

**The 18th Asian Association of Open Universities
Annual Conference**

**Quality Education for all – New Missions and Challenges facing Open
Universities**

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Mobile Learning – the Next Generation of Learning

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Theme

The theme of this conference is Quality Education for all – New Missions and Challenges facing Open Universities. The other keynote speakers have focused on the first half of this theme ‘Quality education for all’. I have chosen to focus on the other part of the theme: ‘New missions and challenges facing Open Universities’.

The new missions and challenges facing Open Universities today, as in the past, are linked to developments in technology.

One can distinguish three generations of technologies in the life of the open universities.

First generation technologies are the technologies of the Industrial Revolution which occurred in Northern Europe and North America in the 17th and 18th centuries. These were the technologies which produced the world of distance learning, based largely on print-based materials, the postal service and transport services. To these were later added audiocassettes and videocassettes.

Second generation technologies came from what may be called an Electronics Revolution of the 1970s and the 1980s and produced distance education systems based on satellite and videoconferencing technologies. These led in the mid 1990s to the development of the Internet and the World Wide Web and the beginnings of electronic learning or e-learning. This is the phase that the Open Universities in Asia and elsewhere are grappling with today, as they decide how much of their programmes should be changed from distance learning to e-learning. This is the present generation of learning at the open universities.

Third generation technologies impacted the world in the last years of the second millennium. The whole world suddenly became wireless in a Wireless Revolution. Mobile phones appeared everywhere, e-commerce became m-commerce, wired connections were abandoned for wireless ones. Mobile learning is the product of this Wireless Revolution. It represents the next generation of learning.

The future is wireless

In this presentation I want to share with you today the excitement and enjoyment of working in the newest area of development for open universities.

The future is wireless.

All over the world the awkwardness of wired connections will be substituted with wireless ones.

The statistics are stunning:

- Ericsson and Nokia tell us that there are 1.500.000.000 mobile phones in the world today. The world's population is 6 billion.
- The number of mobile subscribers in China alone is 200.000.000. This number is increasing at a rate of 2.000.000 per month.
- More that 525.000.000 web-enabled phones were shipped in 2003.
- Worldwide mobile/wireless commerce in 2004 will reach \$200.000.000.
- There will be more than 1.000.000.000 wireless internet subscribers by 2005.

Even in rural Africa there is mobile learning developed today:

Because of the lack of infrastructure for ICT in rural areas in Africa (cabling for Internet and telecom), the growth of wireless infrastructure is enormous.

Between 1997 and 2001, the number of mobile phone subscribers in Africa annually had a triple-digit growth rate. (Shapshak, 2002)

In 1999 Tokyo had more telecom connections than Africa combined. In 2003 Africa had twice as much as Tokyo. (Gourley, 2004)

Africa is leapfrogging from an unwired, non-existent e-learning infrastructure to a wireless e-learning infrastructure.

Background to mobile learning

The background to mobile learning comes from the 'law' of distance education research which states that 'it is not technologies that have inherent didactic qualities that are successful in distance education and in open universities but technologies that are generally available to citizens'.

A typical example was the 12" laser discs of the early 1990s. They had tremendous didactic possibilities, wonderful programmes were developed for them especially in the field of ESL (English as a Second Language), but they never got established in distance education or the open universities because there were not enough of them owned by citizens.

Another background was my irritation and annoyance when studying the plans of Ericsson and Nokia for the development of applications for the advent of 3G wireless technologies. They had 3G applications in development for offices, for homes, for motor cars, even for refrigerators – the only area that appeared to be overlooked was learning and training.

Never in the history of the world has there been a technology so widespread in its use by citizens than mobile telephony. There are 1.500.000.000 of them in the world today and sales are continuing all around the world, especially in China. A few years ago I was in a mobile phones shop in a smallish Chinese town, Handan, with about 1 million inhabitants. Unlike the mobile phone shops in Europe, this one had two storeys with dozens of display cases all full of different models. There must have been 2000 different phones available for purchase.

In addition to this availability is the fact that mobile phones are technologies that citizens carry everywhere with them. They are regarded as personal technologies:

- They are trusted
- They are in frequent use
- They are easy to use
- They are cheap
- They are in fashion
- The statistics for SMS messaging are counted in the billions throughout the world.

In the words of the conference theme: the harnessing of these devices to education and training is central to the new missions and challenges facing Open Universities today. They are a technology that the Open Universities cannot do without.

Some years ago I was at a wedding in London in England. The wedding started at 3.00 pm. As we came out of the church soon after 4.00 pm all the young gentlemen at the wedding whipped out their mobile phones and started clicking them. ‘Oh! Arsenal have scored!’. ‘Thierry Henri has scored!’. ‘Oh! United are still zero-zero!’ There was complete absorption in what the mobile phones were providing. The harnessing of these devices to education and training is an urgent priority.

Definition of mobile learning

In providing a definition of mobile learning one is faced with tensions between functionality and mobility. The technologies involved in e-learning and m-learning (computers, laptop computers, PDAs (Personal Digital Assistants)/handhelds/ palmtops, smartphones and mobile phones can be arranged on a continuum thus:



E-LEARNING

M-LEARNING

Many experts on mobile learning, especially in the United States of America, include laptop computers in their definition of mobile learning, but I disagree. I consider that it is the degree of mobility that is the defining element in mobile learning, even if one has to sacrifice functionality. Therefore, the term mobile learning should be limited to education and training on devices one can comfortably carry around, in one's hand or in one's pocket, and therefore I do not think that the definition of mobile learning should be extended to include laptop computers.

Five examples

I would like to share with you at this stage five examples of mobile learning in action. four of these are European Commission-funded projects and one is a development in Africa.

The five projects of mobile learning in action are:

1. The *From e-learning to m-learning* project led by Ericsson, Ireland
2. The *Mobile learning: the next generation of learning* project led by Ericsson, Ireland
3. The *M-learning project* led by the United Kingdom LSDA (Learning and Skills Development Agency)
4. The *MOBILearn* project led by Giunti Ricerca of Genoa, Italy
5. The *M-learning in rural Africa* project of the University of Pretoria, South Africa.

Project 1

Title: From e-learning to m-learning
Leader: Ericsson Education Dublin
Funding: €400.000
Focus: The project starts from the acknowledgment that e-learning is the state of the art for distance education today, but asks what is the

next dimension. It sets out to produce a series of courses for PDAs, smartphones and mobile phones.

Website: http://learning.ericsson.net/mlearning2/project_one/index.html

What is important about this project is that it solved all the problems confronting the provision of mobile learning courses on PDAs. It took the standard 5.7 cm x 7.6 cm screen of a PDA and, by using Microsoft Reader software, designed a comfortable and successful learning environment for student study.

It took a 1000 A4 page course comprising course materials and background reading and loaded it on a PDA. It offered courses for paid enrolment, for credit as a normal part of the institution's provision. Students were surveyed and expressed satisfaction and no problems with mobile learning as a form of study. The problems of providing mobile learning on PDAs were all solved.

The project also showed that the problems of providing mobile learning on smartphones and mobile phones were not yet solved.

Project 2

Title: Mobile learning: the next generation of learning

Leader: Ericsson Education Dublin

Funding: €400.000

Focus: This project builds on the previous one. It moves the focus from 2G technologies to 2.5G technologies using the Sony Ericsson T600 (mobile phone) and P900 (smartphone) as the basic devices. More sophisticated technologies like colour screens, moving graphics, SMS, MMS, and streaming video are used in course development in addition to the technologies used in the previous project.

Website: <http://learning.ericsson.net/mlearning2/>

The importance of this project is that it moves mobile learning on from 2G to 2.5G technologies and prepares the way for the introduction of 3G technologies. The courseware developed includes courses on art appreciation at museums and Botanical gardens with illustrations, background and commentaries which are accessed by mobile phones as the visitor moves around the galleries or gardens.

More sophisticated technologies are used including streaming video over phones, harnessing the enormous impact of SMS and MMS as part of the student support services provided with the courses.

The success of mobile learning over PDAs is maintained and developed with progress being made in the provision of mobile learning over phones.

The phones being used, the SonyEricsson T600 and P900 have internet access, still and moving photography and exceptional audio quality.

Project 3

Title: m-Learning project
Leader: UK government LSDA (Learning and Skills Development Agency)
Funding: €4.000.000
Focus: The focus of this project is on unemployed and uneducable 16-22 year old British youths, all of whom need training but all of whom refuse to attend colleges or training centres. All have mobile phones.
Website: www.m-learning.org

This project focuses on a group in society who are unemployed and need training but who refuse to attend training centres or other courses. All have mobile phones which they use continually.

The project's goal is to provide them with low level educational content via mobile learning. Besides the UK government and semi-government partners, there are partners in Italy and Sweden.

The project has an important focus on mobile learning on phones rather than on PDAs.

Project 4

Title: MOBIlearn
Leader: Giunti Ricerca, Genoa, Italy
Funding: €8.000.000
Focus: The project provides structures for mobile learning and courseware for students on MBAs, for medical updates and for museum visitors.
Website: www.mobilearn.org

This is a very large project with many of Europe's leading universities, including the Open University of the United Kingdom as partners in addition to important industry providers like Nokia.

The courseware is focused on three groups of students:

- Students on MBA courses who require summaries, examination preparations, additional information and focused studies
- Students in the health care professions who require updates and specialised information
- Visitors to museums and art galleries who will receive detailed information on exhibits on their mobile phones.

This project again has a focus of mobile learning on phones.

Project 5

Title: m-Learning in Rural Africa
Leader: University of Pretoria
Funding: nil
Focus: What is important about this programme is that it is a regular provision of post-graduate education, and not a project. The trouble about projects is that they tend to stop once the funding has run out. The target was rural students in the B Ed (Hons), Advanced Certificate in education and Special Needs Education courses. 99% had mobile phones; none had e-mail or e-learning possibilities.
Website: <http://www.up.ac.za>

This project is focused only on providing mobile learning on phones as the students do not have PDAs.

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 these students:

- 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 – 50
- 66.4% are women
- 22.6% are English first language speakers
- 13.9% are younger than 31
- 97.3% are non-white
- 0.4% have access to e-mail
- 99.4% have a mobile phone

What does the mobile phone support entail?

1. Bulk SMS (pre-planned) to all students or students of a specific programme for general administrative support as well as motivational support
2. Customised group SMS to specific groups of students extracted from the data-base for specific administrative support
3. Customised small group or even individual SMS to specific students extracted from the data-base on an individual basis for specific administrative support

Here are some examples:

Dear Student. Your study material was posted to you today. Enquire in time, quote your tracking number: PE123456789ZA, at your post office.
University of Pretoria

Purpose:

Students do not visit their rural post offices very often and this leads to many returned packages. If students know about a dispatch, they make an effort to fetch packages timely.

Success:

Significant drop in returned packages and accompanying costs

Dear student. If you have not submitted Assignment 2, due to late dispatch of study material, you may submit before 19 Sept. Do this urgently to help you pass your exam.
University of Pretoria

Purpose:

Extension of assignment submission date due to a late dispatch of study material
Encouragement to complete the assignment

Success:

Normal assignment submission statistics

ACE Edu Management contact session block 1 from 7-9 July for modules EDM 401 EDO 401 ONLY, changed to Town Hall Main Street KOKSTAD. New letter posted. University of Pretoria

Purpose:

Urgent notification of a venue change for a specific contact session

Success:

All the students arrived at the correct venue (as far as we know)

Dear Student. We have not received your registration for the Oct exam. Please fax registration form or letter not later than Thursday 31 July. University of Pretoria

Purpose:

Encouragement for exam registration. Notification of the deadline for exam registration

Success:

Increase in the number of exam registrations compared to previous exams

Dear Student. April exam proved that students attending contact sessions are more successful. Please attend July contact session. Register per fax before or on Friday 6 July. University of Pretoria

Purpose:

- Encouragement for contact session registration
- Notification of the deadline for contact session registration

Success:

58% of the learners registered before the closing date vs the normal rate of below 40%.

First bulk SMS dispatch report:

- Total SMSs sent: 279
- Total delivered successfully: 214 (77%)
- Total not delivered due to invalid mobile number: 5
- Total not delivered due to mobile phone network issues: 7
- Total not delivered due to message time-out: 53
(time-out was set at 5 hours, increased to 48 hours since then)
- Current success rate average: 92%

From a quality and financial point of view, the successes are also significant:

Using print and the postal service to distribute the necessary information to students 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 to 18 days (depending on the remoteness of the student) to reach all the students.

There are a number of projects currently running at the University of Pretoria. In summary:

1. Using PDAs in clinical assessment sessions of medical students (limited use of course content + assessment activities)
2. Using PDAs in postgraduate engineering courses (limited use of course content + communication)
3. Using Bulk SMS for general library support (administrative)
4. Developing an "SMS Gateway" as part of our LMS and student online services (administrative and communication)
5. Using Bulk SMS for student support in our three paper-based distance learning programmes [majority of students are situated in rural areas in Southern Africa]

The latter project (5) is the one discussed and referred to above.

It started out as only administrative support. The university is currently designing and phasing in the use of SMS technology for academic support and academic activities for these rural distance learning students (about 8000 students at the moment). The academic support will focus more on academic activities rather than course content as such.

These rural students (98% of them) have mobile phones without MMS capabilities. They do not have Smartphones or PDAs that would be better suited for the limited use of course content. The primary focus is on a "communication" approach for admin and learning support rather than a "content" approach as such because of the comprehensive paper-based study materials they are already provided with.

These are five of the mobile learning activities happening around the world at the present time. I have dwelt at length on the last one as it concerns events in rural Africa, and shows the value of mobile learning there. I hope that many of you will say: if it can be a success in rural Africa, it can be a success with our students too.

Tactics

What tactics, then, should the Asian Open Universities adopt with regard to mobile learning?

Tactic 1. Mobile learning on PDAs.

The problems with developing mobile learning for PDAs, handhelds and palmtops have all been solved. Students have studied full courses on PDAs, and their evaluations have shown that a pleasant and comfortable study environment can be created on PDAs.

Institutions should have no hesitation in offering full courses on PDAs, which students can study on trains, undergrounds, buses, at airports or wherever they are on the move or whenever they have some time free.

A typical PDA of today, like the HP iPAC 5000 series is ideal for mobile learning. Course materials can be developed in HTML, or better in Microsoft Reader Works, which is used by Microsoft to produce e-books and provides a comfortable typeface for studying purposes. Students will need Microsoft Reader software to get full value from the display, and facilities include the possibility of highlighting text and setting bookmarks.

The screen of a HP iPAC is 5.7 cm x 7.6 cm and this allows for extensive study. The memory provision is 128 MB, which allows for courses of 1000 A4 pages in length, or extensive illustration inserted in the text.

Tactic 2. Mobile learning on smartphones

The SonyEricsson P900 may be regarded as a typical smartphone – that is a telephone with many of the features of a PDA. The size of the screen is 6.4 cm x 4.2 cm and it can be held horizontally or vertically. Although the screen size is little different from the screen size of the Compaq iPAC 5000 series, it nevertheless marks a barrier in mobile learning.

Many institutions feel that this is as yet too small for comfortable study and their tactic has been to refrain from developing full courses for smart phones and mobile phones. It is felt that reading many small screens of text would be too taxing for students, even while travelling on crowded undergrounds and buses.

The emphasis has therefore been placed on providing short course summaries or examination preparation notes or student guidance on mobile phones and smartphones. These short courses have tended to be combinations of text materials and graphics, with straightforward assessment questions and facilities for contacting the tutor.

Although courseware for mobile learning used to require development in WAP, the new phones are coming with Opera-type browsers which will accept XHTML and thus make the tactics for developing mobile learning for these devices as straightforward as writing WWW pages.

Tactic 3. Mobile learning already developed for smartphones

The range of mobile learning courseware available as models for new users is getting extensive and includes at least the following:

1. Using PDAs in clinical assessment sessions of medical students (limited use of course content + assessment activities)
2. Using PDAs in postgraduate engineering courses (limited use of course content + communication)
4. Using Bulk SMS for general library support (administrative)
- 5.
4. Developing an "SMS Gateway" as part of an LMS and student online services (administrative and communication)
5. Using Bulk SMS for student support in our three paper-based distance learning programmes [majority of students are situated in rural areas in Southern Africa]
6. Statistics course from the German FernUniversität
7. Courses in literacy and numeracy for undereducated 16-22 year olds
8. Courses in art appreciation from the Budapest University in Hungary
9. Students on MBA courses who require summaries, examination preparations, additional information and focused studies
10. Students in the health care professions who require updates and specialised information
11. Visitors to museums and art galleries who will receive detailed information on exhibits on their mobile phones.
12. Courses in telecommunications from Ericsson in Dublin
13. Courses in business and marketing from a number of US corporations.

Tactic 4. Using the audio, video, streaming media, photography, SMS, MMS, internet facilities of smartphones

The SonyEricsson P900/P910 may be taken as an example of the state of the art for smartphones today and the SonyEricsson T600/T610 may be taken as a state of the art mobile phone of today. Tactic 4 will be to make full use of their specifications for mobile learning.

These phones offer among other facilities:

PDA (on P900 /P910)

Phone with MP3 audio

Still and video camera, MPEG4 video and video streaming
Email, SMS and MMS
Web browser

These specifications provide a wide range of development possibilities for mobile learning.

Tactic 5. Using mobile phones in mobile learning

The challenges of providing mobile learning on PDAs have been solved; the new challenge is to solve these challenges for mobile phones and smartphones. The tactics to be used can be grouped into three categories: (a) The use of SMS on mobile phones for administrative purposes, (b) The use of short courses, additional notes, examination preparation etc on PDAs, smartphones and mobile phones, (c) The use of full courses on PDAs and, perhaps, on smartphones.

Tactic 6. Choice of course materials for smartphones and mobile phones

It would be an excellent idea if all the Asian Open Universities went away from this conference with the decision to develop an administrative system by SMS to all their students by SMS. Detailed description of such a system in rural Africa has been given in this presentation. This would give the Open Universities an immediate contact with all their students for administrative changes, assignment submissions, university deadlines and a whole range of essential administrative decisions.

Mobile learning in the form of short courses, examination summaries, course highlights and additional information can be developed and sent to students' PDAs, smartphones and mobile phones.

Full courses including assignments and questioning, forums for discussion with the tutor and the learning group, and use of the WWW can be developed for PDAs and many smartphones.

Tactic 7. The arrival of 3G technologies

Conclusions

Conclusion 1. The importance of mobile learning

Distance education is intrinsically linked to technology in education. Mobile telephony is the most widespread technology ever. There are 1.5 billion of them for a world population of 6 billion. Their use for learning and training is essential.

Conclusion 2. The new missions and challenges facing the Asian Open Universities today.

Open universities have dispersed student bodies with whom they have to communicate. Each of these students possesses a communication device that he or she carries constantly. A pressing new mission and challenge for the Asian Open Universities is to harness these communication devices for administrative purposes, for course summaries and for full courses.

Conclusion 3. The two markets for mobile learning.

There are two markets for mobile learning: learners that are either without computing infrastructure and access, or learners that are continually on the move.

In other words:

- 3rd world rural or remote area learners who have mobile phones, and
- 1st world learners who are the workforce on the move with state of the art mobile devices.

Conclusion 4. The omnipresence of mobile phones.

The much awaited introduction of 3G wireless technologies will occur in the near future and will make mobile telephony even more powerful and widely used than they are today. The new facilities that 3G will bring will bring further applications of value to learning and training.

Conclusion 5. The success of PDAs

All the problems associated with presenting full mobile learning courses on PDAs have been solved. There should be no difficulties in developing learning materials for these devices and running full courses on them. The problem with PDAs is that there are only 7-8 million of them in the world today and sales are not increasing. Industry experts suggest that PDAs may eventually be merged into smartphones.

Conclusion 6. Mobile learning on smartphones and mobile phones

There are 1.5 billion of these devices in the world today and the Chinese market alone is growing at a rate of millions per month. The problems of presenting satisfactory courseware on these devices have not yet been solved. This is the work for the present development of mobile learning.

Conclusion 7. The future is wireless.

The awkwardness of wiring and wired devices is giving way all over the world to wireless connections. This development is now impacting education and training. The development of mobile learning is the new cutting edge in development, succeeding to e-learning.