectures when the courseware is provided on the WWW in the institution in place of lectures. Thus the provision of the course on computers spread all over the campus can be a supplement to the lectures given in the normal way, or can be a substitute for the lectures which are cancelled.

Mobile learning

Mobile learning is the provision of education and training on PDAs (including palmtops and handhelds), smartphones and mobile phones. Mobile learning is based on the 'law' of distance research which states that 'It is not technologies with inherent pedagogical qualities that are successful in distance education, but technologies that are generally available to citizens'.

Just as distance education and e-learning have become accepted fields of mainstream provision, the role ahead of the field of mobile learning is to become incorporated into mainline education and training.

The development of learning materials for mobile learning

The field of mobile learning has already moved into a second generation of the development of learning materials for mobile learning. The first generation was the development of individual courses using technologies like WAP and XHTML to write the code.

Today there are a number of Learning Management Systems or Learning Content Management Systems that can transform automatically existing courses or existing elearning courses so that they can be displayed on PDAs or smartphones.

These techniques will become much more powerful in the years to come as they feed into three very large industries that are already in place:

- The development of newsfeeds for mobile phones
- The development of sportsfeeds for mobile phones
- The development of pornography.

I remember some years ago attending a wedding in London on a Saturday afternoon at 3.00. As we walked out of the church about 4.00 pm all the young gentlemen at the wedding whipped out their mobile phones in the porch of the church and went click, click, click. 'Oh, Thierry Henri has scored', 'Oh, Manchester United are leading 2-1', 'Oh, Chelsea are drawing' and comments like these came from all of them in the porch of the church.

The development of learning materials for mobile learning will feed off the development of text materials and illustrations for the three, already established, industries mentioned.

Three examples of this second generation course development are mentioned here:

NKI Distance Education, Norway. By writing server side code to their proprietary LMS called SESAM, NKI has produced mobile learning versions of all 400 of their elearning courses.

The German Open University, the FernUniversität in Hagen, which many of you will know, has got its own LMS or VLE which produces printed versions or elearning versions of all their courseware. They have developed a mobile learning version of the LMS so that now they can produce versions of their courseware for paper, elearning, or for mobile devices.

Ericsson Education Ireland has recently acquired a Learning Content Management System from Giunti Labs in Genoa in Italy, which again can automatically produce courseware for mobile learning.

Conclusion

Mobile learning is thus well on the way to becoming the newest development in the field of distance learning.