THE INCORPORATION OF MOBILE LEARNING INTO MAINSTREAM EDUCATION AND TRAINING

by

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CONTENTS

1. The basis of mobile learning

What are the bases for mobile learning? It is important when introducing a new sector of education and training provision to have solid foundations on which to build the new sector.

From my own personal point of view, when I came into mobile learning for the first time in 1999, there were three bases for mobile learning:

- The future is wireless

- Irritation with the published scenarios formobile devices of Ericsson and Nokia

- A 'law' of distance education research.

1.   The future is wireless

In 1999, when I started working in this field, it was already clear that the future was wireless.

M-commerce was already replacing e-commerce, there were wireless applications for banking, stock exchanges, business and the home – the move to wirelessness in telephony and computing was irreversible.

The move to 3G, already rolled out in some countries and soon to be rolled out in many more, will enhance this transition to wirelessness. The humourous version of what 3G will bring and what 3G means is Girls, Games and Gambling, but the establishment of 3G will consolidate the move to wirelessness in telecommunications.

2.   Irritation with the published wireless scenarios of Ericsson and Nokia

Irritation is not a good basis for the foundation of a new sector of education and training provision.

But in 1999 Ericsson and Nokia had already published their plans for the development of wireless applications. Reading these one could only marvel at what was being proposed. There was, however, a glaring lacuna: there was no mention of applications for education or for training or for learning.

Sadly, this scenario is little changed today. Mobile learning remains on the periphery of the planning of the wireless telecommunications operators.

A few days ago I was talking to a senior executive of Sony Ericsson about the new handsets they were planning for production for the market of 2006. He confirmed that, as it was in 1999, mobile learning was of little interest to their market. This is of serious importance for everyone attending this conference and for all who are interested in mobile learning.

3.   A 'law' of distance education research

The justification of mobile learning and a solid foundation for this new sector of provision comes from 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'.

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: Ericsson and Nokia tell us there are 1.500.000.000 of them in the world today for a world population of just over 6 billion. Nokia forecasts further sales of 700,000,000 in 2005. In China alone there are 358.000.000 mobile subscriptions and this grows by 160.000 a day.

Sales will continue as ownership of the latest model becomes of social importance and multi-ownership is already an important phenomenon.

2.   Definition of mobile learning

At other conferences I have heard John Traxler and others proposing complex definitions of mobile learning. Here I would like to propose quite a simple one.

In defining mobile learning one confronts tensions between functionality and mobility. There is a continuum from 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.'

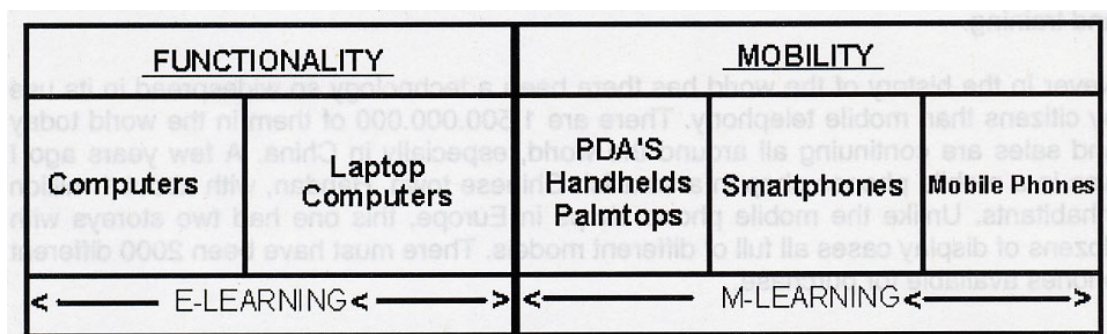| FUNCTIONALITY		MOBILITY		
Computers	Laptop Computers	PDA'S Handhelds Palmtops	Smartphones	Mobile Phones
← E-LEARNING ← →		← M-LEARNING ← →		

Figure 1.   Functionality and mobility in a definition of mobile 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.

3. A subset of distance education

Conventional education and distance education

Mobile learning is best seen as a subset of distance education.

This is because the world of education and training is divided into two halves known as conventional education and distance education.

Conventional education is also known as traditional education, or face-to-face education, or ILT (instructor-led-training. It takes place in schools, colleges and universities, training centres, laboratories and workshops.

The characteristics of conventional education are that the education transaction takes place

- within the learning group

- by interpersonal communication

- between the teacher and the taught.

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 replaced it with

- a largely individualized form of interaction

- based on an apersonal form of communication

- that was mediated by technology

and claimed that the education transaction in which learning from teaching occurs 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

- Avoidance of re-entry to work problems

- Training for taxpayers, and those fully occupied during university lectures and sessions at training centres

- The industrialisation of teaching and learning.

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 two phases:

- From 1870-1970

- From 1970 to the present day.

A major breakthrough in both the quality and quantity of provision came in the 1970s with the foundation of the Euroean 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.

Although the course materials of these open universities attracted much attention it was the student support services that they provided which enabled these universities to spearhead the change in status of distance education. They brought it about that nationally and internationally-recognised university degrees, college diplomas and training certification could be won at a distance.

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 – e-learning is the provision of education and training via the WWW for students who study mainly as individuals using LMSs (or VLEs) like WebCT and Blackboard. Since its beginnings in 1995, it has rapidly become a world-wide multi-billion dollar or euro training industry.

- 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

- The use of the WWW for the provision of education and training on university and college campuses as a supplement to lectures and ILT 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

- Mobile learning – the provision of education and training on PDAs (including palmtops and handhelds), smartphones and mobile phones.

Parallels between distance education and mobile learning

One can see many parallels between the history of distance education and the history of mobile learning. Mobile learning is still in the period of criticism, of lack of acceptance, of lack of status, of lack of certification for its degrees, diplomas and training certificates that characterised the first 100 years of distance education.

When compared with the field of electronic learning or e-learning the scene is quite different. The hard work of the period 1870-1970 in distance education has been largely absent from the field of elearning.

Its ten years of life since the commencement of the WWW have seen the quick acceptance of electronic learning, the rapid achievement of status both at

university level and at corporate level, the swift recognition of degrees, diplomas and training certification, whether wholly or partially awarded for study by elearning and the rapid emergence of elearning as a multi-billion dollar industry, for which many observers forecast exponential growth in the immediate future.

Perhaps the hard work for acceptance done in the field of distance education has rubbed off on electronic learning and will also affect the field of mobile learning.

4. Mobile learning projects

An important dimension of an analysis of the incorporation of mobile learning into mainstream education and training is the study of major mobile learning. There have been many mobile learning projects in various parts of the world. Here we will focus on mobile learning projects funded by the European Commission in Brussels.

There are four major projects in mobile learning funded by the European Commission in Brussels. These are:

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

Brief descriptions of these projects are:

- The Leonardo da Vinci project *From e-learning to m-learning* led by Ericsson Education Dublin referred to above.

   The *From e-learning to m-learning* project addressed the development of courseware for mobile phones, smartphones and PDAs.

   What was important about this project was that the main pedagogical problems of developing mobile learning for PDAs were solved in the project *From e-learning to m-learning*, 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.

The project also had success in developing courseware for phones and incorporated surveys of student satisfaction with mobile learning for students from Ireland, Norway, Germany and Italy.

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

  The main activities to achieve the products of acceptable courseware for smartphones in the *Mobile learning: the next generation of learning project* are installing a web-authoring tool like Macromedia Dreamweaver MX Version 1.0, installing a desk-top browser e.g. Opera 6.31 that has page rendering characteristics similar to a mobile phone, using XHTML 1.0 Transitional 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 the user interface so that the limited screen space available is utilised as efficiently as possible, designing concise neat diagrams to fit the small screen, using Adobe Photoshop to produce light weight GIFs for mobile devices.

  The next generation of mobile learning course development in based on Flash Lite. This development is motivated by the fact that there are thousands of developers who have used Flash to develop elearning content and that there is a lot of elearning content available in Flash, so that – for the first time in the history of mlearning – you can reuse the pedagogical and technical skills of the developers and the content can be reused too.

  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.

- 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.

- 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 are: The definition of theoretically-

supported and empirically-validated models for: Effective learning/teaching/tutoring in a mobile environment; Instructional design and eLearning content development for mobile learning.

This project ended in early 2005 and the mobile learning world is waiting for the release of results from it.

5.   The failure of mobile learning

When one is discussing the question of the incorporation of mobile learning into mainstream education and training it is important to realise that these projects were *projects.* That is, they were research undertakings to set out the first building blocks of a new sector of education and training provision.

It is now time for mobile learning to emerge from its project status and enter into mainstream education and training. Excellent work has been done by the projects listed above but until mobile learning enters the mainstream it remains a fragile and research-based undertaking.

The trouble with *projects* is that they tend to collapse and disappear when the project funding is discontinued.

Why has mobile learning not yet emerged from its project status and not yet taken its place in mainstream provision? Why does it remain at the research project level and not emerge into a serious form of provision?

The problem is that wireless applications are being developed for wireless devices for all walks of life. Learning and training do not figure in these developments. Learning and training do not seem to be high on the list of applications that are receiving attention today.

It is essential for mobile learning that developments in education keep pace with developments in other fields. It is important that mobile learning should not be left behind. As relayed by innovation experts, new ideas and inventions only become innovations when the ideas and inventions are adopted and utilised by the market.

Isn't it strange that all students enrolled in 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 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 these students carry a sophisticated communications device which they use constantly in all walks of life except in their education or training programme.

The answer to these questions that I have been posing about why mobile learning has not moved from project status into the mainstream is well known. It is that mobile learning is not seen as a satisfactory revenue stream for the telecommunications operators. The urgent need for mobile learning is to emerge from its fragile project status and convince the telecommunications operators that it represents a viable and valuable revenue stream.

6.   Towards a solution: a matrix for mainstream provision

We have posed the problem of the status and acceptance of mobile learning – we must now look for solutions to the problem.

One can develop a nine-point matrix for the use of mobile learning in mainstream education and training. One axis is made up of the three types of devices that make up mobile learning provision:

- PDAs
- Smartphones
- Mobile phones.

The other axis is the types of education provision that can reasonably be provided by mobile learning:

- Mobile learning academic administration SMSs. This provides universities and other institutions with structures to send SMSs to all their students, or all students in a particular grouping about timetable changes, examination deadlines, assignment results, changes of procedure that all institutions need to immediately communicate to their students. This can also be used for students who need information from the institution in the form of FAQs, or answers contained in databanks.
- Mobile learning academic summaries. These are 4 to 5 screen academic summaries of content, examination hints, assessment questions for course revision, guidelines for particularly difficult parts of a course or counselling provision for students in need.
- Full modules by mobile learning. This is the presentation of full courses, or full modules of courses, on mobile devices.

This gives the following nine possibilities:

Mobile learning for academic administration on PDAs
Mobile learning for academic administration on smartphones
Mobile learning for academic administration on mobile phones
Mobile learning academic summaries for PDAs
Mobile learning academic summaries for smartphones
Mobile learning academic summaries for mobile phones
Full modules by mobile learning for PDAs
Full modules by mobile learning for smartphones
Full modules by mobile learning for mobile phones.

As I have indicated in my analysis of the European Union-funded projects, many of these have already been achieved; a few remain to be achieved.

7.   Towards a solution: criteria for inclusion in the mainstream

We need criteria for the inclusion of mobile learning courses in the mainstrem. When can they be said to have achieved mainstream status? And when must it be said that more work remains to be done? The following criteria were established by analysing the parallels with the fields of distance learning and of e-learning.

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 in an isolated university department 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 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.

8.   Towards a solution: institutions already operating in the mainstream

The goal for any presentation on 'Incorporating mobile learning into the mainstream' is to be able to state that mobile learning has arrived and is now operating in the mainstream. This is far from being the case with mobile learning. Like the fields of distance education and e-learning before it, mobile learning needs to achieve acceptance and then status and then certification, eventually at university degree level. Mobile learning is just setting out along that path.

There are, however, some institutions which have already travelled extensively along the path, and it may be claimed that they are already operating in the mainstream. In this presentation I want to refer to four examples:

- The University of Pretoria, South Africa

- NKI, Bekkestua, Norway

- Athabasca University, Alberta, Canada

- Our own new project at Ericsson, Dublin, Ireland

The University of Pretoria

The importance of the work being done at the University of Pretoria is that it deals with mainline students who are studying mainline university courses.

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. Currently nearly 98% of these students have mobile phones.

The profile of these 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.

NKI, Bekkestua

NKI has been for many decades one of Europe's leading providers of distance education courses. In more recent times it has become probably the largest European provider of e-learning courses for paid enrolment and has today a portfolio of over 400 e-learning courses.

It is a partner with Ericsson in the *Mobile learning: the next generation of learning* project. During the course of this project is announced that it had developed mobile learning versions of all 400 of its e-learning courses and was offering them for paid enrolment. This represents a massive transfer of mobile learning into the mainstream.

Athabasca University, Alberta, Canada

Athabasca University has announced that their School of Computing and Information Systems has offered their course *Introduction to Computing* in XML for delivery to wireless mobile devices. Students are using a variety of mobile devices including HP iPAQ Pocket PC, Samsung A 860 clamshell mobile phone, Palm One Treo 650 smartphone and Samsung A 540 clamshell mobile phone. They are also trialling next generation devices for mobile learning including ultra notebook computers like Vaio VGN-U71P (about the size of a paperback book), Psion Notebook (larger than a PDA), OQO 1.0 (larger than a PDA) and Toshiba Libretto (a mini-laptop).

Ericsson Education Ireland

I am happy to be able to announce that Ericsson Education Ireland in Dublin has again been successful in winning a grant for mobile learning from the European Commission. Again the grant is small (€350.000) and the programme is very demanding:

- Development of a Mobile Learning Development Kit for the use of mainstream institutions to enable them to introduce mobile learning. A hands-on, how-to-do-it guide.

- A Mobile Learning Academic Administration kit. A hands-on, how-to-do-it guide for mainstream institutions on how to contact all, or groups, of students by mobile learning (on the model of the University of Pretoria)

- Production of 20 academic course guides, 4-5 screens long.

- Production of 10 modules for use as mainstream courses.

- Teaching and evaluation of 20 course guides and 10 full modules with mainstream students.

- Production of a Book on Mobile Learning and an International Conference.

You can see here a transition from a concentration on institution-specific development within a single institution to a focus on the provision of materials for the field as a whole, with the purpose of moving mobile learning into mainstream education and training.

9.   Towards a solution – the literature

The development of the literature of mobile learning has high importance in the move of mobile earning into the mainstream. Mobile learning will never emerge from its present fragile project-based status and take its place in mainstream education and training unless it has a vibrant literature. Deans of Faculties at universities throughout the world will never accept the introduction of mobile learning into their courseware unless they can verify the claims of mobile learning by consulting the research literature.

In some ways the status of mobile learning today is similar to the status of distance education at the start of the 1980s. Distance education, it is true, was characterised by extensive offerings from institutions around the world and the foundation of the Open Universities in the United Kingdom, in Spain and in Germany were beginning to give it new status, but its literature was unacceptably weak.

For this reason *Distance education: international perspectives* was published by me in 1983 to provide a collection of contributions to the literature of distance education from the 1970s, my *Foundations of distance education* was first published in 1986 to give an overview of the field, *Theoretical principles of distance education* followed in 1993 to give a theoretical analysis of the field and *Distance education: new perspectives* was also published in 1993 to give a collection of the contributions to the literature during the 1980s. The international journal *Distance Education* was founded in 1980 and is now in its 25th year.

Similar initiatives are necessary for the literature of mobile learning if it is to convince academics in universities worldwide that it is a viable form of educational provision.

In this context it is excellent to be able to welcome the first book on mobile learning to be published by a major international publisher which will appear in mid-November 2005 from Routledge in London and New York.

Mobile Learning
A Handbook for Educators and Trainers
Edited by: Agnes Kukulska-Hulme, John Traxler

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Publisher:	Routledge
ISBN:	0415357403
Pub Date:	17 AUG 2005
Type:	Paperback Book
Price:	£24.99
Extent:	192 pages (Dimensions 234X156 mm)

This timely introduction to the emerging field of mobile learning explains the technologies involved, their applications and the multiple effects on pedagogical and social practice.

Mobile devices include handheld computers, smartphones and PDAs, and this handbook will emphasize the issues of usability, accessibility, evaluation and effectiveness, drawing from case studies written by researchers and practitioners, all experts in the field.

This is a cutting-edge subject in open and flexible learning, with e-learning a key issue in the UK Government¿s strategy to increase the number of people going in to higher education.

The title is *Mobile Learning: a Handbook for Educators and Trainers* and it is edited by Agnes Kukulska-Hulme of the Open University of the United Kingdom and John Traxler of the University of Wolverhampton both of whom will be known to many in today's audience.

It is described thus:

This timely introduction to the emerging field of mobile learning uses case studies written by experts in the field to explain the technologies involved, their applications and the multiple effects on pedagogical and social practice.

Moobile devices include handheld computers, smartphones and PDAs, and this handbook will emphasise the issues of usability, accessibility, evaluation and effectiveness, drawing from case studies written by researchers and practitioners, all experts in the field.

The paperback version of *Mobile Learning: a Handbook for Educators and Trainers* costs £22.99 and its ISBN number is 0-415-35740-3.

10.   Conclusion

Finally, the problem of the incorporation of mobile learning into mainstream education and training has been addressed in this presentation. The answer to the question 'Why has mobile learning *not* moved from project status to the mainstream?' has been identified. It is that mobile learning is not seen as a satisfactory revenue stream by the telecommunications operators.

Solutions have been proposed for this problem. Firstly, there are thousands pf universities and further and higher education colleges all over the world. If they can all be convinced to accept mobile learning as their normal means of communication with all their students on changes of timetable, submission deadlines, enrolment procedures and other administrative necessities, a massive mobile learning revenue stream will already be set up.

Secondly, the production of a mobile learning development kit for distribution to universities and colleges to enable them to introduce mobile learning will set up another revenue stream.

Thirdly, the production of course guides, course summaries, examination reminders, helps with difficult parts of a course, will set up another revenue stream.

Fourthly, the production of full course modules for PDAs, handhelds, palmtops, and also for smartphones and eventually for mobile phones, will set up another revenue stream.

Finally, the literature of the field needs to be developed, books on mobile learning need to be written, conferences like this one need to be organised.

The challenge to all of you attending this conference is to go away from here convinced of the need to establish mobile learning as a viable and valuable revenue stream for the telecommunications industry.