

EXPLORING THE CHALLENGES AND OPPORTUNITIES OF M-LEARNING WITHIN AN INTERNATIONAL DISTANCE EDUCATION PROGRAMME

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Imagine you are a student, studying as a postgraduate on a distance learning Masters course, offered by a UK institution. You are based in a developing country in Africa, employed full time, and due to the nature of your work in the development sector you often have to make trips to rural areas, and are sometimes away for more than a month at a time. You have a good job, but your disposable income is limited as you have a lot of financial commitments and a young family. You live in a society where livelihoods depend amongst other things on transport, livestock and communication, and where the price of a cell phone is equivalent to a cycle, a cow or three goats. What kind of learning resources and tutorial support would you consider suited your lifestyle and study preferences best ?

For many years, answering this type of question has been constrained to consideration of options revolving around printed study resources, and written assignments submitted to tutors who provide feedback. Over the last decade email has transformed communication, and a lot of consideration has also been given to the use of the Internet and Online Learning Environments. However, access to the Internet as a platform for learning, has remained limited in Africa due to lack of infrastructure, together with reliability, affordability and performance issues.

The big growth trend, over the last five years, has been the rapid and very widespread diffusion of mobile phones. Admittedly the functionality of the phones currently used revolves around text and voice. However, looking forward to three years time, and considering the powerful range of functions that newer phones with General Packet Radio Service (GPRS) and 3rd Generation (3G) functionality possess, we can explore the question raised at the start of this article afresh, as these devices increasingly support use of text, graphics, audio, video and interactive content.

This paper provides a description of the experience of the first year of a two year project titled 'Developing an educational model for delivery and support of postgraduate distance learning in Southern Africa that incorporates M-Learning'. The project is funded through a grant from University of London Centre for Distance Education (CDE), and is being implemented by Imperial College London Distance Learning Programme (DLP) with support from University of Pretoria's Department of Educational Innovation (EI).

The paper focuses on three main aspects of the work done so far:

- i) Results from a baseline survey carried out with the DLPs students in the Southern African Development Community (SADC) countries.
- ii) Lessons learned from the first year, relating to the project context and student profile.
- iii) Preliminary steps taken to design and test practical and educational activities, that aim to make use of mobile phones to add value to the educational experience of the students.

The Baseline

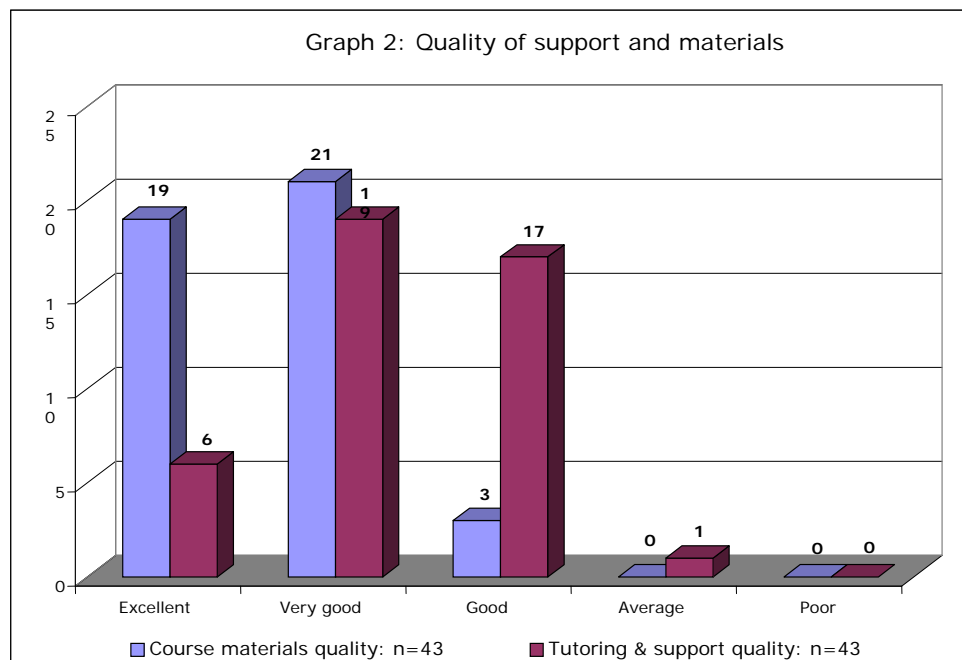
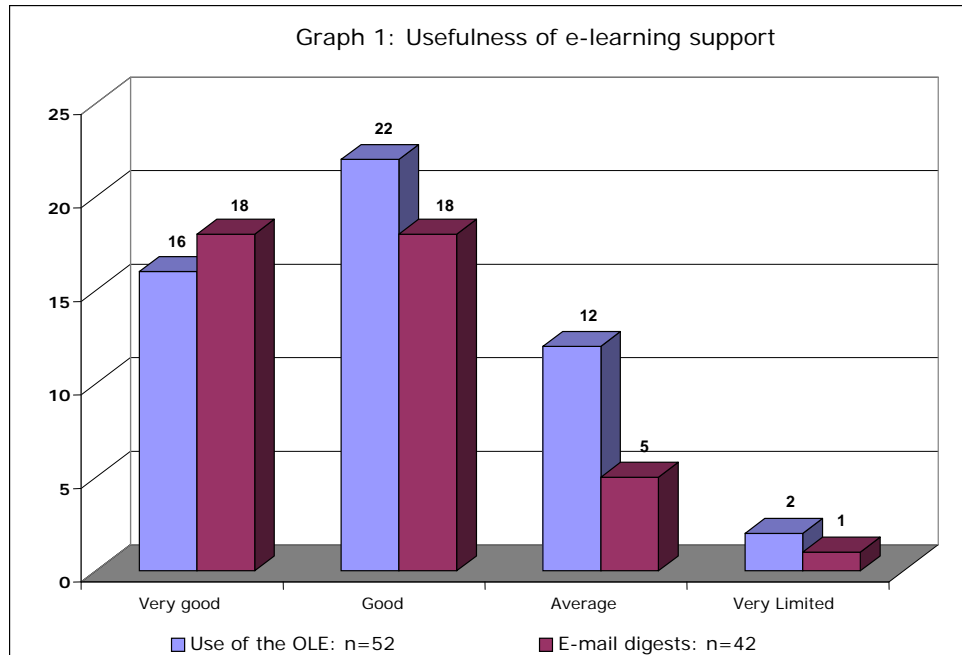
The DLP currently supports 88 Commonwealth Scholarship students pursuing postgraduate Masters level distance learning courses (See Table below). These students are based in Commonwealth countries within the SADC region. In order to improve support to these students, the DLP has worked in collaboration with the University of Pretoria's Department of Agricultural Economics and Department of Educational Innovation (EI) since 2002.

SADC Student Numbers in 2006

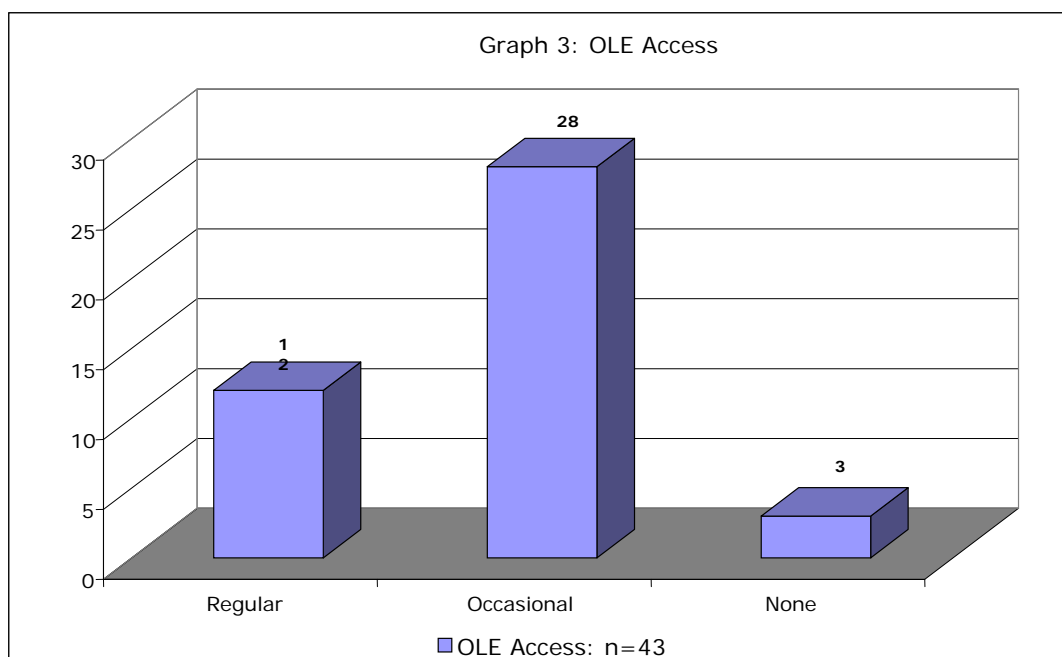
<i>Country</i>		<i>Msc Programme</i>	<i>SADC Student Nos</i>
Botswana	12	Agribusiness for development	9
Lesotho	3	Agricultural Economics	5
Malawi	13	Applied Environmental Economics	1
Mauritius	9	Biodiversity Conservation and Management	10
Mozambique	2	Environmental Management	13
Namibia	7	Food Industry Management and Marketing	1
South Africa	7	Managing Rural Change/Development	18
Swaziland	4	Sustainable Agriculture and Rural Development	17
Tanzania	15	Sustainable Development	14
Zimbabwe	7		
Zambia	9		

DLP students are typically mid career professionals, with more than 75% between 30 and 50 years old and approximately one third are female. On registration they receive a study pack comprising a study guide, copyright cleared reading materials and possibly an audio or video cassette and relevant software. This pack contains everything they need to study a module, and over the last three years the DLP has begun to produce interactive CD-ROM based versions of modules containing a study guide and further study resources. Tutoring originally centred around providing feedback to students who submit optional Tutor Marked Assignments (TMAs), either through the post or by email (n.b. the majority of students have access to email). For several years an Online Learning Environment (OLE) has been provided as a base for group discussion and interaction with tutors, and to improve inclusivity and access to discussions a recent enhancement has been provision of regular tutor e-digests that reflect of student questions and course content.

In March 2006 a baseline survey was conducted with these students, and there were 43 responses. The graphs that follow illustrate the respondents' ratings for the current e-learning approaches:



Whilst these responses are encouraging, the constraint on OLE access (illustrated below) was regarded as a problem, and several in-country tutorials were organised to overcome this limitation. These workshops were rated as useful, but many students found it difficult to get time off to attend, or too expensive to travel to a workshop location. This type of event is also very expensive to organise.



The table below shows the access that the respondents have to different types of technology and application:

Computer	At Home 24	At Work 40	No Access 0	
CD ROM Drive	Yes 41	No 1	N/A 1	
Cell Phone	Personal 38	Provided by Employer 11	No Access 1	
Internet	At Home 8	At Work 38	Cyber café 18	No Access 1
Email access	Regular 37	Occasional 6	No 0	

These responses are unlikely to be typical of the whole survey group, since survey responses were sent in by email. The respondents generally also rated themselves highly in relation to their level of ICT literacy ('very good' (16), 'good' (21) and average (6)). Computer and internet access are most likely to be via the workplace, and yet by contrast most indicated that they study mainly 'at home', followed by 'in the office', and least when they are 'away on field work'. The amount of time spent out of the office was significant, with 18 respondents indicating that they spend 1-3 months per annum in the field, and 13 indicating that they spend more than 3 months.

All respondents indicated that they used their phones for receiving voice calls and almost all sent and received text messages. Interestingly a lower proportion (70%) made voice calls. The amount of money spent each month was also revealing as it varied from \$4 to \$100 per month.

The survey details summarised so far, suggest that there is a potential role for use of mobile phones to support learning, since almost all respondents have them, and they offer the only technology that could potentially be used 'anytime, anyplace'.

The modules that the students were studying were reviewed, and two modules were selected for the focus of the project. These modules are 'Rural Development' and 'ICT for Development'. During the course of the project, new content and activities designed specifically to run or support mobile technology will be developed and tested, and in 2007 the tutors on these two modules will also become directly involved.

Visits were made to Malawi and Tanzania in February 2006, to find out more about local ICT trends, and explore the realities, constraints and possibilities of the context where the students were based.

The students were interviewed and videoed, and audio versions of the interviews have been shared amongst the four students, so that they are familiar with each others' context and suggestions. These interviews provided a rich picture of how students use their current phones, computers and the Internet, and how they prefer to study. Personal factors such as wanting to keep on existing phone networks, or keep an existing phone number were identified, and initial suggestions about how a mobile device could support learning were explored. It became clear that in three out of four cases the students selected had reasonably good access to Internet, and the fourth student could access e-mail on an occasional basis. It was also clear that the students travel a lot locally and sometimes internationally, and mobility is therefore an important factor to be considered during the pilot project and in scaling up mobile learning support to the wider student community.

The main cell phone operators offering services in the countries selected are shown in the table below:

<i>Malawi</i>	<i>Tanzania</i>
CelTel	CelTel
Malawi Telekon	Tigo (formerly Mobitel)
	Vodacom
	Buzz

Meetings were held with CelTel and Vodacom in Tanzania, and it became clear that plans to roll out 3G networks are moving ahead quickly. GPRS services are becoming widely available supporting data services, including multimedia and MMS applications. The price of GPRS services remains high: for example in Tanzania 1 kilobyte of data costs Tsh 50 which is the same as the cost of sending a text message. Significant usage of GPRS services at this stage is therefore not realistic for students, and transfer of large files between students and the DLP will be best done via transfer to a PC and email or internet services. Operators did sell phones, but handsets tend to be sold separate from usage contracts, and are similar in price to SIM free handsets purchased in the UK.

Mobile phone services fall into three main groupings:

- i. Basic level services: voice call and text messaging
- ii. GPRS services: transfer of data and multimedia on an asynchronous basis
- iii. 3G services: real time video calls

Handsets typically have features that are designed to operate well at one of these levels, and students surveyed currently make use of basic level services. The four students helping with the project were given the activity of finding out about available phones and suggesting which services could be used for this phase of the project. The activity made use of their existing phone models, and a combination of e-mail and SMS, confirming our ability to communicate with the students in these ways.

It became clear that rather than proliferating devices, a mobile phone with smartphone capabilities (that support GPRS and potentially 3G services) was preferable to a PDA. Whilst both can be synchronised with a PC and have multiple functionality, the phones were generally smaller and more portable, had better video and image capture, sound and communication capabilities, and offered more scope to explore both learning content and tutoring and administrative support. Both had capability for storage expansion. PDAs typically benefited from larger screens and more practical keypads, and sometimes more powerful applications. The added value of mobile phones for learning was more oriented to multimedia than to input or reading of lengthy text.

The model chosen by the students (shown opposite) is the Nokia N70 (local cost TSh 570,000) supplied with a 1Gb storage card, and Bluetooth connectivity. Its capabilities included:

- Audio recording and playing of compressed sound files (i.e. supporting podcasting approaches)
- Contact management, calendar and to-do list
- SMS and Multimedia Messaging
- Application viewers for pdf, word, excel and PowerPoint files
- Two cameras for video and still images
- Powerful PC based software for management of files between PC and phone, and software on the phone that can powerfully link personal media to a 'typepad' blogging website



The model selected can be purchased and maintained locally, but transferring money and arranging contracts locally was problematic, so it was decided to supply phones from the UK, although this may not be practical in any future scaling up of activities. The phones (with a monthly credit allowance transferred to the student to encourage usage) were supplied to the students in exchange for a commitment to support the project research activities. Through the provision of a specific model we have better control over the variables which may influence the use of mobile device and can therefore concentrate on the appropriate and effective educational use of the device.

The opportunity arose to deliver the phones personally to the two students in Tanzania and show them how to use different features. By contrast the phones were sent by DHL to students in Malawi. This has allowed us to contrast the two groups, and determine the extent to which

training makes a difference. So far, both groups are progressing well, and we are exploring ways in which students can help each other as they encounter problems.

A wide range of practical issues have arisen during the period that flag up important concerns to be considered further in any scaling up of the project to a larger group of students. The SADC students' survey identified and ranked problems faced when making use of a mobile phone as follows:

- | | | |
|----------------|-------------|-----------------|
| 1. Cost | 2. Coverage | 3. Theft |
| 4. Reliability | 5. Damage | 6. Power supply |

The list below identifies other challenges and issues, relevant to any scaling up of activities, that were identified as the context was explored in more depth:

- **Phone Supply:** whether to supply a specific handset to students, or support a wide range of models that students have, provided they meet minimum specifications
- **Insurance:** difficulties in arranging in country cover
- **Import duty:** an issue if the phone is supplied
- **Supporting usage:** since use of phones is expensive, there is a real issue in determining the most affordable ways to offer mobile support to the learners, and this is likely to complement rather than replace current e-learning strategies
- **Technical set-up:** setting up connectivity e.g. between phone and computer, and using Bluetooth, typically requires support
- **Network and Service Coverage:** This is changing fast, and whilst it is not practical to use GPRS for much of the pilot testing, the context in 2-3 years, may make use of GPRS or even 3G a more realistic prospect
- **Power Supply:** recharging phone batteries is an issue when students are working in rural areas
- **Online Content:** WAP currently provides access to low bandwidth websites on older phone models, but over the next 2-3 years, use of phone browsers using HTML/WML or java applications is likely to increase

Preliminary steps relating to design of activities

The project is now entering a key phase, where activities are being developed (i) for testing out the ability of the students to use different functions of the mobile phone and exchange data with the DLP; and (ii) to enhance the module learning materials.

The phone usage tests are nearly complete and are proving that students are capable of using the different functions of the phone, and transferring audio, image and video files back and forth from the phone and exchanging them with the DLP and fellow students via the Internet.

One question the project team faced from the outset, was whether the content of a module could be used in entirety on the mobile phone, or whether the phone should simply be used to support improved communication for administration and tutoring. In order to address this question and explore where value can be added from an educational perspective, a range of activities are now

being developed for the two modules selected. These activities will make use of the multimedia and communication capabilities of the phones, and include testing the following:

- Learning activities, and assignments, that encourage students to make use of their phone's multimedia capabilities, and submit short videos, audio files and images back to the DLP
- The potential for supporting groups working on activities together
- Improved interaction between tutor and student, for example by making simple multimedia versions of e-digests
- Redesign of content, so that it is less dependent on text, so for example interviews with experts and tutors, or use of short interactive content, can replace written explanations of concepts that can be delivered better using multimedia

The activities will be evaluated by students and tutors during the 2007 academic year, and a small database is being set up that will document and profile the outcomes, and provide a reference for answering the following questions:

- What kind of learning objectives, and pedagogical approach is the activity suitable for?
- Are there specific technical pre-requisites that need to be met in order to make use of the activity, e.g. file types, network services
- Were any relevant constraints identified when testing the activity in Tanzania and Malawi?
- How is the activity best delivered to the student ?
- How was the activity designed, and what resources were required ?
- How was the activity evaluated ?
- What were the student and tutor reactions to this activity when it was tested ?

The project team are also testing different models of phone including the i-mate Jasjar, k-jam, Nokia E61 and N80, to gain further insights into the type of equipment and features that might best support module content and activities. It has also been interesting to note and evaluate the ways in which software supplied with different mobile phones is now integrating with online weblogging sites.

In this phase of the project, there will also be a detailed look at the type of support environment that would be need by users of mobile technology. This environment could provide a platform for content sharing, and potentially benefit from a standards based learning object repository designed for mobile technology users.

Based on the insights gained so far, it is clear that there is great scope for building an inclusive learning community in a much more personal way than is possible using the OLE. There are many challenges to consider in scaling up to providing mobile support to students in diverse locations, and from an educational perspective there is significant potential for engaging learners interactively with learning resources that make greater use of multimedia and adapt to different learning styles and lifestyles.

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