

# Using Mobile Technology for Learner Support in Open Schooling

Project report for: Commonwealth of Learning



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## **1. Introduction**

This report summarises the findings of a preliminary research study on the use of mobile technology for learner support in open schooling in developing countries and comprises of the following sections:

1. Introduction
2. Background
3. Methodology and process
4. Findings
5. Things to consider when opting to use Mobile Technologies for Learner Support.

## **2. Background**

Education is seen as an important contributor to the alleviation of world poverty and in response members of the United Nations set a goal to achieve Universal Primary Education. It was hoped that by implementing such an initiative all children world-wide would be able to successfully complete primary school by 2015. This commitment to primary education has resulted in a situation where there have been increased levels of children completing their primary education but access to secondary school is in many instances still an option only available to a select few. Open Schooling at secondary school level is an option that is being considered by developing countries as a solution to the bottleneck that limits learner access to secondary school education. The flexibility of Open Schooling makes it suitable for learners who cannot or will not attend a conventional classroom (<http://www.col.org/colweb/site/pid/5298> ).

An initial background study commissioned by the Commonwealth of Learning (COL) to interrogate this problem and explore the potential of Open Schooling involved collaborators from several developing countries including 11 African ones. The data

collected during the study provided an overview of the general issues affecting access to secondary education for youth and adults in Sub-Saharan Africa. Some of the main findings were that learners drop out of school for a variety of reasons including shortage of spaces in school, cultural practices and the long distances to schools. It was agreed that Open Schooling was a potential solution to the problems faced by out of school youth in developing countries. COL (<http://www.col.org/colweb/site/pid/5298>) goes on to report that “Open Schooling has the potential to meet the rapidly increasing demand for secondary education because it can be conducted at scale and cost-effectively.”

There are many different views on what Open Schooling is however, as defined by COL, Open Schooling is open and flexible and involves, the physical separation of the school-level learner from the teacher, and the use of unconventional teaching methodologies, and information and communications technologies (ICTs) to bridge the separation and provide the education and training. (Rumble and Koul, (2007)).

One of the main characteristics of open schooling however is that the learners are often geographically separated from the teachers and so do not have ready access to ongoing academic and administrative support as they are not physically located in a formal school environment most of the time. However, Open Schooling differs from Open and Distance Learning in that it is more open and flexible as usually there are no rules dictating student ages, prerequisites, course content or number of courses in which learners must enroll.

It is well known that Open and Distance Learning programmes suffer from poor completion rates for a number of reasons namely:

- Learner isolation
- Lack of personal feedback
- Technical problems

- Lack of social interaction

Because in an Open Schooling system learners are also physically separated from the teacher, any viable Open Schooling model must take the associated problems into consideration and include adequate learner support to improve learners' chances of succeeding. Learner support is usually defined as: "enabling learners to study successfully and to develop their own understanding of their learning materials" (Ufi/learndirect and Kineo, 2007).

The British Institute for Learning and Development suggested three forms of student support that should be provided this includes support for:

- **Learner's mediation** with course and learning materials
- A **social environment** that encourages **dialogue and interactions** between learners and staff and between learners themselves
- An administrative framework needed **for management and dissemination of information** to and from students (Ufi/learndirect and Kineo, 2007).

Tait (2000) indicates that the main reasons for having student support integrated in an ODL system are that:

- Students want support (cognitive support to learning)
- It reduces drop-out rates (affective support to promote learning and success)
- Learning often needs mediation of some sort (systemic support to help students manage the rules and systems of the institution so as to encourage persistence).

Tait (2000) goes on to say that student support in ODL aims primarily to assist students to learn successfully and recognizes that in such a system there is a need to help students with their feelings of confidence and self-esteem and so energize them in ways that would encourage them to be persistent and succeed. The innovative use of ICT-based systems is known to be able to deliver these goals very effectively.

As developing countries continue to explore Open Schooling models and what such models might mean for their development and implementation in countries that have limited resources, there is a need to explore the suitability of mobile technologies for learner support in Open Schooling systems. Mobile technologies in this instance refer to wireless technologies such as hand-held PCs, PDAs, mobile phones, iPods etc and these are being touted as being suitable for the purpose of learner support. A lot of different mobile technologies are being tried out and tested in innovative ways for purposes of supporting teaching and learning both inside a formal classroom and in the more informal arenas of learning. Many such initiatives are supported and even funded by companies such as Nokia, Sony, Sony-Ericsson, Siemens etc whose technologies are being tested in this regard. Many of these initiatives are taking place in more formal learning situations, some in well resourced educational institutions found in developed countries and more recently trials in less developed under-resourced institutions in developing countries. This is possibly because it makes it easier for donors to keep track of what is happening and there is some level of accountability.

Whereas there are a lot of online reports and newsletters giving glowing reports of these initiatives at this point in time there is very little more formally documented evidence of how the use of these technologies are impacting on student performance. This may be because many such initiatives are still in their initial pilot phases, whilst others seem to have been carried out over too short a period of time for there to be any measurable impact. Adeya (2005) reported that there were lot of pilot initiatives and anecdotal

evidence but that it was difficult to find literature assessing issues from a user perspective.

There is a need to further investigate the use of these technologies from a literature as well as from a user perspective so as to gain a more informed understanding of what using such technologies might mean for the development of quality student support in Open Schooling systems in the developing world.

This project aims to further interrogate ongoing and completed educational mobile technology initiatives so as to determine any lessons learnt that might be of relevance in the process of developing quality student support systems for Open Schooling in developing countries with a special emphasis on Africa. Evidence will also be sought with regards to the perceived or observed impact of the use of such technologies on student performance and their experience of learning in the Open Schooling System.

### **3. Methodology and process**

A **desktop audit** was carried out to determine what initiatives are out there and to glean any documentary evidence of their impact on student learning available in journals, online, newspaper articles etc. This information was captured in the form of a matrix (See **Appendix 1**). The audit was carried out using the GOOGLE and GOOGLE Scholar search engines. This was done because it was felt that the internet was the most likely place where such initiatives would be reported on. Based on an initial analysis of the information available about the various initiatives, 12 categories of information were identified and were used to construct the audit matrix (See **Appendix 1**). Twenty one initiatives were identified of which ten were of South African origin. Others included projects from Kenya, Uganda, Tanzania, Philippines, India, Israel, Finland and the UK.

The audit also helped to **identify those projects that warranted further exploration.**

These projects were selected on the basis of a number of criteria listed below:

- The initiatives had to be using mobile technology to support learning and teaching in an African context
- Mainly South African projects because of their close proximity and therefore ease of access due to the tight project time frames
- The chosen project needed to have been running for at least two years
- The projects needed to be ongoing at the time of the audit
- Project personnel had to be contactable
- The project contained components that made it suitable for learner support in Open Schooling
- The project allowed for the use of basic mobile technologies to ensure accessibility and cost effective options

An interview schedule was then developed and stakeholders of the selected initiatives were contacted and interviewed by email, telephonically and where possible face-to-face so as to gain further insights and information about the purpose and outcomes/progress being made on their respective projects. The information collected from the desktop audit and stakeholder interviews was analyzed and used to identify those initiatives that were worth visiting so as to gain insights and further information by meeting and interviewing project beneficiaries.

Five initiatives were targeted for further investigation: Dr Maths on MXit; Digital Doorways; MobilEd; M Learner Mobile and the Mobile Research Support Initiative (MRSI). An interview schedule (See **Appendix 2**) was generated which focussed on getting more information. The information collected revolved around getting a **Project Description**, identifying the **target community** and **project participants**, the type of **technology** used, issues relating to project **sustainability**, lessons learnt as well as **challenges and successes**.

The approach taken was slightly different from that proposed in the initial project proposal. It initially had been envisaged that out of the information collected from telephonic interviews a separate tool would be generated for the site visits. However, it became clear from the telephonic interviews that a significant amount of information could be obtained by telephone (talking to implementers) and that many of the projects were in many instances virtual ones with no available means of tracking beneficiaries so as to get inputs and feedback from them. Also access to the schools in the short-time frames given was going to be problematic as it was school holidays and also one would have to obtain ethical clearance from the Department of Education prior to going into the schools (a lengthy process). Lastly, some projects were fairly simple and did not require further investigation through site visits.

Three lengthy telephonic interviews were held with project participants involved in the following initiatives: Dr Maths on MXit; MobilEd and M Learner Mobile (See **Appendix 3** for full interview reports). Unfortunately whilst email contact was made with the person involved in the Digital Doorways project – she was reluctant to cooperate despite having been sent a copy of the questions in advance, so this interesting project was not further investigated. However, a similar project “Hole-in-the-wall” (See Appendix 1) from which Digital Doorways was derived has been extensively evaluated and research done on it with regards to its use for minimally invasive education.

The questions used for the telephonic interviews seemed to generate the sort of information being looked for, therefore these same questions were expanded slightly and used on the different stakeholders interviewed during the site visit to Makerere University to find out more about the MRSI (**Appendix 2**). The site visit questions targeted the following stakeholders: Project leader, administrative staff, research supervisors, students and applications developers. The visit took place over two days and the complete site visit report can be found in **Appendix 4**.

## 4. Findings

The section below summarises the different findings that arose out of the various activities. So as to avoid being repetitive, details from each activity can be found in the relevant appendices attached to the back of this document.

Information collected varied considerably across different projects e.g.

- some just gave a basic/superficial description of the project such as M4Girls (See **Appendix 1**)
- others provided more detail, for example the DEEP project, and the student support project at the University of Pretoria (See **Appendix 1**)

There could be a number of reasons for this. In some instances the projects are still in their infancy and so not much is available about them. However, in other instances some of the information is put out by corporate sponsors whose emphasis is on disseminating information that focuses on advertising their participation in corporate social investment initiatives. It is suspected that other initiatives that were initially touted have fallen from sight and were possibly once-off attempts.

### 4.1 Overview of Mobile Technology use for Learner Support

The following initial findings were made from the desktop audit:

- The initiatives range from those that are institutionally based to those that are virtual. However the majority are located in institutions.
- Most projects used mobile phones but others used other hand-held devices such as e-slates and PDAs e.g. EduVision. In addition to this two of the initiatives (*Digital Doorways* and *Hole in the Wall*) used ‘tethered technologies’ but were considered to be useful for open schooling as these technologies were put in rural areas and were openly made available to those who wished to use them whenever they wanted to.

- Five of the projects focus on High School students and in particular, on the subject of mathematics e.g. Dr Maths on MXit and M Learner Mobile.
- The mobile devices were used for other subjects like biology (two projects: MOOP and MobilEd) and language e.g. MELFA and MobiDic but these were in the minority.
- Some of the projects focussed on student admin and academic support of mature distance education learners in tertiary institutions e.g. The initiatives at Makerere University MRSI, University of Pretoria and the Dunia Moja Project.
- Other subjects covered were of a more general nature and revolved around literacy, numeracy, and basic science aimed mainly at primary scholars e.g. BridgeIT.
- Two of the projects were aimed at teacher development and upgrading of teaching skills e.g. SEMA and DEEP.
- The One world M4G project is a for profit project that focuses on health education, jobs and lifestyle information and tips aimed at low income earners in Kenya. However, most of the projects are not for profit.
- In some projects parts of an offering are free but to get full functionality and access to everything fees of some sort have to be paid. For example, full access to Mobi Maths requires the payment of a monthly fee of R30.
- Most of the projects are made possible by and involve Public Private Partnerships.
- A few projects like the MRSI and M Learner Mobile are implemented and funded by a small group of private individuals and receive little if any financial or other external support.
- There were three different project funding arrangements
  - Donor or corporate funded
  - Institution itself funds the project (self-funded)
  - Not funded (individuals incur costs and time in their private capacity)

- Some of the systems are focussed on information retrieval and download. Other systems make available information that is mediated either for purposes of learning or passing on important administrative information. In some projects mobile phones are used to collect information and encourage cooperative learning and knowledge creation.

However, in general the desktop audit was not sufficient to generate the sort of information that would enable one to make recommendations about using mobile technologies for learner support.

#### **4.2 Lessons learnt from the selected Mobile technology initiatives**

This section provides a summary overview of the three South African based projects and the one Ugandan project that were drawn from the desktop research study based on their potential for adaptation and use in open schooling environments.

Four projects with potential for use in open schooling were targeted and people involved in these projects contacted and then either interviewed telephonically or face-to-face. These included M Learner, Dr Math on MXit and MobilEd. A site visit was made to the Makerere University MRSI (For more details see **Appendices 1, 3 and 4**).

All four projects use the mobile phone in order to support educational processes. While most programmes use basic mobile phones, some use mobile phones with Bluetooth capability. What is clear is that basic phones can be used to provide students with support and allow them to access information. However the nature of that information is limited in terms of amount of text as well as type (it often excludes graphics etc). Some projects combined the use of the mobile phones with computers and servers to add an extra dimension. For example at Makerere one of the ways in which students can receive messages is from email to sms. For M Learner Mobile and Dr Maths on MXit the phones used were able to download software so as to gain full functionality.

The projects generally provide students with a range of services. These vary depending on the sophistication of backend technology and the capabilities of the mobile phones used in the project. All the projects involve some sort of human mediation. The mobile phones (depending on the particular initiative) were being to varying extents, used to:

1. **Access** learning and course materials e.g. **MLearner Mobile**
2. **Mediate** with course and learning materials e.g. Dr Maths on MXit
3. Create a **social environment** that encouraged **dialogue** between learners and staff and between learners themselves either directly or with the aid of chat room software e.g. M Learner Mobile, Dr Maths on MXit, MRSI
4. Encourage **collaborative learning** and the **creation of new knowledge** e.g. MobilEd
5. Provide **administrative support** for the **management and dissemination of information** to and from students e.g. MRSI

These characteristics of the initiative are in-line with the recommendations made by the British Institute for Learning and Development about the types of learner support that should be provided in an Open and Distance Learning (ODL) system.

The mobile phone is clearly invaluable in terms of providing a platform through which students can communicate with their teacher and other students. This includes receiving information on issues such as when they are writing tests and reminders about assignment deadlines.

Communication also involves one and two way relationships between learners and others and revolves around sharing of academic and administrative information but is also about supporting students in other ways, for instance, providing morale and

encouragement and most importantly removing alienation and loneliness which students often feel. Examples of the ways in which mobile phones were used in the various projects are given below.

**a. Accessing of learning and course materials**

- Accessing of downloadable digital information ranging from definitions to short paragraphs or even page downloads from books/manuals
- Sending and receiving of information in text form
- Sending of information/queries in text form and receiving audio feedback (real or synthesized)

**b. Creating a social environment that encouraged dialogue between learners and staff and between learners themselves**

- Communication between learners and teacher/supervisor either through text or voice calls
- Communication between learners either through text or voice calls
- Learners/supervisors using mobile phones to communicate via a server linked to websites or even radio podcasts

**c. Mediation with course and learning materials**

Provision of **academic support for learning** using mobile phones was provided in mainly two forms and was usually focused on providing homework/coursework support e.g.

- Access to content and other information that would otherwise be unavailable.
- Two way communications through either SMS or voice calls to support students' requests for assistance or to help with pacing with regards to completion of a particular task.
- Accessing exercises or tests for study and review

d. **Mobile phones were in some instances used to provide administrative support for the management and dissemination of administrative information to students.** For example; informing of test dates and deadlines i.e. helping the learners to learn about and deal with the complex administrative structures and processes of the institution e.g. Makerere University, MRSI. This was in the form of:

- Text messages from phone to phone
- Text messages from computer to mobile phone (email to sms)

e. Encouraging **collaborative learning** and the **creation of new knowledge**  
Students were encouraged to collaborate on projects through using mobile phones to:

- Communicate and provide support for each other by text or voice calls
- Sharing of information using Bluetooth
- Collect/capture data in the form of pictures
- Uploading or addition of revised or newly created information (in the form of text and graphics) onto specified websites

However despite the fact that mobile phones facilitated quick and easy communication between learners and their teachers/lecturers there are certain potentially problematic aspects of this communication that need to be interrogated further to gain a better understanding of how the technology can be used and range of guidelines and protocols need to be developed to ensure that communication:

- Is effective
- Is timeous
- Is safe
- Is respectful
- Is comfortable for all participants

Examples of some of the challenges that arose out of using mobile phones for learner support in the various initiatives are discussed below:

1. With regards to effective communication: Students at Makerere reported that whilst being able to access their lecturers by mobile phone was a convenient facility and made them feel closer when contact was made they also indicated that the actual process of establishing contact was sometimes not easy. For example if they called and the call was terminated they would be left wondering whether and when to call again. Sometimes they were not made aware of why the call had been terminated leaving them feeling 'unsettled and unsure' of how to proceed. In the same vein staff was often inundated with calls and SMSes from students some at very inconvenient times resulting in information overload and cognitive pressure as well as generating potentially uncomfortable situations for both student and lecturer.
2. Timeous communication is critical to proper functioning within an open schooling or distance education system. Learners in some initiatives expressed frustration at not receiving or receiving delayed feedback or support when they needed it e.g. this was a problem experienced with M-Learner Mobile users. This can impact on student motivation and the student's ability to persist and complete a task.
3. Security issues can be a big problem and appear to pervade systems that are more organized around particular institutions rather than across institutions. For example students from University of Pretoria that provide the homework support for learners are in a position that could result in abuse and improper relationships between tutors and learners resulting in the need for training in how the interactions should take place, and the installation of some form of monitoring system. However if students are located across the country it may be more difficult to cause such harm than if they are located in particular institutions. It must also be noted that many

students use the service to ask for psychological help for which the people that are implementing the projects are not trained.

4. Some students on the MRSI indicated that there were sometimes problems when calling lecturers of the opposite sex who felt their privacy was being invaded and the fear that partners would get upset if they misunderstood who had called and the nature of the calls.
5. Others MRSI students indicated that whereas phones served to bring them 'nearer or closer' they felt safer being at a distance 'unseen' by their lecturer as they felt that being seen could possibly lead to 'bias' or 'discrimination'. Clearly there was an element of fear or aversion to making direct contact. Staff on the programme also reported 'student avoidance' with regards to being contacted whether directly or indirectly.

It is clear that some research has to be done about understanding the dynamics of interacting using mobile phones for learner support as it clearly can impact on how the users feel and therefore how they behave. This could impact somewhat on one's ability to learn successfully.

#### **4.2.1 Sustainability**

Projects that are being supported by resources from donors were found to have better capability in terms of technology and human capacity. These projects also showed greater availability, consistency and quality in the provision of learner support. All these contribute towards increased viability and sustainability.

Basic mobile phones are relatively cheap in comparison to other hand-held mobile technologies such as iPods, PDAs and some of the sophisticated phones that have all sorts of capabilities and function rather like miniature computers. Since most students

involved in the various initiatives own fairly basic mobile phones, this provides a framework for sustainability as costs can be kept at a minimum. However in a number of self-funded projects, team leaders such as teachers do not have resources for the ongoing running of projects, which threatens sustainability e.g. M Learner Mobile (no funding support) and the MRSI (very limited financial support). This situation impacts on the ability to up-scale such projects as there is no room to increase human resource capacity or improve the systems further.

In the case of M Learner Mobile, the support is on a volunteer basis and teachers perform services on an *ad hoc* basis when they have the time. This is clearly not sustainable and results in infrequent and *ad hoc* communication and support to students. Furthermore this approach forces teachers to use their private resources for the project, which cannot be sustained over time. The quality of support that can be offered is therefore questionable as often it is not timeous nor of a sustained nature.

The situation at Makerere on the MRSI is slightly different in that there is an 'incentive' to participate as research supervisors are paid extra compensation for every student that successfully completes their research project. However, this does not change the fact that they have to pay money out of their own pockets to facilitate the research process and yet there are no guarantees that a student will pass. There is limited institutional financial support despite the initiative being seen as innovative. This is because the institution is cash-strapped and therefore at this point in time the MRSI is not seen as a priority.

In the case of the Dr Math on MXit, there is a strong partnership between the University of Pretoria, and CSIR, which ensures the project's sustainability. The university offers volunteer tutors on the project who have to complete community service in order to graduate. The CSIR provides the offices and computers for tutors to provide the feedback to students and gets to carry out research on how the system is used and how

it might be further improved. The research component of the project has the potential to attract further funding from both internal and external funders. This represents a potentially sustainable model of using mobile phones to support students.

Another issue that could impact on project sustainability and future developments is the problem experienced at Makerere where because the students and staff use their own phones. This situation has the potential to impact negatively on future planned developments as they all own different phones with different capabilities and are linked to a number of different mobile phone networks. Such a problem could be overcome by making the phones an integral part of the students' study package and therefore advocating for the buying and use of a particular kind of phone accessing one network. This would also enable software developers to synchronize their applications to these devices. However, this approach of course has cost and other implications.

It is clear that project sustainability especially in under-resourced developing countries is dependent on the formation of strongly synergistic Public Private Partnerships to provide various types of support to such initiatives thus ensuring an element of sustainability, the BridgeIT project in the Philippines is another good example of this. However, as a lot of these initiatives are still in developmental and exploratory stages extra funding could also be accessed by linking project activities to research.

Lastly, it was clear from the various discussions held with stakeholders involved in the MRSI that the extent to which the use of mobile technology is formally integrated into the Distance Education courses and becomes an integral part of programme delivery contributes to increased sustainability of the initiative. But right now there is no evidence that this initiative is sustainable for a number of reasons. These being:

- The initiative is based on a spirit of “volunteerism”
- There is still a lot to be learnt as the initiative is still relatively new

- There is no significant funding available at present to support its integration and possible up-scaling

These factors do not only impact on sustainability and scalability but also limit impact.

#### **4.2.2 Teaching and learning**

At this point in time as people continue to explore the use of technologies, there is insufficient evidence in the initiatives investigated, of how the mobile phones are used to support teaching and learning (in terms of pedagogy). There is no doubt that students can access information that they require. There is also evidence that the phones can be used to support homework by providing feedback on basic problems. The extent of support in this regard is limited by the technology. For example some technologies do not allow for graphs, tables or diagrams.

There is evidence that use of the mobile technology has encouraged more active learner participation in the learning process with learners taking charge of their learning and also supporting each other and collaborating on projects and tasks in a meaningful way. Use of the technology also provides opportunities for the collection of data and the creation of new knowledge that learners and their teachers can make available to others. The MobilEd project is a good example of this. However it should be noted the information generated by learners that is up-loaded onto sites like the Wikipedia site is not necessarily checked thoroughly raising questions and the quality of information generated. This can be disadvantageous.

In Finland, Mattila and Fordell reported that students using a mobile phone to analyze surroundings and to communicate within groups were encouraged to participate in inquiry learning and creative problem solving. Their model involved learner-centered collaborative learning that was teacher supported. The pedagogical principles involved inquiry learning, skills for gathering information and building knowledge, creative

problem solving leading to interactive and cooperative learning. The MobilEd initiative has somewhat similar characteristics in this regard.

There are also limitations in terms of support that can be provided in supporting students to understand newly introduced concepts especially at primary and secondary school level unlike at tertiary level where students are expected to be able to learn pretty much on their own. In all likelihood this would need to be mediated in face-to-face sessions. Finally there are also limitations with the use of the technology to diagnose exactly where students are having difficulties and how they could be dealt with. For instance in solving a geometry question, it is difficult to understand and explain where the student has gone wrong in a 20 step process using mobile phones. Also some subjects are more amenable to delivery and support using this technology than others.

There is a definite need to further interrogate and carry out research into the different pedagogic strategies required to bring about the development of effective conceptual and other higher order learning skills when using mobile technology for learner support within an African context.

Effective uses of mobile phones for learner support at the moment seem to be:

- Support for home work
- Access to relevant information
- Access to Test banks
- Sharing what they've learnt with others
- Creating new bits of knowledge
- Data collection

Traxler in his report on the strategic aspects of wireless and mobile learning pointed out that wireless and mobile learning are usually implemented as enhancements or extras to core provision, often as a variation of conventional e-learning rather than as a new form

of pedagogy. The most exciting, innovative and convincing examples of wireless and mobile learning are projects where new forms of learning are created, rather than where existing forms of learning are re-versioned and ported, but these are most problematic in terms of institutions being able to guarantee the standard and quality of learning for their students.

([http://www.jisc.ac.uk/uploaded\\_documents/Strategic%20Aspects%20FINAL%202005.doc](http://www.jisc.ac.uk/uploaded_documents/Strategic%20Aspects%20FINAL%202005.doc))

#### **4.2.3 Cost**

It is evident that since many projects are in their initial stages of development, there is little focus on or understanding of cost implications at this stage. Also where there are partnerships for backend technology development, it is unclear what the nature of these costs are as the technologies are new and are therefore in a continual process of development. What is clear is that in some projects, such as M Learner Mobile and MRSI teachers bear the brunt of the costs and this situation threatens the success of the project. There is a critical need to do some cost/benefit research to gain a better understanding in this regard. The University of Pretoria initiative being one that is now firmly integrated into the University system is possibly one that could be investigated to gain an understanding of the costs associated in its implementation.

#### **4.2.4 Impact of projects**

One of the challenges that emerged in these projects is that it is difficult to evaluate the impact of projects that run across institutions. This is because many of these projects do not have tracking systems, partly due to security reasons and partly due to the low capabilities of the backend technology. Innovative ways of seeking information about this must be found. Another problem was that many of the initiatives were still too new and not enough information had been gathered about them as yet.

There is clearly a need to identify some of the more sustainable and enduring projects so as to study them further over a longer period of time.

### **4.3 Synthesis of findings**

This brief study indicates that there are projects out there providing support for learners using mobile technologies. A few like the mobile technology for student support project at the University of Pretoria are pretty firmly entrenched in the system and there is on-going active research linked to the initiative. However most initiatives seem to be in their initial testing phases and would need further more in-depth exploration to gain a better understanding of the intricacies involved.

Initial findings indicate that there is definite potential for using mobile phones in various ways to provide learner support in the African context. Mobile phones are being used in a number of developing countries in this regard. On the recently initiated Dunia Moja Project under- and post-graduate students based at three Universities in Africa collaborate via cell-phone with students at Stanford University. The students can watch or listen to presentations loaded on their mobile phones. They have sophisticated mobile smart phones with video cameras, audio recorders and internet capability that were donated by Sony Ericsson. The students also have access to a moblog which is an online interface which sends postings to mobile phones. Students can also view their materials on a CD. They can text, send images and make phone calls whilst class is in session and issues can be debated through the internet. They are able to communicate with leading experts in different countries. Students share course materials, exchange information, contribute course content and help design collaborative activities. Whilst this is a very exciting initiative, it raises questions of sustainability and scalability as it uses a wide variety of strategies and technologies that would probably prove to be very costly to implement in a developing country context unless heavily financially and technologically supported.

A variety of simpler technology strategies (some that combine different technologies) are being used that involve enhancing communication between learners and teachers that are geographically separated. The types of communication vary from simply sending and receiving of academic or administrative information, to providing mediated academic support e.g. for completion of homework or providing pointers to useful information, helping to pace or motivate a student etc. Such communicative support has been reported as being successful in helping support and direct students so that they persist and complete assigned tasks.

The technology used seems to consist mainly of one of three types of mobile phone

- Basic mobile phone requirement (no connectivity)
- Basic mobile phone Java or GPRS enabled (with connectivity)
- Mobile phone with Blue tooth capability (ability to transfer information between two phones near each other)

The phone capabilities impact on the way they can be used to provide support with the more sophisticated phones being able to do more but are substantially more expensive. Very few young people in Africa have access to such fancy phones. This means that in under-resourced situations many services offered by interventions are limited by the phone capabilities.

The phones are often linked to other technologies such as computers and servers, as well as relevant mobile phone software. There are challenges with this such as issues of compatibility between the different types of technology as well as the different software formats and platforms. Other challenges faced are those relating to network connectivity and down-time. In many rural areas mobile phone networks and electricity are variable creating difficulties in that there is no consistency in such services. This can impact negatively on delivery of student support services using mobile technology and needs to be taken into consideration when planning such interventions.

The backend technology support tends to be of two types. It can be a centrally driven government or a research agency supported system and is often quite sophisticated. Implementers are usually able to experiment and explore more as there are dedicated funds and capacity available. An example of this is the MobilEd and the Digital Doorways projects. However, the volunteer system as seen in the example of the MRSI and M-Learner Mobile projects often arises out of an individual's passion or dedication towards an intervention but in some instances people that are then co-opted to help implement are not necessarily dedicated, creating a system that is unsustainable due to lack of available incentives and other institutional or external support.

Mobile technology has been used for purposes of teaching and learning in the following ways:

- Supports resource provision/access to information
- Used for projects e.g. data collection
- Creation of new knowledge
- Encourages collaborative learning
- Encourages active learning
- Pacing of students
- Motivating students

At the University of Pretoria mobile phones are being used to provide asynchronous academic support in the form of: questions via SMS with feedback; phone in to listen to mini lectures using interactive voice response technology; interactive multiple choice quizzes; directing to specific resources for specific tasks via SMS. These SMSes are classified as:

- Academic – instructional
- Academic – interactive
- Student questions – interactive

- IVR – mini lectures
- Lecturer response - instructional

Viljoen, du Preez and Cook from the University of Pretoria are of the opinion that the successful use of technology to support student learning depends equally and critically on the ability of their educators to design and develop didactically sound m-learning opportunities and environments.

There are of course limitations to what can be achieved using a mobile phone due to its small screen and in some instances limited capabilities – some are limited to text only, others have limited graphic and colour capability. Other more expensive ones have camera and internet capabilities. This also means that the mobile phone is not suitable for use with regards to teaching and learning of certain subjects or processes and yet is suitable for use with others. Most projects investigated involved using mobile phones to support learning of Maths. This is probably because the set-up of such a phone lends itself more easily to a Maths exercise than it might for a Biology or History essay. However it is clear that in whatever way the phones are used information can only be passed on in small packets.

Available information on research and evaluation of mobile technology interventions is rather limited at present with the exception of initiatives like that at University of Pretoria. This is probably because many interventions are still in their early developmental stages and have not progressed far enough to warrant an evaluation. Some projects are difficult to evaluate because they are virtual and/or have a security component to protect young learners and so cannot be easily tracked. Institutional based interventions are easier to evaluate but do not provide as much information that can be transferred to an open learning context at this point in time. There is a definite need for more in-depth research to gain further understanding in this regard

There is no clear information regarding costs and benefits associated with the running of the different initiatives. This is partly because most are in their initial stages and are focussed on testing the technology. However, most projects that have been able to scale up are supported through Public Private Partnerships. What we do know is that in some interventions educators have often had to pay their own bills associated with the initiative which they are not keen to do. This situation impacts negatively on the potential for any such initiative to up-scale or even become sustainable. In such instances there is the need for incentives and other support to help maintain the projects. Cost is an important aspect of any interventions to be undertaken in an under-resourced context. This means that it is imperative that more long-term research be carried out to further understand the actual cost implications as this has an impact on project viability and sustainability.

Traxler (2005) summarises the situation quite succinctly by saying:

*“Current projects in wireless and mobile learning are mainly ‘first-generation’, meaning that their focus is frequently on making the various technologies work, ensuring learning happens and satisfying funding conditions. These projects do not usually address issues of scale, embedding or quality, and technical challenges often squeeze the time and resource available for evaluation. Consequently identifying explicit and objective improvements or costs can be problematic.”*

([http://www.jisc.ac.uk/uploaded\\_documents/Strategic%20Aspects%20FINAL%202005.doc](http://www.jisc.ac.uk/uploaded_documents/Strategic%20Aspects%20FINAL%202005.doc))

At this point in time, not enough long-term information is available to make informed decisions about developing models using mobile technologies in open schooling systems. Of the African initiatives studied the University of Pretoria and the MRSI ‘models’ have many components that would be relevant within an open schooling context, it is initiatives such as this that might warrant further research to gain further understanding. Interestingly, there is some evidence that The University of Pretoria

project is replicable to a limited extent as the MRSI initiative evolved from it. However, it has not been possible to completely replicate it due to the fact that Makerere is acutely under-resourced in comparison. Other initiatives such as BridgeIT also need to be further investigated as they seem to have been very successful and scalable.

More in-depth research is required into the various issues raised out of this study. What is clear is that a model would need the integration of appropriate technologies with quality programme delivery. This means that there would be a need to first develop a suitable open schooling model and in developing it ensure proper integration of the technology to provide quality learner support within a properly contextualised framework.

## **5. Things to consider when opting to use mobile technologies for learner support**

Ideally any agreement to use technology should preferably be integrated into initial planning, policy and strategies of the programme or institution to achieve systemic integration. However in light of the fact that use of mobile technologies for supporting teaching and learning in developing countries is relatively new and not clearly understood at this time, one could go for a more step-wise research focused approach but must be fully aware of the constraints and limitations of using non-systemic, non-integrated approaches as often the researchers or individuals involved in such initiatives move on and the developments may never be consolidated.

The Joint Information Systems Committee (JISC) is an organization based in the United Kingdom whose activities support education and research by promoting innovation in new technologies and by providing support of ICT services. This organization has developed tools that can be used to help institutions, managers and education practitioners plan for the use of mobile and other wireless technologies within a system.

The institutional tool can be used either for an institutional audit or planning for future provision. This tool also has a matrix that can be used to ensure processes are in place for continuous monitoring, quality assurance, organizational learning and improvement.

These tools can be found and downloaded from:

[http://www.jisc.ac.uk/publications/publications/pub\\_innovativepe.aspx](http://www.jisc.ac.uk/publications/publications/pub_innovativepe.aspx) (Also see Appendix 5)

Initial interrogation of the tools indicates that they are very relevant and can easily be adapted for use in different contexts.

The **institutional tool** recommends that the following areas need to be considered before attempting to implement the use of mobile technologies in an institution:

- Learners and their experience of learning
- Pedagogic culture and expertise
- Infrastructure
- Organizational strategy and vision

**N.B.** In this instance the institution can be a whole institution, department or faculty or a smaller body such as a programme team.

The **practitioners' tool** covers the following areas:

- Learners and their experience of learning
- Learning and teaching
- Technologies and infrastructure
- Planning for skills development

The **manager's tool** focuses on:

- Functionality and procurement
- Managing the devices
- Setting up or extending a wireless network

Whilst it is clear that these tools were developed within the context of well resourced institutions they definitely are a good starting point for adaptation and the development of a tool that might be useful to help support the development of innovative practice using mobile technologies for learner support in a developing country context where access to resources is likely to be a major constraint. This could be done also taking into consideration some of the preliminary but important findings that have been made in this study such as:

- The need for guidelines and protocols to **ensure the technology is used effectively for teaching**. That the teaching and learning using the devices is:
  - Is effective
  - Is timeous
  - Is safe – i.e. both health and personal safety
  - Is respectful
  - Is comfortable for all participants
- There is a need to building in features that would ensure **sustainability**
  - Allocating funds/budgets
  - Development of synergistic PPPs
  - Securing funds for development and innovation by linking project to research outputs
- There is a need to develop a clear **understanding of what it is going to cost** e.g. What the costs are relating to:
  - Developing technology functionalities – software development and hardware development
  - Content development costs
  - Human resources required to develop, implement and maintain
  - Usage costs – to project, to user e.g. phone, download, connectivity
  - Teaching costs

In conclusion, whilst there clearly is a need for further in-depth research and interrogation into how mobile technologies can be meaningfully, fruitfully and cost-effectively used for learner support in an open schooling system within a developing country context, this should not necessarily serve as a deterrent to starting to implement mobile technology learner support initiatives. There are available some tools and guidelines that could be adapted for use within the developing world context. Such mobile technology initiatives should be investigated and developed along-side or aligned with existing moves to develop functional open schooling systems in order to make them relevant and an integral part of the whole system.

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10. Innovative practice with e-learning: A manager's planning tool for use of mobile and wireless technologies.

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# **COL Investigation into the use of Mobile Technology for Learner Support in Open Schooling**

**A brief desktop survey of initiatives using Mobile Technology for Learner Support**

**October 2008**

**Please note:**

- The following matrix was generated from information gathered during an initial desktop audit and is neither complete nor exhaustive. In the instances where there are gaps the information was not available at the time of the survey.
- The survey was done within a very limited time-frame.
- Most of the information was obtained mainly from the Internet where most discussions on mobile technology are taking place. Some information was gathered from journal and other articles.
- Four projects were selected for further investigation. Additional reports on these are found in **Appendix 3**
- All the hyperlinks listed were fully functional at the time this report was written (October 2008)

1. Project Name	<b>M4girls</b>
2. Country of implementation	Republic of South Africa
3. Targeted beneficiaries	Grade 10 girls in 2 schools in NW province (A Technical School and A Technical College)
4. Project description	Nokia 6300 cell-phones loaded with educational materials that are used to support and improve mathematics performance. Funds were also provided for training teachers and school managers in the use of ICT resources
5. Technology used	Nokia 6300 cell phones
6. Area of focus	Mathematics
7. Implementers	
8. Partnerships	Nokia, Department of Education and Mindset Network
9. Funders	Nokia – It is a community development program
10. Year of initiation	2008 (April)
11. Evaluation/Impact	No evaluation or impact has been done yet as the project is still in its infancy
12. Source of information	<ol style="list-style-type: none"> <li>1. <a href="http://www.sagoodnews.co.za/education/innovation_project_uses_cell_phones_to_teach_math_s.html">http://www.sagoodnews.co.za/education/innovation_project_uses_cell_phones_to_teach_math_s.html</a></li> <li>2. Contact Sam Mpherwane at <a href="http://www.mindset.co.za">Mindset Network</a> 0861 00 6463</li> <li>3. <a href="http://www.mydigitallife.co.za/index.php?option=com_content&amp;task=view&amp;id=1036101&amp;Itemid=42">http://www.mydigitallife.co.za/index.php?option=com_content&amp;task=view&amp;id=1036101&amp;Itemid=42</a></li> <li>4. <a href="http://www.itweb.co.za/sections/telecoms/2008/0804081343.asp?A=TEL&amp;S=Telecoms&amp;T=News&amp;O=C">http://www.itweb.co.za/sections/telecoms/2008/0804081343.asp?A=TEL&amp;S=Telecoms&amp;T=News&amp;O=C</a></li> </ol>

1. Project Name	<b>MobilEd</b>
2. Country of implementation	Republic of South Africa
3. Targeted beneficiaries	Targeted grade 11 Biology learners with the aim of supporting both formal and informal schooling. Initially Cornwall Hill College (a well resourced private school) and Irene Middle School (an under-resourced public school). Now also being trialed at Tshepagalang High School

	and Eletsa High School.
4. Project description	<p>The project was piloted at 2 Gauteng based schools (1 poor under-resourced public school and another better resourced private school) in 2006 and it is intended to extend to 3 North West province schools in 2008. The initial biology topic focused on HIV/AIDS.</p> <p>The project involves giving <b>access to information</b> in Wikipedia using low-cost mobile phones and a <b>short messaging system</b>. Learners get their <b>response through a speech synthesizer</b>. Speakers can be used to <b>share information with others</b>. The received messages <b>can be rewound</b> etc. Students <b>can dictate information to Wikipedia as an audio clip i.e. they can contribute to the generation of new information</b>.</p> <p>(For more details see Appendix 3b)</p>
5. Technology used	Cell phones (GSM, MMS, SMS) and networks; Wikipedia; social software such as Media Wiki and blogs; open source language technologies with speech interfaces, audio usage etc; open source telephony and software frameworks and platforms
6. Area of focus	Can be used across all area of focus but initially used for Biology
7. Implementers	The Meraka Institute of the CSIR
8. Partnerships	The Department of Science and Technology, The University of Arts and Design Helsinki, University of Pretoria, Meraka Institute, Tshwane University of Technology, University of Sao Paulo Brazil, Wiki-media Foundation, Nokia (in 2006)
9. Funders	Department of Science and Technology
10. Year of initiation	March 2006
11. Evaluation/Impact	Looked at outcomes from pilot in two schools, one advantaged and one disadvantaged. Wanted to determine the influence of service language on usage. Also wanted to determine effect of

	<p>technology literacy and exposure impacted on service adoption. Needed feedback from learners about needs, environments and backgrounds. They found that:</p> <ul style="list-style-type: none"> <li>• Most learners indicated that they would continue to use the service in future.</li> <li>• Most learners happy with response time of service but greater dissatisfaction levels at first school where initial start-up problems were experienced.</li> <li>• Most students felt the navigation system was easy to use.</li> <li>• Students at the disadvantaged school felt that there was sufficient time to listen to the articles whereas students at the better resourced school indicated that more time to listen would have made a difference.</li> <li>• Most learners did not like the synthesized voice.</li> <li>• Learners at Irene indicated that they would prefer the use of another language.</li> </ul> <p>Out of these observations recommendations were made on how the technology might best be used in future</p> <p>UNICEF has now installed its own MobilEd server in New York and has plans to use it as a platform for activities in developing countries.</p>
12. Source of information	<ol style="list-style-type: none"> <li>1. ScienceScope, November 2007, Science for Society: Youth and learning.</li> <li>2. <a href="http://www.csir.co.za/enews/2007_dec/ic_06.html">http://www.csir.co.za/enews/2007_dec/ic_06.html</a></li> <li>3. MobilEd - An accessible mobile learning platform for Africa? IST-Africa 2007 Conference Proceedings - Merryl Ford and Adele Botha.</li> <li>4. Also: Cell-phones as learning devices: <a href="http://www.bizcommunity.com">http://www.bizcommunity.com</a></li> <li>5. <a href="http://www.shareideas.org/index.php/MobilED_audio_wiki_in_classroom">http://www.shareideas.org/index.php/MobilED_audio_wiki_in_classroom</a></li> <li>6. <a href="http://researchspace.csir.co.za/dspace/bitstream/10204/1613/1/Van%20den%20Berg_2007.pdf">http://researchspace.csir.co.za/dspace/bitstream/10204/1613/1/Van%20den%20Berg_2007.pdf</a></li> </ol>

1. Project Name	<b>Dr Maths on MXit</b>
2. Country of implementation	RSA

3. Targeted beneficiaries	Initially was aimed at helping high school learners with their homework - started with 20 learners at one school. Now about 3000 reported to be using it country wide some from grades as low as Grade 4.
4. Project description	<p><b>Tutoring system</b> using MXit an instant messaging program and mobile phones. It has <b>call centre-like functionality</b> that runs from a client-based platform run on a PC. <b>Offers real-time support as learners can communicate with tutors via IM - English and Afrikaans.</b> MXit is a low cost instant messaging application. This setup can easily be set up by teachers in their schools.</p> <p>(See Appendix 3c for more details)</p>
5. Technology used	Mobile phones and a client based platform run from a PC
6. Area of focus	Mathematics
7. Implementers	Meraka Institute (Laurie Butgereit), University of Pretoria volunteers in the Engineering Department are used as Maths tutors
8. Partnerships	Meraka Institute and University of Pretoria
9. Funders	
10. Year of initiation	January 2007
11. Evaluation/Impact	The project does not track students because of security reasons. However due to the fact that they are unable to collect data on students, they are unable to evaluate the impact of the project. However they do have anecdotal information from students who suggest that the project has been invaluable and has improved their results.
12. Source of information	<ol style="list-style-type: none"> <li>1. <a href="http://researchspace.csir.co.za/dspace/bitstream/10204/1614/1/Butgereit_2007.pdf">http://researchspace.csir.co.za/dspace/bitstream/10204/1614/1/Butgereit_2007.pdf</a></li> <li>2. <a href="http://www.bizcommunity.com/Article/196/78/13142.html">http://www.bizcommunity.com/Article/196/78/13142.html</a></li> </ol>

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1. Project Name	<b>Using mobile technology for student support at University of Pretoria</b>
2. Country of implementation	RSA
3. Targeted beneficiaries	University of Pretoria Distance Education students
4. Project description	<p>To enhance quality of administration and academic support eg sending of general admin messages, students could send messages.</p> <p>Now also includes asynchronous academic support: questions via SMS with feedback; phone in to listen to mini lectures using interactive voice response technology; interactive multiple choice quizzes; directing to specific resources for specific tasks via SMS. SMSes classified as:</p> <ul style="list-style-type: none"> <li>• Academic – instructional</li> <li>• Academic – interactive</li> <li>• Student questions – interactive</li> <li>• IVR – mini lectures</li> <li>• Lecturer response - instructional</li> </ul> <p>SMS support is integrated into existing systems and processes of University. SMS interventions were diarized meaning that expenses can be budgeted for.</p>
5. Technology used	Mobile Phones
6. Area of focus	Student administrative and academic support

7. Implementers	University of Pretoria Unit for Distance Education (Johan Hendrikz and Jeanne Marie Viljoen)
8. Partnerships	A private service provider who provides 'free –sponsored' SMS
9. Funders	
10. Year of initiation	2002 SMS for admin, 2006 using SMS to register, 2005 use of SMS for academic purposes - using academic tools
11. Evaluation/Impact	Reported, improved throughput and decreased drop out levels. Improved administration efficiency and increased interactivity at lower cost.
12. Source of information	<p>1. Viljoen J-M, Du Preez, C and A. Cook. The case for using SMS technologies to support distance education students in South Africa  <a href="http://www.up.ac.za/dspace/bitstream/2263/1757/2/Viljoen_Case(2005).pdf">http://www.up.ac.za/dspace/bitstream/2263/1757/2/Viljoen_Case(2005).pdf</a></p> <p>2. Hendrikz, J and J-M Viljoen. The use of Mobile Phone Technology for Student Support In: An Anthology of 'Best Practices' in Teacher Education. Case Study 9 pp 88 – 95.</p> <p>3. Viljoen, J-M, Du Preez, C.B. and A. Cook. Transforming learning through technology: the case of usin SMSs to support distance students in South Africa.  <a href="http://www.learningmaterials.co.za/resources/Transforming_learning_through_technology.pdf">http://www.learningmaterials.co.za/resources/Transforming_learning_through_technology.pdf</a></p>

1. Project Name	<b>MobiDic</b>
2. Country of implementation	<b>RSA</b>
3. Targeted beneficiaries	anyone

4. Project description	<b>Access to dictionary content</b> via sms - <b>paid for R2 per sms.</b> Materials provided by Macmillan SA. Revenue generated goes to charity
5. Technology used	Mobile phones
6. Area of focus	improving language skills
7. Implementers	
8. Partnerships	SABC Education, Gauteng Economic Development Agency, Biza Telecoms
9. Funders	
10. Year of initiation	
11. Evaluation/Impact	
12. Source of information	1. <a href="http://www.sabcmobile.co.za/mobidic.htm">http://www.sabcmobile.co.za/mobidic.htm</a> 2. <a href="http://www.scienceinafrica.co.za/2005/march/mobidic.htm">http://www.scienceinafrica.co.za/2005/march/mobidic.htm</a>

1. Project Name	<b>Eduvision</b>
2. Country of implementation	Kenya
3. Targeted beneficiaries	Grade 5 pupils in rural Kenyan primary school
4. Project description	Access to satellite distributed content on handheld devices (called e-Slate) or low cost hand-held computers and laptops. E-slates contained all textbooks needed as well as a calculator, dictionary and other supplementary reading materials.

	Teachers were trained how to use e-slates and methodology prior to project start-up. Then teachers then trained students. Support from EduVision staff. EELS Training Curriculum was created specifically for classroom use.
5. Technology used	E-slates - small handheld computers connected to a wide-area, low cost content distribution network powered by digital satellite radio. Textbooks are converted into digital files and sent from the Network Operation Centre via internet to WorldSpace radio satellite and then bounced off to a base station consisting of content routing hub (a bare-bones, display-less computer with a hard disk for content storage) at the school which transmits to end-user terminals in the form of the e-slates which update automatically each morning. The entire platform is referred to as the EduVision E-learning System (EELS). Devices selected based on durability, reliability and cost. User interface is divided into 4 main sections: text; image; question; overview. Also is a toolbox that has user specific features such as text highlighting, changing text size, adding textbook notes. All sections cross-referenced but can be browsed independently
6. Area of focus	General
7. Implementers	Eduvision
8. Partnerships	
9. Funders	Biovision - a Geneva based NGO (\$55 000)
10. Year of initiation	2005
11. Evaluation/Impact	<p>Reported on at e-learning Africa 2008? Students reported e-Slates allowed them to find information better. It took staff longer to become familiar with software than their pupils. Initially e-slates were used alongside print textbooks until a level of comfort was reached with e-slate use.</p> <p>Comments from a blog posted by Jamais Cascio on Feb 28 2005 :  a) EELs does not appear to be an appropriate solution for regions with grinding poverty</p>

	<p>and war but rather for more stable developing countries.</p> <p>b) Devices may not often be stolen because they are 'locked' to specific base-stations, however they could be stolen for spare parts eg WiFi cards - this also limits the usability of the e-slates as general purpose devices.</p> <p>c) Locations are tied into one-way broadcasts from EduVision and are not connected to internet therefore no way to get feedback. (<a href="http://openfuture.com/wcarchive/2005/02/eels_for_kenya.html">http://openfuture.com/wcarchive/2005/02/eels_for_kenya.html</a>)</p> <p>Eduvision believes the system can be tailored for health workers, civil servants and farmers. They had talks with Kenya Technical teacher's College wrt to possible use for teacher training</p>
12. Source of information	<ol style="list-style-type: none"> <li>1. <a href="http://www.eduvision.or.ke/technology/tech4.html">http://www.eduvision.or.ke/technology/tech4.html</a></li> <li>2. <a href="http://www.eduvision.ch-welcome@eduvision.ch">http://www.eduvision.ch-welcome@eduvision.ch</a></li> <li>3. <a href="http://www.elearning-africa.com/newsportal/english/news80c.php">http://www.elearning-africa.com/newsportal/english/news80c.php</a></li> <li>4. <a href="http://news.bbc.co.uk/2/hi/technology/4304375.stm">http://news.bbc.co.uk/2/hi/technology/4304375.stm</a></li> <li>5. <a href="http://news.bbc.co.uk/2/hi/programmes/click_online/4727617.stm">http://news.bbc.co.uk/2/hi/programmes/click_online/4727617.stm</a></li> <li>6. <a href="http://ugandawatch.blogspot.com/2005/07/africas-digital-future-kenya-pilots_31.html">http://ugandawatch.blogspot.com/2005/07/africas-digital-future-kenya-pilots_31.html</a></li> <li>7. <a href="http://www.teleread.org/blog/2005/07/31/pocket-pcs-displaying-text-book-style-content-in-africa/">http://www.teleread.org/blog/2005/07/31/pocket-pcs-displaying-text-book-style-content-in-africa/</a></li> <li>8. <a href="http://www.eduvision.ch/en/meta/documents/1BeamingBooks.pdf">http://www.eduvision.ch/en/meta/documents/1BeamingBooks.pdf</a></li> <li>9. <a href="http://www.eduvision.ch/en/meta/documents/Developmentpoweredbyeducation.pdf">http://www.eduvision.ch/en/meta/documents/Developmentpoweredbyeducation.pdf</a></li> <li>10. <a href="http://mail.millennium.berkeley.edu/pipermail/tier/2005-March/000683.html">http://mail.millennium.berkeley.edu/pipermail/tier/2005-March/000683.html</a></li> </ol> <p>Contacts: <a href="mailto:herren@eduvision.or.ke">herren@eduvision.or.ke</a> and <a href="mailto:msudra@ambientinteractive.com">msudra@ambientinteractive.com</a> or <a href="mailto:sudra@eduvision.or.ke">sudra@eduvision.or.ke</a></p>

1. Project Name	<b>Mobile Research Supervision Initiative (MRSI)</b>
2. Country of implementation	Uganda

3. Targeted beneficiaries	Post graduate students in department of distance learning at Makerere University
4. Project description	Provision of academic and administrative student support of students in a Distance Education programme. Research supervision via cell phone - fixing of appointments with lecturers, guiding of data collection, encouraging student to student and staff to staff collaboration and communication. Guidance and support is provided for final year students doing their research project. Use of voice and text increases the 'availability' (physical and virtual) of the research supervisor
5. Technology used	Mobile phones, software
6. Area of focus	Student Research
7. Implementers	Dept of Distance Learning Makerere University
8. Partnerships	
9. Funders	None – self funded by individuals carrying costs
10. Year of initiation	2005-2006 academic year
11. Evaluation/Impact	<p>Muyinda, Lynch and Lubega (2007) reported that:</p> <ul style="list-style-type: none"> <li>• Voice and text collaboration helped minimize the perceived negative impact of lack of face-to-face interaction and encouraged the development of a personal touch between research students and their supervisors because: <ul style="list-style-type: none"> <li>○ A virtual community of practice amongst students and their supervisors was created</li> <li>○ Lonely distance learners were motivated</li> <li>○ Students felt cared for</li> <li>○ It bred intimacy amongst the alumni and their institution</li> </ul> </li> <li>• There was increased throughput with more students successfully completing their projects in the statutory time frame of 5 months. Those who did not collaborate using cell-phones took longer i.e. 7 months and longer</li> </ul>

12. Source of information	<p>1. <a href="http://www.elearning-africa.com/newsportal/english/news107.php">http://www.elearning-africa.com/newsportal/english/news107.php</a></p> <p>2. <a href="http://cit.ac.ug/downloads/ICT_Complete_book_2008.pdf">http://cit.ac.ug/downloads/ICT_Complete_book_2008.pdf</a> (pp 359-376: Muyinda, P.B. Lynch, K and J.T. Lubega (2007) Mobile Research Supervision Initiative (MRSI) at Makerere University: Lessons to Learn)</p> <p>(See Appendix 4)</p>
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1. Project Name	<b>Mobi Maths</b>
2. Country of implementation	RSA
3. Targeted beneficiaries	Grade 10 to 12 scholars - but Grade 8 and 9 learners can benefit from the "basic skills" section
4. Project description	<p>Allows users to chat, (Mobi chat) listen to music (Mobi radio) and learn maths (mobi maths). The software is downloaded and installed for free on mobile phones and is tailored for the SA curriculum.</p> <p>The application can connect to an online server via a mobile wireless protocol such as 3G or GPRS - then gives access to MOBI Maths, MOBI Chat and MOBI radio. Maths available in 4 modes - Basics, theory, examples and exercises. Full access to MOBI maths - a nominal monthly fee of R30 but some sections e.g. "basic skills" is free - ie designed with affordability in mind.</p> <ul style="list-style-type: none"> <li>• Application can carry out diagnostic processes using MOBI assessor which tests and then assigns students to areas of weakness for revision.</li> <li>• Basic skills - aimed at filling gaps from previous years.</li> <li>• Theory - focuses on grade specific content.</li> <li>• Exercise - allows students to assess depth of knowledge by letting them try to solve problems before accessing the solutions offered. It's for exam and test preparation. Also has a previous papers section.</li> </ul>

	Available in English or Afrikaans. Can also load software on a pc.
5. Technology used	<p>Runs on mobile phones or PCs, can be downloaded and installed for free. Then can connect to an online server via a mobile wireless protocol such as 3G or GPRS</p> <p>Mobi can be accessed from a PC with internet access (<a href="http://www.mymobi.co.za">www.mymobi.co.za</a>) or through most Java-enabled mobile phones with wireless protocols such as GPRS or 3G. It can be downloaded for free and the user gains access to Mobi maths, Mobi chat and Mobi radio.</p> <p>The content has been developed with the specific needs and limitations of mobile phones in mind. The result being some dead space on a PC screen but an adequately functional display on the limited screen of a mobile phone.</p>
6. Area of focus	Mathematics
7. Implementers	IT School Innovation (a private company) - J Liebenberg (012-8072045) or (082 564 9668)
8. Partnerships	
9. Funders	None, sold for profit by IT School Innovation
10. Year of initiation	2007
11. Evaluation/Impact	None available as yet
12. Source of information	<ol style="list-style-type: none"> <li>1. <a href="http://ict4champions.blogspot.com/2007/06/mobi-world-first-for-mobile-maths.html">http://ict4champions.blogspot.com/2007/06/mobi-world-first-for-mobile-maths.html</a></li> <li>2. <a href="http://www.mg.co.za/article/2007-08-01-mobile-education">http://www.mg.co.za/article/2007-08-01-mobile-education</a></li> <li>3. <a href="http://www.itschools.co.za">http://www.itschools.co.za</a></li> <li>4. <a href="http://www.mymobi.co.za">http://www.mymobi.co.za</a></li> </ol>

1. Project Name	<b>Mobile Technology in teaching and learning at Salisbury College</b>
2. Country of implementation	UK
3. Targeted beneficiaries	16 to 18 year old learners
4. Project description	<p>Salisbury College in the UK is a further and higher education college with around 7,000 full and part time students.</p> <p>Using cell-phones to: inform students about support and advice after issuing of exam marks; text-back facility for job enquiries; invite students to pre-course assessments; contact students at risk; keeping deaf students informed; keep students informed about external talks about sexual health, drugs etc</p> <p>Support for the initiative was provided by the Association for Learning and Teaching (ALT); Leading learning and Skills ; LSN; Quality Improvement Agency (QIA)</p>
5. Technology used	Mobile phones, text and phone calls - a sms service that converts message to email seen by administrators. System can also send images to student phones that are compatible
6. Area of focus	Student administrative support
7. Implementers	Salisbury College
8. Partnerships	
9. Funders	LSDA Q Project Initiative but now funded by departments that contribute to costs
10. Year of initiation	Not known
11. Evaluation/Impact	1. Benefits were mainly because of increased speed of communication and ability to contact

	<p>students and track them quickly</p> <p>2. Financial savings were made where texts had been sent instead of a letter.</p>
3. Source of information	1. <a href="http://www.alt.ac.uk/docs/salisburyv3.pdf">http://www.alt.ac.uk/docs/salisburyv3.pdf</a>

1. Project Name	<b>Digital Education Enhancement Programme (DEEP)</b>
2. Country of implementation	Egypt and RSA
3. Targeted beneficiaries	Primary school teachers and students (over 2000) in 24 schools (12 in each country). Two teachers from each school were involved (a total of 48).
4. Project description	<p>Aimed at impacting on teacher's pedagogy and practice. Teachers used various technologies and handheld computers; a variety of professional development activities created as e-books, videos, audio-clips, web links and class room resources were provided.</p> <p>Project purpose: to inform policy makers, educational researchers and others in ways in which new forms of technology can enhance teachers' capabilities and improve knowledge and professionalism.</p> <p>Research questions:</p> <ul style="list-style-type: none"> <li>• What is the impact of ICT use on the pedagogic knowledge and practice of teachers and the communities in which they live and work?</li> <li>• What is the impact of ICT enhanced teaching on student achievement and motivation?</li> <li>• How can teacher education and training be developed to ensure that teachers have the capacity to exploit the potential of ICT?</li> </ul>
5. Technology used	Various technologies and hand-held computers - initially used the HP Jornada 565 Pocket PC. Then the iPAQ (Pocket Excel, pocket Word, Pocket MSN, iTask, Outlook, Microsoft Reader,

	Calculate, Games, iPAQ Image Zone)
6. Area of focus	The teaching of literacy, numeracy and science.
7. Implementers	University of Fort Hare. Open University
8. Partnerships	Open University, University of Fort Hare, Programme Planning and Monitoring Unit (Egypt), TESSA
9. Funders	DFID
10. Year of initiation	
11. Evaluation/Impact	<p>Leach, Ahmed, Makalima and Power (2006) reported that:</p> <ul style="list-style-type: none"> <li>• ICT use enhance teachers' professional knowledge and capability</li> <li>• All teachers introduced ICT into planned lessons with their classes and there was wide—ranging evidence of positive outcomes</li> <li>• The majority of teachers were highly motivated to succeed in using ICT for their own and for their student's learning despite numerous challenges</li> <li>• The nature and uses of ICT varied according to context, particularly with respect to: teachers' access to adjacent technologies; geographical location; local educational and cultural practices; home language; teachers' subject specialisms.</li> <li>• ICT facilitated new forms of teacher-to-teacher cooperation.</li> <li>• There was no significant correlation between teachers' prior use of ICT and the ICT-enhanced classroom practices they developed during the programme.</li> <li>• There were more women participants than men; successful outcomes were equally visible for both men and women.</li> <li>• Students in both contexts quickly developed confidence in using desktop/lap-top and hand-held computers for a range of purposes.</li> <li>• Students used ICT to carry out a range of literacy, numeracy and scientific activities and the following outcomes: high levels of motivation in using ICT within and outside of lessons; improvements in literacy and science learning were reported by students, teachers and parents; there was an increase in school attendance</li> </ul>

- Majority of teachers reported using the hand-held computers on a regular basis for a variety of functions including classroom activities
- Where mother tongue interfaces or software were not available this limited effective uses of ICT for both professional and personal purposes.
- Existing cost analyses of ICT use for teacher education in developing contexts are likely to be inflated because they are based on outmoded forms and uses of ICT
- Educational uses of ICT must be strongly grounded in educational and pedagogic principles, employ quality resources and ensure that professional support is paramount.

Policy implications:

- Policy planning for the development of national systems of teacher education should explicitly recognize the increasingly important role of ICT and its potential for increasing access and improving quality.
- ICT policy and practice need to be closely matched to local contexts and needs, with a particular focus on classroom relevance and learner achievement
- The potential of new, mobile technologies needs further investigation in a wider range of contexts and purposes
- Further evidence is urgently required as to the way in which new forms of technologies, particularly mobile technologies, can impact on the logistics/costs of ICT provision for teacher education

A number of principles were deemed necessary to determine the quality of ICT-enhanced school-based teacher education in developing contexts these include:

- personal access to ICT;
- ICT appropriate to local setting and conditions;
- opportunity to integrate ICT activity into daily routines and practices;
- use of ICT-supported peer and team learning;
- focus on ICT for curriculum and classroom purposes, not skills;
- availability of relevant content in an appropriate language medium;
- provision of local, national and international professional e-networks;
- assessment practices relevant to ICT-enhanced learning;

	<ul style="list-style-type: none"> <li>• user evaluations of the relevance of ICT hardware, software and related curriculum uses for learning;</li> <li>• strong vision of the potential of ICT for learning from national ministries and educational policy makers;</li> <li>• visible political determination to plan for ICT access by schools and their communities, ensuring synergy across and</li> <li>• between adjacent services (e.g. education, healthcare, agriculture);</li> <li>• Research and development that strengthen exemplification of the way ICT can be effectively used by teachers and students, in order that evidence, rather than rhetoric, becomes the authority.</li> </ul>
12. Source of information	<ol style="list-style-type: none"> <li>1. <a href="http://receiver.vodafone.com/mobile-learning-in-developing-countries">http://receiver.vodafone.com/mobile-learning-in-developing-countries</a></li> <li>2. <a href="http://www.mlearn.org.za/CD/papers/Jenny%20Leach%20-%204D%20Technologies.pdf">http://www.mlearn.org.za/CD/papers/Jenny%20Leach%20-%204D%20Technologies.pdf</a></li> <li>3. <a href="http://www.open.ac.uk/deep/Inkanyezi/web/">http://www.open.ac.uk/deep/Inkanyezi/web/</a></li> <li>4. <a href="http://www.open.ac.uk/deep/Public/web/index.php">http://www.open.ac.uk/deep/Public/web/index.php</a></li> <li>5. <a href="http://www.open.ac.uk/deep/Public/web/publications/core.html">http://www.open.ac.uk/deep/Public/web/publications/core.html</a></li> <li>6. <a href="http://www.open.ac.uk/deep/Public/web/publications/pdfs/JLeach2005-DSAAC.pdf">http://www.open.ac.uk/deep/Public/web/publications/pdfs/JLeach2005-DSAAC.pdf</a></li> <li>7. <a href="http://www.open.ac.uk/deep/public/web/publications/pdfs/ReportExecSumm2006.pdf">http://www.open.ac.uk/deep/public/web/publications/pdfs/ReportExecSumm2006.pdf</a></li> </ol>

1. Project Name	<b>Dunia Moja Project</b>
2. Country of implementation	Tanzania, Uganda and RSA
3. Targeted beneficiaries	University students on distance learning programs (post and under-graduate).
4. Project description	Students in Africa collaborate via cell-phone with students at Stanford. Can watch or listen to presentations loaded on their mobile phones. Also have access to a moblog which is an online interface which sends postings to mobile phones. Students can also view their materials on a CD. They can text, send images and make phone calls whilst class is in session. Can debate

	issues through internet and mobile technology interactions as well as have exposure to leading experts. Students share course materials, exchange info, contribute course content and help design collaborative activities
5. Technology used	mobile smart phones with video cameras, audio recorders and internet capability (Ericsson and Sony Ericsson) - also have memory chips containing videos and PowerPoint presentations that they can watch or listen to
6. Area of focus	International Environmental Issues
7. Implementers	Makerere University, University of the Western Cape, Mweka College of African Wildlife
8. Partnerships	Ericsson and Sony Ericsson; Stanford University, Makerere University, University of the Western Cape, Mweka College of African Wildlife
9. Funders	
10. Year of initiation	2007
11. Evaluation/Impact	Initial indications are that the moblog helped students dispel some misconceptions and stereotypes and lead to broadened perspectives
12. Source of information	<ol style="list-style-type: none"> <li>1. <a href="http://www.bizjournals.com/eastbay/stories/2007/07/02/daily27.html">http://www.bizjournals.com/eastbay/stories/2007/07/02/daily27.html</a></li> <li>2. <a href="http://daily.stanford.edu/article/2007/7/19/duniaMojaProjectBridgesContinents">http://daily.stanford.edu/article/2007/7/19/duniaMojaProjectBridgesContinents</a></li> <li>3. <a href="http://duniamoja.stanford.edu/Welcome.html">http://duniamoja.stanford.edu/Welcome.html</a></li> </ol>

1. Project Name	<b>Mobile E-Learning for Africa (MELFA)</b>
2. Country of implementation	Republic of South Africa

3. Targeted beneficiaries	Building and Construction workers
4. Project description	Provision of complementary literacy and skills training to building and construction workers with reading difficulties. Work in progress
5. Technology used	Innovative interactive technologies, including OCR, text-to-speech, speech translation, 3-D graphical illustration and m-learning
6. Area of focus	language/reading
7. Implementers	CatchWord Language and Speech Technologies (RSA), Motto-Captura ApS(Denmark), Sensus ApS, University of Copenhagen,
8. Partnerships	CatchWord SA – developing a Xhosa text-to-speech application, Motto-Captura Denmark – developed the application that changes pictures into words, Sensus ApS, University of Copenhagen, the Danish Building research Institute, The Master Builder's and Allied Trades Association- Western Cape, TJEKA Training
9. Funders	DANIDA
10. Year of initiation	2007
11. Evaluation/Impact	
12. Source of information	1. <a href="http://www.melfaproject.net/intranet/?q=node/37">http://www.melfaproject.net/intranet/?q=node/37</a> 2. <a href="http://www.melfaproject.net/intranet/?q=node/39">http://www.melfaproject.net/intranet/?q=node/39</a> 3. <a href="http://www.melfaproject.net/intranet/?q=node/41">http://www.melfaproject.net/intranet/?q=node/41</a>

1. Project Name	<b>Digital Doorways</b>
2. Country of implementation	Republic of South Africa

3. Targeted beneficiaries	People in rural communities
4. Project description	<p>The project seeks to verify results of the Indian “hole in the wall” initiative. It uses a minimally invasive model allowing for self teaching of computing skills plus communication via chat program. It provides 24 hour access to multi-terminal media computers that provide access to various applications and communication. Seeks to help students in absence of teachers.</p> <p>Uses Open Source Software. Each installation is customizable, replicable, upgradeable and sustainable. Also investigated aspects such as: locally relevant language modules, cultural significance of graphics and icons, significance of computer terminology in a multilingual environment.</p> <p>Also developed and deployed a multi-media story-authoring tool called “Storymaker” that is deployable on a number of operating systems. The application is linked to a database of phrases and words used in a number of African languages – user can select language of preference. Characters, objects and sounds also translated into a number of languages. Story can be played back in one language with sub-titles in another language. Uses MySQL database (an open source one).</p> <p>User content was obtained from a variety of open source sites and included:</p> <ul style="list-style-type: none"> <li>• Science software</li> <li>• Geography</li> <li>• Mathematics</li> <li>• Puzzles</li> <li>• Encyclopedia</li> <li>• Office Suite</li> <li>• Music programs</li> <li>• Paint Programs</li> <li>• Educational games</li> <li>• Agriculture information</li> <li>• Storymaker</li> </ul>

	<p>Project seeks to encourage users to give something back to the community through content creation and sharing. This was to be further encouraged by the introduction of community notice boards and open source programming environments. Also planned content delivery via satellitecasting.</p>
5. Technology used	<p>Kiosks, with wireless networks. Are 4 configurations:</p> <ul style="list-style-type: none"> <li>• 3 terminal system – server running “Xubuntu Linux” and two ‘fat clients’ without hard-drives that run off server for file access. Enclosed in a steel enclosure metal keyboards and LCD screens, webcams, speakers and UPS. System is vandal-proof.</li> <li>• 4 terminal system – same as above but terminal has four sides and has internet connectivity provided by various means e.g GPRS</li> <li>• Accessible system for the disabled – has two terminals adapted for wheelchair access and has grab handles as well as joysticks instead of a mouse (in some instances). Specially adapted software.</li> <li>• Single terminal system – seats one and has LCD screen, keyboard, touch-pad and GPRS internet connectivity. Server has ability to do video capture.</li> </ul> <p>Used an open source platform for the following reasons:</p> <ul style="list-style-type: none"> <li>• Savings by eliminating costs of purchasing and licensing of proprietary software</li> <li>• Alignment with the government’s drive for OS awareness</li> <li>• Need for skills development in OS operating systems</li> <li>• Multilingual capabilities of OS software</li> <li>• Stability of operating system</li> <li>• Suitability for remote management</li> </ul> <p>Use video surveillance to provide inputs with regards to monitoring and evaluation</p>
6. Area of focus	General self education
7. Implementers	
8. Partnerships	<p>Department of Science and Technology, Meraka Institute (CSIR) (Contact: Ronel Smith - <a href="mailto:rsmith2@csir.co.za">rsmith2@csir.co.za</a>)</p>

9. Funders	
10. Year of initiation	December 2002
11. Evaluation/Impact	<p>Use of open source as compared to proprietary software:</p> <ul style="list-style-type: none"> <li>• Found that there were some associated disadvantages to using open source as it required some experience to configure and customize a Linux system.</li> <li>• Absence of adequate drivers for certain hardware limited the availability of educational content</li> <li>• The fear that users familiar with Linux might struggle to adjust to a different computer environment</li> </ul> <p>However, in general findings are that the benefits of open source software far outweigh the disadvantages.</p> <p>Grobler (2004) reported that: users ranged from 10 to 65 years of age. Users were almost always male. Children in groups of 4 to 10 were the most common users for up to an hour at a time. Adults used the facilities in the early mornings or late afternoons. She reported increased confidence o use over time and that usage tended to become more structured and directed to what was wanted. It was concluded that both objectivist (direct instruction from peers) and constructivist learning took place both individually and in groups.</p> <p>Another study looked at how the Digital Doorway accommodates teaching and learning from an objectivist/constructivist perspective based on Cronjé's four quadrants of teaching and learning. He found that the Digital Doorway can accommodate teaching from both perspectives.</p> <p>Many kiosks continue being installed all over South Africa.</p>
12. Source of information	<ol style="list-style-type: none"> <li>1. <a href="http://www.digitaldoorway.org.za/index_main.php?do=concept">http://www.digitaldoorway.org.za/index_main.php?do=concept</a></li> <li>2. <a href="http://www.digitaldoorway.org.za/index_main.php?do=hardware">http://www.digitaldoorway.org.za/index_main.php?do=hardware</a></li> <li>3. <a href="http://www.digitaldoorway.org.za/publications">http://www.digitaldoorway.org.za/publications</a></li> </ol>

	<a href="http://www.digitaldoorway.org.za/publications">http://www.digitaldoorway.org.za/publications</a> 4. Grobler, R (2004) "The digital doorway Project in Mamelodi", dissertation submitted in partial fulfillment of the requirements for the MEd (CIE), University of Pretoria, Pretoria 5. <a href="http://www.up.ac.za/dspace/bitstream/2263/1881/1/Cronje_Learning(2006).pdf">http://www.up.ac.za/dspace/bitstream/2263/1881/1/Cronje_Learning(2006).pdf</a>
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Project Name	<b>Hole in the Wall Project</b>
Country of implementation	India
Targeted beneficiaries	School children aged 8 to 14
Project description	A computer kiosk with internet connectivity was installed in the boundary wall of the NIIT Ltd's offices and was turned on without any announcement or instruction. A video camera was installed to monitor activity in an around the kiosk. Uses a minimally invasive exploratory learning model by giving access to computer technology with no prior training. Idea was to see how children would respond to exposure to computers and whether they could achieve computer literacy on their own.
Technology used	A kiosk containing a computer, a colour monitor and touchpad with internet connectivity (2Mbps). Used Windows NT operating system. A video camera was set up separately to monitor activity at the kiosk.
Area of focus	
Implementers	NIIT Ltd
Partnerships	
Funders	
Year of initiation	January 1999
Evaluation/Impact	<p>Found that children were acquiring functional computer literacy by sharing their knowledge with each other. They can learn irrespective of who or where they are. They also developed their own language for working on the computer. For example:</p> <ol style="list-style-type: none"> <li>1. The kiosk was used immediately by children aged between 5 and 16.</li> <li>2. The children learnt basic operations of the PC for browsing and drawing within a few days</li> <li>3. adults did not make any attempt to learn or use the kiosk</li> <li>4. MS Paint and Internet Explorer were the most commonly used applications</li> </ol>

	<ol style="list-style-type: none"> <li>5. Children formed impromptu classes and taught each other</li> <li>6. Children invented their won vocabulary to define computer terms</li> <li>7. within a month the children were able to discover and use features such as: new folder creation; cutting and pasting; shortcut creation; moving/resizing windows and using MS word to create short messages even without a keyboard</li> </ol> <p>In one district in India 103 children across three villages were administered the curricular examination for “Computer Science” at Grade 8 level. Children who had learnt at the kiosks were able to complete the exam without being taught the subject and scored only marginally lower than those taught in school.</p> <p>In another study, the impact of the kiosks on performance scores of 161 13-14 year old learners in English, Science and Mathematics were examined. They found that frequent users scored better than infrequent users of the kiosks with frequent users scoring significantly higher in Mathematics. However this was not the case with scores for English and Science. This was possibly due to the fact that these subjects tended to be rote-learned and needed answering in a prescribed manner and format that the software on the kiosk could not relate to. Also it is possible the content on these subjects was not relevant to the content knowledge expected of the curriculum.</p> <p>Recently replicated in Uganda (November 2007) funded by Commonwealth Connects and Government of India</p>
Source of information	<ol style="list-style-type: none"> <li>1. <a href="http://www.ncl.ac.uk/holeinthewall.html">http://www.ncl.ac.uk/holeinthewall.html</a></li> <li>2. <a href="http://www.hole-in-the-wall.com/docs/paper07.pdf">http://www.hole-in-the-wall.com/docs/paper07.pdf</a></li> <li>3. <a href="http://www.thecommonwealth.org/news/172670/201107cwconnects.htm">http://www.thecommonwealth.org/news/172670/201107cwconnects.htm</a></li> <li>4. <a href="http://www.newvision.co.ug/D/9/586/598124">http://www.newvision.co.ug/D/9/586/598124</a></li> <li>5. <a href="http://timesofmalta/articles/view/20071126/local/hardly-a-hole-in-the-wall">http://timesofmalta/articles/view/20071126/local/hardly-a-hole-in-the-wall</a></li> <li>6. Parimala Inamdar, 2004. Computer skills development by children using ‘hole in the wall’ facilities in rural India. <i>Australasian Journal of Educational Ttechnology</i>, 20(3), pp 337-350.</li> <li>7. Parimala Inamdar, 2007. “Hole in the Wall” Computer Kiosks foster mathematics</li> </ol>

	achievement – a comparative study. <i>Educational Technology and Society</i> , 10(2) pp 170-179.
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Project Name	<b>Math4Mobile</b>
Country of implementation	Israel
Targeted beneficiaries	
Project description	<p>Applies the attributes, abilities and functionality of cellular phones to the educational setting taking into consideration their usage, spread, cultural attitudes, needs, current functions and technological aspects. The model allows student to learn anytime, anywhere, with any media. Mobility, availability and flexibility are key to the project. There are 5 applications:</p> <ol style="list-style-type: none"> <li>1. Fit2Go is a linear function quadratic function graphing tool and curve fitter. Allows students to view a phenomenon, identify variables, conduct experiments and take measurements in order to construct models</li> <li>2. Sketch2Go is a tool for constructing qualitative graphs. Together with Fit2Go it forms a comprehensive view on models and modeling.</li> <li>3. Graph2Go is a special purpose graphing calculator which operates for given sets of functions' expressions.</li> <li>4. Quad2Go is a tool that offers ways of learning quadrilaterals by generating examples, observing and experimenting with examples.</li> <li>5. Solve2Go supports the solving of equations and inequalities via conjectures based on visual thinking.</li> </ol>
Technology used	<p>5 Java applications that are designed to encourage intuitive learning of mathematical concepts using mobile phones.</p> <p>Midlets were developed using Java Mobile Edition language (J2ME) and the free Netbeans environment. Midlets were initially tested on Nokia 6680. Use the TinyLine @D SDK toolkit to enable use of device independent fonts.</p>
Area of focus	Mathematics

Implementers	Institute of Alternatives in Education, Faculty of Education, University of Haifa (contact person: Arik Weizman - <a href="mailto:arik@arikv.com">arik@arikv.com</a> )
Partnerships	Netbeans, Eurocom, University of Haifa
Funders	Is a University funded project
Year of initiation	
Evaluation/Impact	
Source of information	<ol style="list-style-type: none"> <li>1. <a href="http://www.math4mobile.com/development">http://www.math4mobile.com/development</a></li> <li>2. <a href="http://zimbio.com/member/denizusar/articles/339544/Mobile+Education">http://zimbio.com/member/denizusar/articles/339544/Mobile+Education</a></li> </ol>

Project Name	<b>SEMA</b>
Country of implementation	Kenya
Targeted beneficiaries	Primary school teachers in an in-service distance learning program
Project description	Provision of support to primary school teachers in an in-service distance learning program. Provided a secure free managed messaging service that connected teachers and officials in local clusters to provide study support around materials and encouraged group chats around current topics. Access given to registered users only. Also used print, video, radio and audio materials. Involved departmental officials too.
Technology used	Mobile phones
Area of focus	student academic support and communication
Implementers	Government of Kenya and DFID

Partnerships	
Funders	
Year of initiation	2006
Evaluation/Impact	About 8000 registered users with about 85% active. In the region of 250 000 sms generated during field trials. Has also resulted in development of system for parents to check on their children's registrations for tests.
Source of information	1. <a href="http://www.receiver.vodafone.com/mobile-learning-in-developing-countries">http://www.receiver.vodafone.com/mobile-learning-in-developing-countries</a>

Project Name	<b>MOOP</b>
Country of implementation	Finland
Targeted beneficiaries	primary school learners - best for those aged 10 -12
Project description	Use of mobile phone to analyze surroundings and to communicate within groups. Encourages inquiry learning and creative problem solving. Learner-centred collaborative learning that is teacher supported.
Technology used	An interactive m-learning environment with an interface that allows the collection of media from mobile phones with GPS and shares it through real-time data connection to a server and the www environment. Uses Symbian (S60) platform technology. Digital data (text, photo, video and audio) is collected and transmitted to a server address using GPRS/3G. Students can also search the task, messages and notes made by the teacher or other pupils. Teacher had access to admin tools that can edit, plan routes and tasks, can move student work to where it can be made accessible to others. There is a push to talk facility allowing direct voice communication.

	Key elements of MOOP: tools for observation; GPS location technology; push to talk function
Area of focus	General education
Implementers	
Partnerships	
Funders	EU (EAKR-Program) and City of Oulu, Finland
Year of initiation	2004 with a class of 25 pupils and then repeated in 2005 with 3 classes and then 1000 novices
Evaluation/Impact	Pedagogical testing and development included 3 teachers. 1000 pupils used and tested the system. Users have found the system to be motivating, encouraging and "cool" and expressed enjoyment of working in this way. Students also have learnt to take responsibility for their observations and are sensitive to ethical issues - and have developed a sort of "mobile etiquette". Has encouraged successful cooperative learning and knowledge building. Teacher creates learning situations to be solved by students through their own planning, actions and reasoning.
Source of information	1. <a href="http://www.mlearn.org.za/CD/papers/Mattila.pdf">http://www.mlearn.org.za/CD/papers/Mattila.pdf</a>  Contacts: P Mattila. <a href="mailto:Pasi.mattila@ope.ouka.fi">Pasi.mattila@ope.ouka.fi</a> and T Fordell <a href="mailto:timo.fordell@ope.ouka.fi">timo.fordell@ope.ouka.fi</a>

Project Name	<b>Open Knowledge Network</b>
Country of implementation	Kenya
Targeted beneficiaries	Marginalized and poor communities
Project description	Has a series of projects that involve transfer of information via sms on issues such as HIV/AIDS prevention and control; tips to pregnant women; health management; nutritional advice. Subscribers charged a small fee.
Technology used	mobile phones

Area of focus	Information transfer
Implementers	
Partnerships	
Funders	
Year of initiation	
Evaluation/Impact	
Source of information	<ol style="list-style-type: none"> <li>1. <a href="http://arnic.info/workshop05/Adeya_WirelessDev_Sep05.pdf">http://arnic.info/workshop05/Adeya_WirelessDev_Sep05.pdf</a></li> <li>2. <a href="http://www.kiwanja.net/database/document/report_wireless_development_africa.pdf">http://www.kiwanja.net/database/document/report_wireless_development_africa.pdf</a></li> <li>3. <a href="http://www.it46.se/courses/ict4sd/2008/projects/ICT4SD_manica_vescovi.pdf">http://www.it46.se/courses/ict4sd/2008/projects/ICT4SD_manica_vescovi.pdf</a></li> </ol>

Project Name	<b>Bridgelt</b>
Country of implementation	Initially the Philippines but now other countries too including Tanzania
Targeted beneficiaries	Primary school children (grades 5 and 6) and Primary school teachers
Project description	<p>It is an intervention strategy for improving teaching of English, Maths and Science in grades 5 and 6. Curriculum delivery is determined and controlled by the Department of Education. Focus is on scaleability, sustainability and replicability. Aim was to merge high technology methods with basic education needs.</p> <p>Teachers in remote areas in developing countries receive training and are able to access state of the art learning materials by sending a sms to a satellite that then delivers digital content to a classroom TV via a video machine. High quality content delivered for the cost of a cell-phone sms. There are in the region of 900 multimedia educational resources available including 480 lesson plans, 370 Science, Maths and English videos.</p> <p>Objectives of programme in Tanzania:</p> <ul style="list-style-type: none"> <li>• Increase learning gains among std 5 and 6 students (especially girls)</li> <li>• Improve teacher performance</li> </ul>

	<ul style="list-style-type: none"> <li>Launch, expand and integrate BridgeIt into the education system at low cost</li> </ul>
Technology used	Each school gets a satellite dish, 29" TV, a 40Gb video server/recorder plus two or three mobile phones TV runs on either a car battery or electricity, classroom terminal stores retrieved material for later use.
Area of focus	A variety of subjects including Peace Education – in Philippines Maths, Science and Life Skills – in Tanzania
Implementers	SEAMEO-Innotech is overall project coordinator for lesson development, training, monitoring and linkages in Philippines. In Tanzania – International Youth Foundation with Tanzania Ministry of Education and Vocational training, the Forum for African Women Educationists, Nokia Corporation and Pearson Foundation
Partnerships	In Philippines: International Youth Foundation, Nokia, Pearson plc, UNDP, SEAMEO Innotech and local partners e.g. Departments of Education, Globe Telecoms, USAID (ELSA project), Ayala Foundation, PMSI Dream Broadcasting, Chikka Asia  In Tanzania: International Youth Foundation with Tanzania Ministry of Education and Vocational training, the Forum for African Women Educationists, Nokia Corporation and Pearson Foundation
Funders	Nokia, USAID, Globe Telecoms in Philippines USAID in Tanzania (\$2 000 000)
Year of initiation	2003 in the Philippines under the name text2teach. Was to be implemented in Tanzania in 2007 but now pilot to start in 2009
Evaluation/Impact	<b>Shareideas.org reports</b> that academic performance improved when compared to control group. Programme has benefited 122 000 5th and 6th grade pupils and trained 920 teachers.

	<p>Decreased absenteeism reported by <b>University of Philippines</b>. Also was reported that teacher-pupil and pupil-pupil interactions were increased. <b>Philippines national institute for science and mathematics education development</b> credited the programme with improving teacher's competence and attitudes in using technology and encouraging officials, community leaders and parents to support technology enhanced lessons. Student's performance and attitudes toward science and technology improved significantly. These have contributed to programme expansion each year.</p> <p>Videos are foreign as come from Pearson plc however SEAMEO-Innotech has started producing local ones. Costs involved limit its spread. Considered by some to be a philanthropic endeavour. Programme received two awards in 2004 and another in 2006.</p>
Source of information	<ol style="list-style-type: none"> <li>1. <a href="http://www.shareideas.org/index.php/Bridgeit: Using Mobile Technology to Improve Educational Opportunities">http://www.shareideas.org/index.php/Bridgeit: Using Mobile Technology to Improve Educational Opportunities</a></li> <li>2. <a href="http://pdf.usaid.gov/pdf_docs/PDACK830.pdf">http://pdf.usaid.gov/pdf_docs/PDACK830.pdf</a></li> <li>3. <a href="http://ncomprod.nokia.com/A41003043">http://ncomprod.nokia.com/A41003043</a></li> <li>4. <a href="http://www.newsflash.org/2004/02/si/si002009.htm">http://www.newsflash.org/2004/02/si/si002009.htm</a></li> <li>5. <a href="http://www.pearsonfoundation.org/pg5.1.html">http://www.pearsonfoundation.org/pg5.1.html</a></li> </ol>

Project Name	<b>Mlearner Mobile</b>
Country of implementation	RSA
Targeted beneficiaries	High school students with access to cell-phones
Project description	Students can use mobile phones to access practice questions for maths and science. Can also do MCQ tests and get feed back. Have chat rooms so can communicate with others as well as teachers
Technology used	cell phones, interactive website, mobile browser (Operamini)

Area of focus	Maths and Science
Implementers	3 Durban based School teachers
Partnerships	
Funders	
Year of initiation	
Evaluation/Impact	
Source of information	<p>1. <a href="http://www.mlearner.co.za/index.htm">http://www.mlearner.co.za/index.htm</a></p> <p>(See Appendix 3a)</p> <p>Contact Person:</p> <p><b>Sihle Nzimakwe</b>  <b>Manager:</b>  Liason  Strategic Planning  International Affairs</p> <p><b>Contact Us</b>  P.O. Box 1245  Wandsbeck  Durban  South Africa  3631</p> <p>Fax:(031) 266 7678  Email: <a href="mailto:info@actc.mobi">info@actc.mobi</a></p>

Project Name	<b>One World M4G (Mobile for Good) project</b>
Country of implementation	Kenya
Targeted beneficiaries	<ul style="list-style-type: none"> <li>• Bottom-of-the-Pyramid (BOP) consumers - generally defined as the low income segment of the population that lives on less than 2 USD a day;</li> <li>• Consumer groups outside the BOP who have greater disposable income and to whom revenue-generating, premium priced services can be provided which enables M4G to subsidize the services offered to the BOP.</li> </ul>
Project description	<p>Information services focused on areas such as:</p> <p><b>Jobs</b></p> <ul style="list-style-type: none"> <li>• Kazi560: Kazi560 is a job information service aimed at blue-collar workers and employers, for which job-seekers pay 7 Kenyan Shilling (Ksh) per SMS received during the pilot phase. It offers jobs in more than 40 categories from carpenters to secretaries.</li> </ul> <p><b>Health</b></p> <ul style="list-style-type: none"> <li>• Health Tips: The Health Tips service is designed to provide subscribers with useful tips on various pertinent health issues for a nominal fee of 7 Ksh per SMS received.</li> <li>• MyQuestion: MyQuestion is a service, which has been developed to allow customers to anonymously ask HIV/AIDS and Breast Cancer related questions and receive answers for a price of 7 Ksh per question and 7 Ksh per answer.</li> </ul> <p><b>Lifestyle</b></p> <ul style="list-style-type: none"> <li>• Her560: Her560 is a lifestyle channel aimed at professional women, providing information on health, diet, fitness, fashion, family, finance, events, etiquette, motivation, romance and the home. One-off tips and subscriptions are available, all charged at 7 Ksh per SMS.</li> </ul>

	<b>Community</b> <ul style="list-style-type: none"> <li>Community News: The Community News service is distributed free to subscribers in Kibera, Kangemi, Kawangware, Mathare and Mukuru. It provides a channel for sending out information on events in the community.</li> </ul>
Technology used	Cell phones
Area of focus	HIV/AIDS, health, lifestyle, jobs
Implementers	OneWorld, Vodafone, Safaricom
Partnerships	OneWorld, Safaricom (mobile operator), Mobile Planet (mobile platform)
Funders	Vodafone
Year of initiation	2003
Evaluation/Impact	Now a franchise scheme the company has reportedly reached breakeven point with annualized revenues of US\$100,000.
Source of information	<ol style="list-style-type: none"> <li><a href="http://news.bbc.co.uk/2/hi/technology/4054475.stm">http://news.bbc.co.uk/2/hi/technology/4054475.stm</a></li> <li><a href="http://uk.oneworld.net/article/view/117284">http://uk.oneworld.net/article/view/117284</a></li> <li><a href="http://community.eldis.org/.598dd962/0">http://community.eldis.org/.598dd962/0</a></li> </ol> <p> OneWorld Kenya  Business Manager: Antony Mwaniki  OKN Mobile  4th floor Kimathi House  P. O. Box 1021-00100  Nairobi </p>

	<p>Tel.: +254 (020) 241 920 / 316 800</p> <p>Email: <a href="mailto:antony.mwaniki@gmail.com">antony.mwaniki@gmail.com</a></p> <p>Website: <a href="http://www.kazi560.co.ke">www.kazi560.co.ke</a></p>
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# **COL Using Mobile Technology for Learner Support in Open Schooling**

## **Questionnaire used for telephonic interviews**

### **Project Description**

1. When did the project start?
2. What was the purpose/rationale behind the project?
3. Who initiated the project?
4. What is the project about/describe how it works.
5. Describe briefly whether the project is focused on communication, collaboration, administration and academic support
6. Is it institutionally based or does it operate across institutions?

### **Target community/project participants**

1. No of participants in the project?
2. Describe the participants of the project e.g. maths teacher, grade 12 science students
3. Define/describe the roles and responsibilities of the different players.

### **Technology**

1. What technology are you using in the project and why did you choose this option?
2. Does each person have their own device or do they share, please explain?
3. Does the technology depend on connectivity? Please explain
4. Do all participants have the same technology or do they require certain basic functionalities to secure their participation? What are the basic requirements?

### **Sustainability**

1. Who funds the project and for what period of time?
2. What is the annual budget and what is it used for?
3. Who owns and purchases the technology?

4. Is the technology insured?
5. What is the cost of the technology device?
6. Are there ongoing costs, what are they and who is responsible for this cost?

### **Challenges and successes**

1. What are the successes of the project?
2. What are the challenges of the project?
3. How do you measure the progress and impact of the project?
4. Has the project been formally evaluated? Provide details

### **Teaching and learning**

1. How does the project support teaching and learning activities?
2. What educational value does the technology offer that traditional resources are unable to provide?
3. Is it classroom based or does it operate across classrooms, schools etc?
4. Does the project have print and other resources to support participants? Please describe
5. Who trained the participants? Describe the nature of training offered to participants
6. Can you provide some advice about how this project could be adapted for open schooling?
7. What human resource requirements does the project have? Do these people perform these tasks as part of their formal work in their institutions or is it done on a volunteer basis?

### **Other**

Please provide me with contact details of participants that you think I could talk to.

# **COL Using Mobile Technology for Learner Support in Open Schooling**

## **Questionnaire used for stakeholder interviews during site visit to MRSI Makerere University, Kampala**

NB: Different stakeholders were asked different questions depending on their role in the initiative. However, some of the questions were asked across the board.

### **Project Description**

1. When did the project start?
2. What was the purpose/rationale behind the project?
3. Who initiated the project?
4. What is the project about? Describe how it works.
5. How if at all is the technology used for data collection?
6. Describe briefly whether the project is focused on communication, collaboration, administration and/or academic support?
7. Can you estimate the time spent on the different uses mentioned above?
8. How has the technology changed the nature of engagement between supervisor and student? / Student and administrators?
9. How has the initiative impacted on workload? E.g. sudden influx of sms and calls
10. How do you manage the personal financial implications of participating in the initiative?

### **Target community/project participants**

1. No of participants in the project?
2. Describe the different participants in the project.
3. Define/describe the roles and responsibilities of the different players.

## **Technology**

1. What technology are you using in the project and why did you choose this option?
2. Does each person have their own device or do they share? Please explain
3. Does the technology depend on connectivity? Please explain
4. Do all participants have the same technology or do they require certain basic functionalities to secure their participation? What are the basic requirements?
5. What software has been developed or is used for the project? Describe its functionality?  
Costs of developing and maintaining?
6. What security features does the technology have?
7. What potential is there to develop relevant security features for the protection of younger users?

## **Project monitoring and evaluation**

1. What have been the successes of the project?
2. What have been the challenges of the project?
3. What possible solutions have been considered to overcome the challenges?
4. How do you track/monitor the progress and impact of the project?
5. Has the project been formally evaluated? Provide details and lessons learnt
6. How have you incorporated lessons learnt along the way?

## **Sustainability/Costs**

1. Who funds the project and for what period of time?
2. What is the annual budget and what is it used for?
3. Who owns and purchases the technology?
4. Is the technology insured?
5. What is the cost of the technology devices?
6. Are there ongoing costs, what are they and who is responsible for this cost?
7. What are the unexpected costs that have arisen from this project? How have these been dealt with?

## **Teaching and learning**

1. How does the project support teaching and learning activities?
2. Does the project demonstrate “social constructivism”? Explain.
3. In what ways does the initiative reflect components of the “conversation theory”?
4. What educational value does the technology offer that traditional resources are unable to provide?
5. Does the project have print and other resources to support participants? Please describe them
6. Who trained the participants? Describe the nature of training offered to participants
7. Can you provide some advice about how this project could be adapted for open schooling?
8. What human resource requirements does the project have? Do these people perform these tasks as part of their formal work in their institutions or is it done on a volunteer basis?
9. What are the limitations of this technology with regards to the skills and knowledge that need to be acquired by the students?

## **Other**

1. How is this project being received by other academic and admin staff in the institution?
2. What are the possibilities of this initiative becoming institutionalized? What are the discussions and debates going on in this regard? (scaleability, replicability)
3. What would be the possible implications of scaling up and replicating the initiative?
4. What are the challenges that might be faced in trying to institutionalize this initiative within the university?
5. How suited might this use of a mobile technology initiative such as this one be for open schooling?

## **COL Investigation into the use of Mobile Technology for Learner Support in Open Schooling**

- **Project investigated: M Learner Mobile**
- **Person Interviewed: Mr K.G. Pillay**
- **Interviewer: Ms Fatima Adam**

### **Project Description**

M Learner Mobile uses cell phones to provide support to students in maths and science. This project was conceived out of a Masters Degree research study that the project leader undertook. The planning started about 4 years ago but the project was implemented about 2 years ago.

The project offers three services:

- Content that is aligned with C2005 in math and science. This can be downloaded by phone, one page at a time. The content is comprehensive in that it covers the entire curriculum. Students can select topics in math and science.
- Support through MCom which provides students with feedback on request. Therefore students ask for assistance on particular topics or issues and the project team provide the relevant support. However the feedback is ad hoc i.e. as and when the teachers have the time to respond to students requests.
- Mobile testing banks. These are multiple choice tests that learners can complete. This service offers students the results and answers immediately. This also includes Multiple Choice tests to measure speed and accuracy.

At this stage the project has recorded about one million hits on the web site.

## **Technology**

Students can access M Learner Mobile through basic cell phones or computers. Students require web enabled cell phones and can obtain this GPRS access for about R200 from their service providers. It is estimated that students can use M Learner Mobile services for about R30 of air time per month. The project uses Microsoft product, Sequel basic and Visual basic. Services are free to students.

The project has been presented to government at both national and provincial level. This project won the Microsoft Teacher innovation award in South Africa as well as at the international level.

## **Resources**

A three person team runs the project on a part time basis. They are all full time teachers in one school. One supports maths, the other supports science and the third person develops the backend technology.

## **Research and evaluation**

This project has no database to evaluate students. Even on the internet site, there is no login requirement and therefore no details of who is accessing the site.

## **Open Schooling prospects:**

All components of the project exist in a number of other internet projects. Therefore the access to information, the MQ test bank etc are all available through other services.

However the fact that students can access these via their cell phones does offer students in disadvantaged communities the opportunity to access content and services that they would otherwise not have access to.

It must be noted that the feedback service is erratic and inconsistent and cannot be relied on.

## **COL Investigation into the use of Mobile Technology for Learner Support in Open Schooling**

- **Project investigated: MobilEd**
- **Person Interviewed: Ms J Batchelor**
- **Interviewer: Ms Fatima Adam**

### **Project Description**

MobilEd was initiated by the CSIR in 2005 as part of their Meraka Institute research Initiative on technology use in education. It was conceptualised in 2005 and implemented from 2006 for a period of three years. The project was initially funded by government. Other support came from Nokia-Finland and the University of Helsinki who provided the mobile phones and expertise respectively.

The aim of the project was to explore and adapt this open source technology to support teaching and learning efforts in the South African context. MobilEd is an international research and innovation collaboration partnership to design, develop, pioneer and evaluate pedagogically appropriate mobile technologies in education environments<sup>1</sup>. The idea was to make technology accessible to many learners by utilising basic cell phone options. The intention was to:

- Build an open source solution
- Enable communities without traditional connectivity to gain access to information<sup>2</sup>

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<sup>1</sup> Van der Berg M & Aucamp F, NOT DATED. A practical look at results from the two mobile learning pilots in South Africa. Meraka Institute, CSIR.

<sup>2</sup> Van der Berg M & Aucamp F, NOT DATED. A practical look at results from the two mobile learning pilots in South Africa. Meraka Institute, CSIR

This project was piloted in two Gauteng based schools, one private and one public. Students were able to use basic mobile phones to:

**Access information:** For example, accessing Wiki through sms. Students send a sms with the word request to the server. This will provide a synthesized voice response which reads the definition to students. Thus it is a text to speech option.

**Add to Wiki:** This facility allows students to create and share knowledge. However at this stage there is not vetting system through which the accuracy and quality of the input is checked. This is useful for sharing what students have done. For instance students who conducted research on HIV could share it with others. Thus they could upload their work and voice file to the Wiki, where it could accessed by others.

The initial pilot involved at least 70 students and 4 teachers per school. The project is not running at the moment because it is being redesigned based on research findings. Thus the technology is being adapted to suit the needs of students.

### **Technology**

Students require very basic mobile phones because of the software used by the CSIR to support the backend technology. At this stage the technology does not allow students to receive diagrams and graphs, but this functionality is being developed.

The technology gives students access to content, it allows students to access their progress, and creates tests/assessments. It also has the potential to assist students to conduct research and share their findings with others.

Since the technology offers a text to speech option, it is less alienating to students than the text to text option.

## **Cost**

At this stage it is difficult to discern the costs because of the support of CSIR and the fact that the technology is in its developmental stages.

## **Evaluation**

Three Masters' students from the University of Pretoria participated in evaluating this project in different ways. While none of the research studies looked at the impact of mobile technologies on teaching and learning, they did provide the following findings:

- Mobile phones have the potential to provide inexpensive support for students
- The students were encouraged to learning independently through the device. For instance students had to find innovative ways of storing, accessing, and utilising information.
- The mobile phone is able to go beyond the physical constraints of the classroom.
- Mobile phones enriches collaboration
- It provided a good medium for the delivery of small scale information/content
- Mobile phones integrate well with other technologies
- Skills acquired through this were transferred to other settings.
- Student-teacher relationships were altered and students were less passive about seeking assistance.
- While some students found the synthesized voice difficult to hear, most preferred this option. This is being further investigated by CSIR.
- Participants felt that the response rates were too lengthy and requested quicker response rates. This is being investigated by CSIR.

## **Prospects for open schooling**

Whilst this project is one that is classroom based, it has several components that could easily be adapted for an open schooling system. It allows for independent learning but also encourages active learning, collaboration and the generation of new knowledge.



## **COL Investigation into the use of Mobile Technology for Learner Support in Open Schooling**

- **Project investigated: Dr Maths on MXit**
- **Person Interviewed: Ms Laurie Butgereit**
- **Interviewer: Ms Fatima Adam**

### **Project Description**

The project started in Jan 2007. It was initiated by an individual who was trying to assist her son and his friends with their homework. This project has now been integrated into the Meraka Institute (a parliamentary research institute set up as part of the CSIR in order to explore technology CSIR in teaching and learning) and receives some resources as a result of this integration. Initially the project focused on one person providing assistance to a small group of students that she knew. With the assistance of Meraka the project was able to expand to about 3000 children spread throughout the country. Meraka provides computers and the coordinators time. In addition the project entered into a partnership with University of Pretoria who provides the tutors for the project.

Through this project students receive homework support in mathematics. Assistance is provided for all grades. Students send their mathematics requests via their cell phones to the Dr Maths MXit site. These questions or problems are routed to tutors who try to assist students. There are three workstations and therefore three tutors available to support students at any one time. The service generally operates from 2 - 4 pm in the afternoons on Mon, Tues, Wed and Thurs. However on some occasions, support is offered until about 10pm at night as well as on Sundays. Tutors are volunteers from the University of Pretoria who require community based service points to graduate. These students are from the built environment department; however the project is willing to use students from any faculty as long as they have completed some mathematics at university level. The project is considering using high school students to support

primary school students. It must be noted that this project is not focused on teaching but rather on providing quick tutor support for students to complete their homework.

Tutors have access to assistance on the internet that they can use.

Ideally tutors can be located anywhere i.e. they don't have to be in the same country. For example tutors in Portugal can help those in Mozambique. This of course depends on the curriculum and the student's familiarity with the curriculum. It must be noted that while the project can operate from anywhere i.e. it is not institutionally based (tutors can work from home), for security reasons it is better to work from a base. In this way tutors can be closely monitored in order to protect children who participate in the project.

In addition to the above programme, the project has also initiated a math competition, which occurs through MXit. Students challenge each other and the winner is announced on MXit. The system can also feed out fixed information on a key word request basis. This is useful for obtaining short definitions or formulae.

## **Technology**

Students require cell phones that can install MXit. In addition they need a colour screen and web browser. Dr Maths is not too costly for learners since they utilise the SMS functionality which is substantially cheaper than a phone call and cheaper than the normal SMS rates. The Meraka software is a JAVA application, open sourced software. While Google Talk can be used for this purpose, this is limited to institutions.

The project does not track students because of security reasons. They try to ensure as much anonymity for the safety of students participating in the project. Also they make it very clear to tutors that they should not contact students outside of this arrangement etc. However due to the fact that they are unable to collect data on students, they are unable to evaluate the impact of the project. However they do have anecdotal

information from students who suggest that the project has been invaluable and has improved their results.

### **Sustainability**

The fact that the project requires very few resources in order to operate is one of its key strengths. First the project uses just 3 computers to support 3000 students. Second the project has a medium term arrangement with the university to ensure tutor availability (Tutors need to do community service). Tutor provision is therefore not dependent on funders. However since the tutors are volunteers and have other core business, they can be erratic at times. For example during exam periods, tutors are absent. Third, each student is responsible for his or her own technology.

### **Teaching and learning**

The project focuses on home work support and is not involved in teaching. Teaching through the cell phone can be challenging, particularly in mathematics where teachers have to understand the logic of student's responses in order to understand where the conceptual problem lies. However as a homework support system it works reasonably well. However each subject and even area or topic must be assessed in terms of the value that this approach can offer and an acknowledgment made of the constraints and limitations. This type of mobile phone based system is better for basic maths and algebra, but does not work very well with geometry and graphs.

The other issue of concern is that of security for the children. The centre trains their tutors carefully and also records and monitors all conversations periodically. Tutors are provided with a code of conduct to which they must adhere. The project did submit their initial proposal to the ethics committee of Tshwane University of Technology and obtained approval to go ahead. Two issues emerge in this process. One is that students often ask inappropriate questions and make inappropriate advances with tutors. The

second is that some students need psychological help and seek this through this service. Childline support call centres are not willing to provide support to students on MXit and the tutors are not trained to deal with these issues.

### **Open schooling prospects**

This model can be used for open schooling in a wide variety of subject areas. It is not appropriate for language skills because children do not spell correctly and use short machine language. Each subject needs to be assessed for possibilities and limitations.

# Using Mobile Technology for Learner Support in Open Schooling

## Site visit report: Makerere University Mobile Research Support Initiative



**Date: October 2008**

## **Introduction**

Makerere University is the oldest university and until only fairly recently was the only University in Uganda. It was initially established as a Technical School in 1922 but evolved over time and eventually gained full University status in 1970. The Department of Distance Education (DDE) is within the Institute of Adult and Continuing Education (IACE) and it is the only unit which has the mandate to offer programmes at a distance and runs the University's External Degree Programme (EDP). The IACE consists of 3 departments namely:

- Department of Adult Education and Communication Studies
- Department of Community Education and Extra Mural Studies
- Department of Distance Education.

The EDP is being run on a collaborative basis involving:

- The collaborating faculties
- The Department of Distance Education and
- The central University administration

The DDE's major role in the running of the EDP is administrative whilst the teaching is carried out by academic staff of the collaborating faculties. The Central University administration carries out the rest of the duties relating to the registering of students, running examinations and managing the financial matters of the programme. (Aguti, 1999)

The EDP was designed to give adults and other school leavers who have the minimum entry requirements to join the University, thus increasing access to the institution.

A site visit was made by Dr Alice Barlow-Zambodla to the DDE at Makerere University in Kampala, Uganda on the 22<sup>nd</sup> and 23<sup>rd</sup> September 2008. The purpose of the visit was to learn more about their Mobile Research Support Initiative (MRSI) an initiative that

provides support to distance students using mobile phones. A number of stakeholders were interviewed. The people interviewed included:

1. Paul Muyinda (Initiative Leader)
2. Sam Siminyu (Head of Department)
3. Arthur Mugisha (Research Coordinator)
4. Sylvia Mukyala (BCom student)
5. Juliet Namugenyi (BCom student)
6. Fred Tamale (BEd student)
7. Okurut-Opolot (Research Supervisor/lecturer)
8. Tomas Baguma (Research Supervisor/lecturer)
9. Godfrey Mayende (Developer)

Findings from the site visit appear below.

### **Background to the MRSI and the rationale behind it**

In 2005 Nakibuuka reported that one of the reasons DE programmes at the University had registered significant attrition due to the lack of lasting relationships and personal care provided by university staff to the students. Kajumbula and Tibaingana (2006) in their study on relationship marketing for the university also reported that:

- There is no system in place to track and analyse information pertaining to students' lives
- Students have to report physically and register with the university since there is no online registration system in place
- There is no centralised database where all information about a student can be obtained. Rather it is gathered from different offices.
- Some staff members that students approach for services are unfriendly

These issues pointed to a poor quality student support system for DE students.

The MRSI started in 2005 in response to concern about the low throughput rates of final year students in the EDP. It was felt that possibly students were failing to complete their studies in the required time because they needed more support with the research component of the course which requires them to complete and submit a mini research dissertation during their third and final year. Approximately 40% of the students do not complete their course for various reasons whilst most of these successfully complete the coursework component of their course, it was discovered that many do not complete the research component. It was felt that maybe this was due to insufficient support during the research process. This is further exacerbated by the fact that the majority of these students live and work far away from the main campus.

In response to this problem a number of lecturers that are involved in supervision of the research component agreed to use the sms and call facilities on their own personal mobile phones to facilitate improved communication and contact between themselves and their students. The initiative started somewhat spontaneously out of a commonly perceived need despite having cost implications for all participants. The decision to use mobile phone technology was based on the fact that it had been ascertained that 97% of the students had access to mobile phones that had at least basic text facilities. It was felt that the remaining 3% without mobile phones could use payphones plus receive communication from their fellow students that lived or worked in the same vicinity. Also, an earlier attempt to try and support students using computer-based e-learning ran into problems as there were issue relating to accessibility (due to students' distance from the centres) of these 'tethered technologies' that were further exacerbated by inconsistent connectivity.

The initiative is not run as a funded project as it is to a certain extent is based on a spirit of volunteerism and has accompanying costs of personal mobile phone usage that are carried by both the supervisor and student. There is an incentive however in that the research supervisors receive a financial incentive from the university for every student

that they supervise who successfully completes the course and of course students get to graduate with a degree timeously.

### **Target population**

The target population of the initiative are final (3<sup>rd</sup> year) year students studying for BEd, BSc and BCom and those on the Commonwealth Youth Programme (an externally funded diploma programme) studying at a distance from the University. The Department of Distance Education collaborates with other departments to deliver the courses. It also works with lecturers from other Universities, officials from the Ministry of Education and District Education Officers to facilitate delivery of the programme.

There are ± 6500 out of approximately 30 000 students countrywide enrolled in the DE programmes at the University. These are widely dispersed in all corners of the country – mostly rural. About two thousand five hundred of the EDP students are in third year. Many (60-70%) are married and working at the same time. Those on the BEd DE programme are mainly primary school teachers based in deeply rural areas that have a teaching Diploma from a Teacher training College and joined the university as mature entrants. These students earn very low salaries (US\$ 200 000 is equivalent to approximately R1000 per month).

There are two other programmes that have students that are studying by distance at Makerere but are not managed by the DDE these are; The Master's in Public Health (linked to the Medical School) and a UNESCO funded MEd (ICT) based in the School of Education.

As is often the case in many Universities in the developing world the students in the programme (who have to pay their own tuition fees) are not in most instances academically strong students. Those students on similar internal programmes (unless

they are admitted as private students) do not have to pay tuition and are accepted based on academic merit straight from high school. Such students tend to be better performers academically. Students on the DE programmes definitely need good support in order to complete their studies especially the research component.

### **EDP description**

The mode of delivery is mainly print-based supported with two 14 days long block contact sessions held on campus at the beginning and towards the end of every semester i.e. it's mixed mode. There are two 15 week semesters each year. Students are expected to work on their course using print materials in the weeks between the two block contact sessions. Students stay on campus for a further two weeks during exams.

The institution has a number of centres around that country that serve as programme coordination, communication and information hubs. Each is manned by an administrator and there are books and other print materials, computers (in most instances not enough of them) and telephones (used by the admin person to communicate with main campus) at these sites. Books can be borrowed by students for a maximum of two days at a time. Occasional 1 day contact sessions are held there if there are specific academic problems being experienced that might require input from lecturers. Students are also given guidance with processes relating to payment of tuition fees at the centres. There is also a website that students can use to access useful support information and course admin information as well.

There is also a mobile broadcast system housed in the Department of DE (DDE) on the main campus that is used for general programme administration and can send out bulk sms to students. The system allows for querying as well as the selective dispersal of messages. The system is internally funded within the DDE and was developed after a visit to the University of Pretoria and was developed by local mobile developers who

customised an existing system. Communication using the mobile broadcast system is one-way and so is not interactive i.e. from the DDE to the students. Messages sent tend to be of an informative nature. It is hoped that the system can be developed further. There is no other such system used at the University.

Connectivity at the main campus where all the supervisors are based is good but students in deep rural areas have limited or no access to internet due to poor connectivity and limited access to computers. In addition internet connectivity tends to be dial-up and therefore slow and expensive in such areas.

In terms of tracking and monitoring student progress both the DE and full-time students generally get official communications from the University by letter. Students that do not complete their courses within the prescribed time are sent letters through the formal University system. Extra learner support and communication is provided by supervisors and lecturers that agreed to use their own mobile phones to contact their students and thus enabling two-way communication.

### **Research supervision on the EDP**

The focus of the mobile research support initiative (MRSI) is to enhance communication between distance learners and their research supervisors over and above the basic print and other sms communications sent to them by the DDE and the University Administration. The focus therefore is on the provision of guidance and support with regard to the academic research process so that students can complete their degrees timeously thus improving throughput. Over and above the MRSI there are a number of other support mechanisms in place. These include:

- A research supervision manual
- Having an academic coordinate research activities instead of an admin person. This person also serves to mediate if there are problems between the student and supervisor

- Supervisor briefings wrt expectations regarding research supervision
- Student briefings wit their allocated supervisor
- Setting of deadlines and soliciting regular feedback from supervisors in order to track student progress with research

In order to facilitate the mobile research support initiative students are given a list of participating academics' mobile phone numbers during orientation at the beginning of their 3rd year of study. Students are encouraged to regularly submit and update their contact details to ensure they are readily contactable at all times.

There is a research coordinator (lecturer) in the DDE whose job is to ensure that all students are allocated a research supervisor and also keeps track of progress with regards to the research process in terms of supervision, student participation and progress. The departmental research coordinator communicates directly with supervisors with regards to student progress and if there are any issues it is his responsibility to communicate directly with such a student. Messages that are sent depend on the need e.g. the sending of sms text messages to students to either sensitize them to approaching deadlines or to query whether there is a problem. As the Research Coordinator is expected to follow-up regularly with students the DDE facilitates mobile phone usage for this purpose by providing pre-paid airtime but sometimes this is insufficient and he finds himself using his own personal air-time to contact students. He reported that the peak period with regards to mobile phone usage is during the process of getting the students started on their research starting with the writing and submitting of a concept paper outlining their proposed research topic and the methodologies to be used. He reported that this period usually lasts about one week during which many calls are made to students to enquire how they are doing, inform about deadlines and to encourage and offer them support and guidance in the process.

Not all academics are participating in the initiative as some only are involved in delivery of the coursework component. However, almost all lecturers involved in student research supervision in the DDE ( $\pm 20$  of them) are active participants. There are about 72 supervisors in total and about half of these are reported to be actively engaging with the initiative. Staff members however are regularly sensitized about the benefits of the initiative in various arenas including the Research Committee meetings and during other activities and events such as the training of materials writers and course tutors. It was reported that it has been found to be more effective with regards to uptake, to brief groups of people about the initiative than to brief individuals.

The supervisors oversee anywhere between 12 to 20 students depending on their past performance, with those who have successfully supervised students who passed being allocated greater numbers of students. Those supervisors that have been less successful with getting students to pass are given fewer students. However such supervisors are penalized as they lose out on earning extra funds that they would normally be paid for every student that they successfully supervise.

Participating supervisors made a commitment to ensure that students do not waste time and money (when they travel long distances to main campus only to find the supervisor they need to see is not available) by ensuring 'real time' communication occurs with regards to when they can meet individuals face-to-face and to inform them timeously of changes in plans.

In the DDE supervisors communicate with students mainly with regards to academic queries relating to their research projects and also to get answers and reinforce the message in letters sent when queries arrive from the Research Coordinator about student academic progress. The postal system can be unreliable at times. Supervisors can also send internet-based smses to students (but the number that one can send is limited per day) and can only be sent out one by one – these do not cost the lecturer

anything to send. However, the Research Coordinator phones and also sends written queries to research supervisors requesting reports on student progress if students have 'overstayed'.

### **Preparation and support of students for and during the research component of course**

- Students do a research methods course during semester 1 of their 3<sup>rd</sup> year and then all attend a briefing after the course. The briefing serves to outline what a concept paper is, inform students of what is expected of them, and also an agreement is reached on the expected timeframes for different research activities such as when the concept paper is to be handed in.
- After the concept papers are handed in a committee is constituted to evaluate the proposed research. Students whose proposals are rejected are SMSed or called by the Research Coordinator and told of the outcome. They are then invited to meet with him so that they can be advised about what the problems are with their proposals and given suggestions of what corrections need to be made. After the proposals are accepted supervisors are appointed by the Research Office to support these students in the research process.
- Whilst some lecturers allow their students to submit work electronically most expect the students to submit the drafts and the final report in hard copy. This is to ensure that it is the students that are doing the work and not someone else. This means there have to be a number of meetings to discuss the work. The students and supervisor agree on when and where they should meet. Some students have been supervised almost entirely online in instances where the supervisor happens to be outside the country. In this case the work is then verified and endorsed by the HOD.
- Students are provided with extra support materials: research guide, copies of research reports and journal articles plus other print information deemed necessary.
- The mediation and coordination of the research process by the Research Coordinator adds value as these activities serve to hold the initiative together and strengthen it.

## **Findings and lessons learnt**

An initial evaluation was carried out during 2007 (Muyinda et al, 2007). The evaluation plus input collected during interviews with the various stakeholders involved in the initiative is reported on in the sections below.

### **Project leader, research supervisors and departmental administrators**

1. The 2004/2005 cohort was the first group to be actively supported using mobile technology. This group was supposed to start their research in May 2007 and do final exams in December 2007. Almost 80% of students had completed and submitted their research by exam time in December 2007 – a big improvement from previous years where the completion rate was about 60%.
2. Students who actively interacted with their supervisors were able to successfully finish their research projects and graduate well within the prescribed time period. Those who did not either took longer to complete or dropped out.
3. Supervisors who actively participated in the initiative benefited by increasing student throughput and attracting financial incentives linked to students they had supervised who successfully completed the course.
4. It was felt that students had a better connection with their lecturers some of who reported that students brought them gifts (one of the cultural ways of showing appreciation) after they completed their courses and even invited them to graduation parties. This was an interesting finding as often students and lecturers sometimes deal at a 'distance' within formal 'face-to-face' programmes i.e. some individuals never meet, interact or communicate directly with a lecturer/student except at a 'distance' during their courses.
5. It was reported however that some students avoid the face-to-face contact sessions preferring to communicate at a distance.
6. Also when some students are called they do not call back ie are also reluctant to communicate.

7. Relationships were formed between supervisors and students beyond being 'academic' that continued even after completion of the programme of study e.g.
  - a. students later coming back and asking for help with other issues such as references
  - b. requesting former supervisors to help them in instances where one would need someone who can help intervene in a situation - creating social networks
  - c. invitations to graduations – social binding
8. Despite the challenges relating to costs there was evidence of very good 'buy-in' with the students showing their appreciation and gratitude by informing other students about who they felt were the 'best' supervisors
9. A recent evaluation indicated that 30% of participants were not constrained by mobile phone costs; 62% were sometimes constrained and 8% said they were always constrained by air-time costs.
10. Despite the initiative being acknowledged as being an innovative way of communication with and supporting students the DDE cannot over-ride University Student administrative processes which are still mainly print based – however it is understood that the DDE system adds 'value' and 'support' to the University administrative processes because the postal system is not very good.
11. Impact of the initiative on workload – The EDP works with a lot of different stakeholders e.g. from other University departments, lecturers from other Universities, officials in the Ministry of Education and District Education Officers. The HOD reported that impact varies because the initiative is still based on volunteerism and so uptake has been varied and 'rather slow' but all participating staff on the EDP has been sensitized with regards to the benefits of the initiative. Therefore, varied technology uptake has mostly impacted on workload in that those closest to the DDE who are somewhat more committed to the initiative and in the absence of funding tend to feel the strain more.

12. Staff that employed from outside the DDE does not fall directly under the Director's authority. They are doing extra work and are contracted to do it thus they receive extra money. There thus is an expectation from this group that they would be supported in using their own phones to support the initiative and so fewer are using this means of communication to support their learners.
13. The HOD reported that in general the initiative has lead to a "broadening of perspective" with regards to what can be done using technology
14. In the past when there were problems with students and there were few mobile phones, one might have to physically go and look for a student to try and find out what the problem was. However, now an SMS or call ensures easy, quick feedback allowing for the necessary interventions to be activated timeously. This has resulted in a better, more systematic monitoring of student progress than previously due to the fact that information and feedback can be obtained quickly and can easily be regularly updated. This also means 'risky' situations can be quickly pinpointed and corrected.
15. However, there are challenges experienced with regards to the variety of network providers and the different rates charged. Also issues relating to network down-time.
16. Although the initiative has not been taken up by the University in general, a lot of interest and awareness in its potential has been raised when DDE has shared what it is doing in various forums such as University group project meetings e.g. DDE received funding from Carnegie Foundation to develop a DE policy for the University. This project has involved various stakeholders from different departments who are participating in developing a systematized approach to DE for the institution. People involved in the project have been informed of the MRSI. Impact has been limited to individuals who have reported that they have taken the practice up and are saying that it works well for them. However impact is not university wide as there is no specific funding allocated to support the initiative.

17. Sufficient lessons have been learnt by the DDE about the initiative and it is committed to up-scaling. A line item is to be built into the budget especially to support and further utilize the existing bulk sms system more extensively. It is anticipated that the service provider might be approached to negotiate for a subsidized flat rate that would allow staff to send messages to from Internet to sms. The initiative has also been built into other funding proposals for external funds.
18. Most discussion and debates with regards to the possibility of up-scaling the initiative are being held mostly in research arenas such as the e-learning committee. Peer reviewed papers about the initiative have been published in journals and presentations made at International Conferences. However, it is felt that the sort of funding that might be attracted would be insufficient to enable institutionalization and sustainability.
19. The University also solicits proposals from departments to access external funding from organisations such as NORAD however they tend to work with specific faculties and it is difficult to get on board if a department has not been involved previously.
20. The Director of the IACE is the 'champion' for the initiative. She sits on a number of committees and gets to tell people about it. However, despite the fact some of the top management is supportive eg the Vice Chancellor, they are not sufficiently embedded or familiar with DE issues to engage actively with them and support them where needed. This is further complicated by the fact that institutional structures tend not to fully support DE initiatives as they are more oriented to face-to-face delivery.
21. An ICT policy has been developed for the institution and a strategic plan for the next 10 years has been developed and accepts the in principle the use of m-learning for the IACE but not for the entire University. However the development and up-scaling of m-learning and DE are to be one of the key performance indicators to be implemented.

22. Supervisors incur most of the costs during the research phase as they often have more than 10 students to supervise. They have to regularly track, give feedback and follow-up the progress of each student. The supervisors tend to take more responsibility and follow up on students more consistently in this regard.
23. During the research phase supervisors reported that they often experienced information overload via their phones and had increased cognitive loads as they had to multitask at this time.

### **Students (BCom and BEd)**

1. Students reported that they felt that they now 'belonged' to the university
2. Students also indicated that that they felt 'cared for' and thus were encouraged and better motivated.
3. Not all students on the DDE are participating in the initiative as some whilst they are distance students, live relatively close by to the main campus and so can easily access their lecturers and supervisors. However, others either do not have cell phones or else even if they do they feel the cost is prohibitive.
4. The students were never given any guidelines or rules about communicating with their lecturers but told that they should only communicate about academic issues.
5. Those students who are part of the initiative indicated that it eases communication and that it enables them to consult from a distance and also set up meetings at appropriate times.
6. Issues students tend to communicate about mainly revolve around test and exam dates, assignment deadlines, and other administrative queries. They indicated that they on average would communicate about 3 times a month in this regard.
7. Whereas the students viewed being able to communicate by mobile phone as 'bringing them closer' to their lecturers others (female) felt that using mobile phones were beneficial because they 'removed potential bias/discrimination' as one could communicate without being seen/judged – ie they were of the opinion that they felt

more comfortable with communicating but at a 'distance'. It was clear that in some instances there was discomfort in interacting with their lecturers 'face-to-face'

8. Ease of communication between lecturers and students: Students indicated that whilst being able to access their lecturers by mobile phone was a convenient facility and made them feel closer when contact was made they also indicated that the actual process of establishing contact was sometimes not easy. For example if they called and the call was terminated they would be left wondering whether and when to call again. Sometimes they were not made aware of why the call had been terminated leaving them feeling 'unsettled and unsure' of how to proceed.
9. Student felt being able to freely communicate with their lecturers was the best support that they could get whilst doing their research. They said that they each are given a manual which gave guidelines on doing research and report writing. However, the manual doesn't provide complete support and they agreed that lecturer support and facilitation was important.
10. Some students are still reluctant to communicate directly with their lecturers and tend to communicate (by mobile phone) with their fellow students about admin and academic related issues.
11. When asked about the sort of costs associated with using their own phones to communicate with their lecturers students indicated that costs varied according to the various activities happening during the semester e.g.
  - For students – most communication occurred around tests, exams and assignments. At busy times costs could be in the region of US\$ 10 000 (R50) per month.
  - Costs associated with admin queries tended to be lower in the region of US\$ 2000 (R10) per month.
  - Lecturers tend to receive calls with regards to academic queries so generally students carry the costs of these call and SMSes. Students tend to take more responsibility to follow up on coursework related issues.

- Sometimes during the research phase students call their supervisors but are told to call again later – leads to extra costs being incurred
  - Students also incur costs when they have to phone and get feedback relating to their proposals or reports.
12. Whilst using their own personal mobile phones cost them money, students said they benefited by the fact that they did not waste time and even larger amounts of money making unplanned or unnecessary trips to the main campus.
13. Mobile phone network failure was reported as a challenge as it is experienced a lot. When this happens students are forced to communicate with lecturers using alternatives such as email – in this instance feedback is much slower.
14. Email access is readily and freely available at the main campus. However the DE students struggle to gain access to email as not all centres have such facilities and where they do they are not free. This is possibly because some centres are based at other institutions such as colleges and schools and so whilst computers are available there they are not accessible to the students. Students are then forced to pay for internet access at business facilities such as internet cafes where available. If all else fails they use pay-phones to communicate with lecturers.
15. An evaluation done and reported on by Paul Muyinda during the Emerge2008 Online Conference, listed the following issues as constraints experienced by the students during participation in the MRSI. They are listed below starting with the least constraining factor in ascending order:
- Electricity load shedding
  - Requirement to communicate by email
  - Non response to communication
  - Need for word processed manuscripts
  - Long distances travelled
  - Limited guidance
  - Limited time allocated to research project paper
  - Costly research process

- Non-availability of supervisor at certain times
- Busy own work schedule
- Rigour of the research process

From this list it can be seen that the research process was the students' main challenge and that their own personal work schedules and the non-availability of human support in the process had the most negative impact on ability to complete, however there are clearly other factors at play here too.

### **Developers**

The main developer is a computer scientist with an interest in DE and has worked in DDE since graduating in 2001.

1. Initially developed an SMS platform plus a web-based tool for sending messages to lecturers. This was a modification of an existing email to SMS system. Later a site was developed where there is a database of student lists of various categories. The system can be used to send emails to particular students who receive the messages as SMSes on their phones. However the system had limited utility and was used to send basic information to the students.
2. He got a scholarship in 2005 and went to Norway to do a Masters – the focus being the use of mobile phones to support discussion groups. Whilst in Norway, he developed a database connected to a web server and used mobile applications (JAVA) to create a communication link to the web server. He used JAVA applications as Windows based ones required the use of more expensive smart phones as opposed to the cheaper JAVA enabled phones. Java ME includes flexible user interfaces, robust security, built-in network protocols, and support for networked and offline applications that can be downloaded dynamically. Applications based on Java ME are portable across many devices, yet leverage each device's native capabilities. This set-up was used as a group discussion tool that

could be used by a group of students and their leader to send messages, comments, or questions via the internet that would be stored on the data-base and then disseminated to all students as an SMS. The database was searchable. The students had internet access on their phones.

3. However, most of the DDE students outside of Kampala have limited or no internet access. Access is limited in the small town centres and is mostly dial-up making it slow and expensive.
4. Substantial funding needs to be found to enable further system development.
5. Ways in which the existing SMS service could be improved:
  - a. Could be configured to respond to student messages
  - b. SMS could be configured to support different aspects eg student motivation or even academic support

But the system is basically limited to SMS only.

6. Challenges faced with the existing email to SMS system include the fact that when the network is down the system cannot be used and one can only send a limited number of SMS for free per day. A possible solution that is being tested is the use of a mobile phone with pre-paid airtime linked to a computer. This system works but has financial implications.
7. No financial support is obtained from the University to support the initiative as the institution is cash-strapped and the initiative is to some extent viewed as a peripheral activity despite being recognised as being innovative. To further complicate the situation the University is trying to reduce the number of students in the DE programmes. The DDE does not receive any subsidy from government for its students and functions on money paid for tuition by the students. Thus DDE has try and access external funding on its own.
8. Accessing of external funding has its own challenges especially with regards to situations that involve the linking of external funds with university funds as there was an instance where funding was sourced from an external funding agency to help in the development of the external EDP centres. This project was to be co-funded by

the University – delays in accessing the university portion of the funds had a negative effect on the final outcome and the funding agency was unhappy with this. It was also felt that the funders had unrealistic expectations of what could actually be achieved within the Ugandan context at the time.

### **Possible way forward**

Further discussions were held between the project leader, developer and Dr Barlow-Zambodla about how the initiative might be enabled to move forward and move away from being one based on volunteerism to a fully fledged, fully integrated, institutionalized and therefore financially supported aspect of the EDP programme. There is a need to concretize this initiative (as m-learning) and make it an integral part of DE programme delivery. This would ensure that the project becomes more sustainable and would gain dedicated financial support from the institution.

It was agreed that there is a need to get or develop more portable, mobile phone-integrated tools or systems for use in the support of teaching and learning on the EDP. However in order to chart the way forward the main question needs to be answered: What best can be done with the limited resources available? Other questions that also need investigating include:

- How can one move from an asynchronous SMS system to one that is more interactive?
- How can one get mobile learner management systems? Tools such as Blackboard are computer-based.

In light of the fact that resources are limited it was felt that the existing system could possibly be modified and used to support a discussion group and JAVA applications could be used to create a link between a server and mobile phone (client) but at this point in time very few DE students have sophisticated internet-enabled cell phones i.e. less than 30% - the majority of such students being privately sponsored. Students that

have access to the more sophisticated phones tend to be full-time students who tend to be better resourced – have government and often parental financial support.

Another problem is that most students also often do not know what the functionality of their phone is. There would be a need to sensitize learners about the different functionalities of their phones when using mobile technology as an integral part of DE programme delivery. However it is acknowledged that most new mobile phones (even cheap ones) are JAVA-enabled. The cost of a basic JAVA-enabled phone is US\$45 000 (R225). Because of cost and possible security problems Bluetooth enabled phones are not considered to be an option at this point in time.

It was also agreed that if mobile phones become an integral part of course delivery eg the mobile phone is part of the student study/learning pack and everyone pays for and receives one along with their other learning materials and equipment this would eliminate issues relating to disparities in phone capabilities. Standardising of phones and networks would also help in supporting the further development of the mobile learner support system.

However such system modifications would require accessing financial resources which are limited thus there is a need to further investigate any possible Corporate Social Investment options and the development of strong Public Private Partnerships to help support the initiative. The development of Public Private Partnerships is crucial to get support in a situation of limited resources eg Vodacom gave mobile phones with subsidized rates to staff at historically disadvantaged institutions in South Africa. There is a need to identify and to talk to the right people.

However, the project members indicated that such providers in Uganda might not be as open to an initiative being touted as a corporate social investment opportunity that would be provided free of charge. It was felt that service providers could be approached

for subsidized phones and rates or technology providers and service providers could be approached separately. Data that has already been collected from students about which service provider they use. This information will possibly be used to approach one of the service providers to see whether some sort of arrangement can be made to support the initiative. Whereas such an arrangement might still have associated costs that would need to be carried by the students and possibly the staff – they could be made to see how useful and beneficial such an arrangement might be for their studies.

Funding also needs to be accessed through the development and submission of research proposals to private funders for developmental aspects of the initiative. For example, in order to fully understand the implications of integrating the mobile technology support aspect into the EDP there is a need to carry out some research into costing. No such exercise has been done as yet. The possibility of partnering with an organisation outside Uganda to do the research would add value to such an exercise as they could contribute in a variety of ways including helping to develop the necessary capacity to make the initiative sustainable.

Based on reports from both students and lecturers about responses to phone calls there is clearly a need for telephone etiquette and clear guidelines with regards to mobile phone usage on the programme.

### **Open Schooling Prospects**

The initiative whilst aimed at supporting adults in DE has a variety of components that could easily be adapted and integrated into the functioning of an Open Schooling Learner Support system. The support provided is mostly SMS support for:

- Academic purposes
- Making appointments
- Motivational purposes
- Pacing of students

- Encouraging collaboration and dialogue
- Meeting of deadlines

The project leader Paul Muyinda reported that the system contributed to:

- Creation of a virtual community of practice
- Reduced loneliness
- Broke students' phobias relating to research
- Facilitation of active and collaborative learning

The initiative as a whole does provide each of the elements recommended by Tait (2000).

The MRSI provides:

- Cognitive support (support and development of learning)
- Affective support (support related to emotions that support learning and success)
- Systemic support (helping students to manage rules and systems of the institution in ways that support persistence)

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## Innovative practice with e-learning

### An institutional audit tool for mobile and wireless and other forms of e-learning

This tool is designed to support an organisational approach to implementing e-learning – including mobile and wireless technologies. The term ‘organisation’ is used here to stand for a whole institution, department or faculty, or a smaller body such as a programme team. Not all questions will be relevant to each of these contexts, but they provide a framework that can be useful in a variety of ways:

The questions can be used to audit existing provision, either by a single individual with an overview of e-learning and learning with mobile and wireless technologies, or in discussion amongst a range of stakeholders. This second approach could reveal significant differences in how the current situation is perceived, and could be more instrumental in moving the organisation forward.

The questions can also be used to plan for future provision that will support quality and innovation as consideration of the next steps to be taken follows on naturally from an audit of current provision. The tool could then provide a structure for a meeting or workshop to explore organisational change. In addition, users are invited to consider how the organisation’s processes – particularly decision-making – support or hinder innovation. Whatever the current situation, effective self-evaluation, dialogue, participation and review will enable progress to be made. As new technologies and opportunities emerge, the organisation’s capacity to adapt and learn is more important than any single effort at bringing things up to date.

The tool offers four separate areas for consideration. These are:

1. Learners and their experience of learning
2. Pedagogic culture and expertise
3. Infrastructure
4. Organisational strategy and vision

At the end of each section, users are invited to identify the key issues that the organisation needs to address within a given time frame.

Please note that to embed the use of mobile and wireless technologies alongside e-learning technologies, strategic managers should encourage practitioners, e-learning managers and other staff to use the planning tools for implementation of mobile and wireless technologies provided on the ‘JISC Innovative Practice with e-Learning’ CD-ROM. These could provide input to this wider organisational audit, for example:

- Use of the practitioner’s planning tool can provide input to the section on ‘Pedagogic culture and expertise’.
- Use of the e-learning manager’s tool can provide input to the section on ‘Infrastructure’.
- Use of the manager’s tool can provide input to the section on ‘Organisational strategy and vision’.
- Feedback from learners, in the form of evaluation surveys and interviews, can also be used to answer some of the questions posed in the section on ‘Learners and their experience of learning’.

All tools in this publication can be downloaded from the CD-ROM and amended to suit individual circumstances.

1. Learners and their experience of learning		
Issues	Commentary	Your current situation
<i>What kinds of learners are served by the organisation? (This question will be of greatest relevance to smaller organisational teams)</i>	Consider learners': <ul style="list-style-type: none"> <li>• Typical programmes of study and qualifications sought.</li> <li>• Access and progression routes.</li> <li>• Accessibility requirements (physical or sensory difficulties).</li> <li>• ICT skills, and confidence in using the available technologies.</li> <li>• Ownership of personal computers and mobile devices.</li> <li>• Autonomy in learning (i.e. capacity to be self-directed).</li> <li>• Collaborative learning skills (i.e. capacity to work with others).</li> </ul>	
<i>How are learners introduced to e-learning, and how are their expectations managed?</i>	Consider whether: <ul style="list-style-type: none"> <li>• e-Learning and mobile technologies are introduced at induction as an integral part of the learning experience.</li> <li>• Learners' prior skills and expectations are investigated on entry.</li> <li>• Learners have opportunities to voice their preferences about technologies used for learning.</li> <li>• Use of e-learning technologies is integrated into programmes.</li> <li>• Use of mobile and wireless technologies is integrated into programmes.</li> </ul>	
<i>How do learners acquire and develop skills for e-learning?</i>  Skills for e-learning include not only ICT skills but research skills, information literacies, time management, presentation and communication skills for different media, and self-directed study skills.	Consider how these skills are assessed, supported and/or accredited and whether: <ul style="list-style-type: none"> <li>• Results of initial diagnostic testing feed in to individual learning plans (FE).</li> <li>• Practitioners can call on specialist support for individual learners.</li> <li>• Learners can access relevant support themselves, e.g. via separate skills modules, online tutorials, or drop-in sessions with information professionals and learning support staff.</li> </ul>	
<i>How are learners with non-typical needs identified and supported?</i>	Consider the support available within programmes of learning and whether: <ul style="list-style-type: none"> <li>• Diagnostic tools and assistive technologies are available to</li> </ul>	

	learners during programmes of study. <ul style="list-style-type: none"> <li>• Access to support is made a natural and routine part of the learning process.</li> </ul>	
<i>To what extent do learners have independent access to, and ownership of, learning tools and resources?</i>	Consider whether learners have independent online access to: <ul style="list-style-type: none"> <li>• The organisation's learning resources, e.g. library catalogue.</li> <li>• Learning resources not provided by the organisation, e.g. via a personalised portal or via shared access to a VLE..</li> <li>• Their own individual learning plan, or learning record and personal data.</li> <li>• Opportunities for online formative assessment.</li> <li>• An e-portfolio, learning log, or repository of achievements.</li> <li>• Opportunities to collaborate online with other learners, e.g. in self-selecting groups and peer networks.</li> </ul>	
<b>Which of the above represent key issues that need to be addressed by the organisation in the next 6 months to 1 year?</b>		
<b>In the next 2–3 years?</b>		
<b>2. Pedagogical culture and expertise</b>		
<b>Issues</b>	<b>Commentary</b>	<b>Your current situation</b>
<i>What kinds of learning, teaching and assessment are particularly valued or promoted by the organisation?</i>	Consider any initiatives to promote particular approaches, e.g. learner-centred, or problem-based approaches and whether: <ul style="list-style-type: none"> <li>• There is a range and diversity of different approaches to be found within the organisation.</li> <li>• Departments and individual practitioners have autonomy in selecting their approach.</li> <li>• The current policy is a help or hindrance to innovation.</li> </ul>	

<p><i>How far do practitioners have the skills necessary to deliver effective e-learning and learning with mobile and wireless technologies?</i></p>	<p>Consider whether practitioners, in general, can:</p> <ul style="list-style-type: none"> <li>• Find quality e-learning materials for their subject.</li> <li>• Create, adapt or reuse e-learning materials for themselves.</li> <li>• Support learners at a distance using e- and m-technologies.</li> <li>• Use e- and m-technologies 'live' in the classroom.</li> <li>• Facilitate online discussion and collaboration.</li> <li>• Use e-assessment, including e-portfolios.</li> <li>• Support other staff and share their expertise.</li> </ul>	
<p><i>What opportunities are available to staff to develop these skills?</i></p>	<p>Opportunities might include workshops, drop-in sessions, mentorships, secondments and project funding. Consider whether:</p> <ul style="list-style-type: none"> <li>• Any of these opportunities are tailored to the needs of specific practitioners (e.g. by subject area, by role).</li> <li>• Any result in accreditation.</li> <li>• There any policy statements or contractual requirements regarding skills that all practitioners must have.</li> <li>• There opportunities for enthusiasts to develop further skills.</li> <li>• The organisation uses its own e-learning infrastructure to deliver staff development.</li> </ul>	
<p><i>Does the organisation support e-learning champions or other practitioners with a specific remit for e-learning?</i></p>	<p>Organisations need a cohort of experienced practitioners, preferably with credibility in their own department or area of work. Consider:</p> <ul style="list-style-type: none"> <li>• How the organisation is developing practitioners' skills.</li> <li>• Whether it offers any particular rewards, or encouragement to gain professional accreditation.</li> <li>• Whether training is available to all practitioners.</li> </ul>	
<p><i>How is the organisation developing its own expertise in implementing e-learning?</i></p> <p><i>Does the organisation promote multidisciplinary team working?</i></p> <p><i>Does the organisation encourage sharing of expertise, for example through an internal newsletter or lunchtime workshops?</i></p>	<p>Consider whether the organisation has expertise in:</p> <ul style="list-style-type: none"> <li>▪ How legislation might apply to learning with e- and m-technologies.</li> <li>▪ Accessibility and the Disability Discrimination Act.</li> <li>▪ Pedagogy of learning with e- and m-technologies.</li> <li>▪ Integration and interoperability standards.</li> </ul> <p>Consider the ways in which the dissemination of skills is currently occurring within the organisation.</p>	

Which of the above represent key issues that need to be addressed by the organisation in the next 6 months to 1 year?

In the next 2–3 years?

### 3. Infrastructure (note that specific technologies make specific additional requirements on the organisational infrastructure)

Issues	Commentary	Your current situation
<p><i>How stable, reliable and secure is the campus network?</i></p> <p><i>To what extent do learners have any time, any place access to the network?</i></p>	<p>Consider how the network currently supports learners and also whether planned improvements will include wireless networks:</p> <ul style="list-style-type: none"> <li>• On all main campus sites.</li> <li>• In outreach venues.</li> <li>• In libraries, dedicated computer suites and learning resource centres.</li> <li>• From general teaching areas.</li> <li>• In social areas.</li> <li>• From learners' homes or halls of residence.</li> <li>• From their workplaces (on placement or work-based learning).</li> </ul>	
<p><i>Is a range of technologies used for learning, teaching and assessment?</i></p> <p><i>What rationale is given for excluding any of these?</i></p> <p><i>Do support services respond</i></p>	<p>Consider whether the following are available, reliable and well supported:</p> <ul style="list-style-type: none"> <li>• Staff and student email.</li> <li>• Virtual Learning Environment.</li> <li>• Managed Learning Environment.</li> <li>• Learning resource gateway or portal.</li> <li>• Online discussion and collaboration tools.</li> <li>• Assessment management system. (please turn over)</li> </ul>	

<p><i>positively to new technologies and opportunities?</i></p> <p><i>Can staff choose from alternative systems to suit different needs?</i></p> <p><i>Can staff and students use their own devices on the network?</i></p>	<ul style="list-style-type: none"> <li>• E-portfolio or log book.</li> <li>• Web- or course-authoring software.</li> <li>• Video and audio conferencing.</li> <li>• Electronic whiteboards.</li> <li>• Data projection in teaching rooms.</li> <li>• Interactive whiteboards.</li> <li>• Wireless laptops and/or palmtops/PDAs.</li> <li>• Voting devices.</li> <li>• Other mobile devices (e.g. mobile phones, GPS).</li> <li>• Subject-specific tools (e.g. virtual microscopes and virtual field trips; statistical and qualitative data analysis).</li> </ul>	
<p><i>What progress has the organisation made towards interoperability among systems relevant to learning?</i></p>	<p>Relevant systems include VLEs, assessment management systems, e-portfolios, portals, learner records, library/resource management systems, timetabling systems. Consider whether:</p> <ul style="list-style-type: none"> <li>• Practitioners and learners have a single sign-on to learning resources and systems.</li> <li>• Learners' records are designed for transferability between institutions.</li> <li>• Practitioners are able to monitor learners' attendance, progress and assessment scores across programmes of study.</li> </ul>	
<p><i>How well does the organisation manage its learning resources?</i></p> <p><i>Is there effective collaboration between subject specialists and resource designers/managers?</i></p>	<p>Consider how much content development goes on within the organisation and whether there is support for:</p> <ul style="list-style-type: none"> <li>• Instructional/learning design.</li> <li>• Web authoring.</li> <li>• Capturing and editing audiovisual material.</li> <li>• Graphics processing.</li> </ul> <p>Consider whether the organisation makes effective use of resources developed elsewhere, for example through:</p> <ul style="list-style-type: none"> <li>• Resource-sharing networks.</li> <li>• Subscription to information services.</li> <li>• Staff and learner portals.</li> </ul>	
<p><i>How well do physical spaces support the use of innovative technologies and approaches?</i></p> <p><i>Are e-learning opportunities taken into account in the design or</i></p>	<p>Consider whether learning spaces lend themselves to:</p> <ul style="list-style-type: none"> <li>• Learners working alone or in groups of different sizes.</li> <li>• Learners collaborating around laptops or desktop computers.</li> <li>• Transition between didactic and collaborative forms of working (front facing/group facing). <i>(please turn over)</i></li> </ul>	

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<i>How well is e-learning and learning with mobile and wireless technologies championed among senior managers?</i>	<p>Consider whether:</p> <ul style="list-style-type: none"> <li>• e-Learning has its own identifiable champion in the senior management team.</li> <li>• Senior managers use mobile and wireless technologies.</li> <li>• Heads of department and other key managers have to demonstrate a commitment to e-learning in their area of influence.</li> <li>• e-Learning is separately funded and is given a high level of priority.</li> </ul>	
<i>What are the key drivers for and barriers to innovation in your organisation?</i>	<p>Consider the role (positive or negative) of:</p> <ul style="list-style-type: none"> <li>• Different levels of management.</li> <li>• Staff expertise and appetite for innovation.</li> <li>• Learners' demands and expectations.</li> <li>• Requirements of accrediting bodies and/or professional bodies.</li> <li>• External auditing and inspection.</li> <li>• Internal self-evaluation/assessment.</li> <li>• Legal compliance.</li> <li>• Data security.</li> <li>• Procurement strategy.</li> <li>• Flexibility/reliability of ICT infrastructure and support.</li> <li>▪ Administrative systems.</li> </ul>	
<i>Does the organisation actively promote innovation, research and development in learning(HE) ?</i>	<p>Consider whether:</p> <ul style="list-style-type: none"> <li>• The organisation rewards innovation, for example by funding internal projects, bidding for externally funded projects, supporting specialist research units and development teams, seconding staff.</li> <li>• Practitioners are encouraged to research the pedagogy of their subject area and disseminate the findings.</li> <li>• There is a culture in which research and teaching are seen as opposing rather than complementary activities (HE).</li> </ul>	
<i>Does the organisation have a realistic long term business strategy for e-learning?</i>	<p>Signs of an unrealistic strategy include expectations of:</p> <ul style="list-style-type: none"> <li>• Short term efficiency savings and cost benefits.</li> <li>• Rapid expansion into distance learning markets.</li> <li>• Research and development partnerships with commercial providers, without obvious and immediate benefits.</li> </ul>	

**Which of the above represent key issues that need to be addressed by the organisation in the next 6 months to 1 year?**

**In the next 2–3 years?**

## The learning organisation

While the previous tool can be valuable for auditing the situation at one moment in time, this matrix can be used to ensure the processes are in place for continuous monitoring, quality assurance, organisational learning and improvement. It is recommended that this page is printed out and enlarged for use in group contexts.

<b>Consider in each of these areas:</b>	Network and interoperability development	Procurement of hardware and systems	IT/ICT support	Learning, teaching and assessment strategy	HR/staff development	Estates management/development	Timetabling	Quality assurance and audit	Legal compliance e.g. (IPR, DDA.)
How are decisions made and by whom?									
How are the views of practitioners taken into account?									
How are the experiences of learners taken into account?									
How is good practice elsewhere taken into account?									
How are decisions subsequently reviewed and evaluated?									
How does this process support quality and innovation in learning, teaching and assessment?									

## **Innovative practice with e-learning**

### **A manager's planning tool for use of mobile and wireless technologies**

This planning tool, designed for use by strategic and curriculum managers in post-16 and higher education, takes a stepped approach towards the implementation of mobile and wireless technologies within an institution, department or faculty, or within the work of a programme/curriculum team. Throughout the tool, the term 'institution' is used. The planning tool may, however, be adapted to a range of management contexts, from whole institutions to departments, faculties and individual teams. The questions and guidance provided may not apply equally to all contexts, but are intended to provide a broad framework from which to commence the planning process.

Four separate areas are considered:

- Reviewing strategic aims
- Laying down plans
- Managing learning and teaching
- Supporting innovation

#### **Points to note:**

The way forward when planning to implement mobile and wireless technologies will depend on a number of factors, including the institution's strategic aims, its resources and structure, the types of communities it supports and its current infrastructure. As a result, some factors may be specific to that institution or sector and may not be covered in this tool.

It is recommended that this tool is used in conjunction with the JISC publication 'Innovative Practice with e-Learning' or its accompanying CD-ROM, and that managers also read the practitioner's and e-learning manager's planning tools which can be found in the 'Next steps' section of the CD-ROM. All tools in this publication can be downloaded from the CD-ROM and amended to suit individual circumstances.

<b>Step1: Reviewing strategic aims</b>		
<b>Issues</b>	<b>Commentary</b>	<b>Your next steps</b>
<p><i>Does the institution have a strategy for e-learning or a teaching and learning strategy that incorporates e-learning?</i></p> <p><i>How have mobile and wireless technologies been included in these?</i></p> <p><i>Is the planned use of these technologies evident in other strategies, e.g. estates and IT?</i></p>	<p>Consider whether:</p> <ul style="list-style-type: none"> <li>• Use of mobile and wireless technologies is incorporated into the institution's e-learning strategy in ways that support specific categories of learners and/or enhance the efficient management of learning.</li> <li>• The impact of the use of mobile and wireless technologies is recognised in other strategies.</li> <li>• The teaching, learning and assessment strategy shows understanding of appropriate uses and pedagogies.</li> </ul> <p>Case studies in 'The manager's perspective' section of this CD-ROM give an insight into other institutions' strategic planning for mobile and wireless learning.</p>	
<p><i>What are the institution's current priorities?</i></p> <p>These could be:</p> <ul style="list-style-type: none"> <li>• Wide-scale implementation of an e-learning strategy</li> <li>• Improving attendance and retention</li> <li>• Transforming the quality of learning, teaching and training</li> <li>• Widening participation</li> </ul>	<p>Consider whether:</p> <ul style="list-style-type: none"> <li>• The current e-learning strategy is up to date and responsive to the needs of all learners e.g. learners have supported and flexible access to learning resources any time, any place.</li> <li>• A review of the potential of mobile and wireless learning would reveal links with the strategic priorities of the institution.</li> </ul>	

<ul style="list-style-type: none"> <li>• Personalising learning</li> <li>• Lifelong learning</li> <li>• Upgrading premises and infrastructure</li> <li>• Maintaining the quality of the institution's profile in learning and teaching and/or academic research (HE)</li> </ul>	<ul style="list-style-type: none"> <li>• The implementation of mobile and wireless technologies would provide opportunities to raise the quality of teaching and learning, or support an agenda for personalised or lifelong learning.</li> <li>• Innovative designs for wireless-enabled learning and teaching accommodation would increase the profile of the institution.</li> </ul>	
<p><i>Which areas of the institution's core functions might benefit from the use of mobile and wireless technologies?</i></p> <p><i>How might mobile and wireless technologies meet challenges identified in internal audits and self-assessment reports or external inspection reports?</i></p>	<p>Consider the potential role of mobile and wireless technologies in:</p> <ul style="list-style-type: none"> <li>• Administration and information management processes.</li> <li>• Teaching and learning in outreach venues and other off-campus sites as well as on main campuses.</li> <li>• Improving motivation and attendance by learners through a greater diversity of pedagogical approaches.</li> <li>• Enabling more flexible use of learning spaces.</li> <li>• Reducing the cost of sustaining desktop provision.</li> <li>• Other identified targets for your institution.</li> </ul>	
<b>Step 2: Laying down plans</b>		
<b>Issues</b>	<b>Commentary</b>	<b>Your next steps</b>
<p><i>What are the priorities for implementing wider scale use of mobile and wireless technologies?</i></p>	<p>Robustness and reliability of the network is key to wireless-enabled learning. Not all parts of the estate will support this, and a phased introduction across the institution will almost certainly be necessary</p>	

	<p>where older and newer buildings are combined. However, the most important asset needed to make any system work is the desire of practitioners and learners to use it.</p> <p>Consider the extent to which plans will involve:</p> <ul style="list-style-type: none"> <li>• Listening to, assessing and responding to the needs of learners.</li> <li>• Listening to, assessing and responding to the needs of curriculum teams.</li> <li>• Round table discussions between practitioners, managers, learning resources and learning support staff, network and IT support staff to develop a shared understanding of benefits and constraints.</li> <li>• Ongoing monitoring of new systems and technologies to ensure effective and efficient uses.</li> <li>• Supporting use of personal devices by learners and practitioners.</li> </ul>	
<i>Is the current IT infrastructure sustainable?</i>	<p>Consider whether:</p> <ul style="list-style-type: none"> <li>• IT audits have been taken to assess the lifespan of hardware and the ratio of computers to learners in the institution.</li> <li>• Longer term replacement plans are sustainable.</li> <li>• A review of the institution's position in relation to competitors has been undertaken to assess whether a wider scale adoption of mobile learning would be</li> </ul>	

	beneficial.	
<i>What other improvements are planned in the institution's premises over the next three years?</i>	<p>Consider whether:</p> <ul style="list-style-type: none"> <li>• The design of the current learning space meets the needs and expectations of modern learners and is efficiently managed.</li> <li>• The current network infrastructure can be extended into new building projects.</li> <li>• A cost analysis of extending a cabled network and installing a wireless network with laptops or tablet PCs for all practitioners will show efficiency gains in the longer term.</li> </ul>	
<i>Where could funding be found?</i>	<p>It is essential to identify potential revenue streams to prepare the institution for 21<sup>st</sup>-century learning. The possibilities will vary widely from institution to institution, e.g. realising capital locked in city centre sites, acquiring funding from urban or rural regeneration schemes, using development funding, or tapping into new markets. Consider also:</p> <ul style="list-style-type: none"> <li>• Ways in which mobile and wireless technologies could improve the financial standing of the institution by raising its status in the community, improving efficiency and increasing retention.</li> <li>• How increased use of personal mobile devices could offset the institution's costs.</li> </ul>	
<i>How well are staff and learners prepared?</i>	Any move into mobile and wireless technologies, even on a small	

	<p>scale, will depend on timely and flexible training and support for users. Consider whether:</p> <ul style="list-style-type: none"> <li>• Cost-benefit analyses have taken IT support services and additional staff development into account.</li> <li>• e-Learning champions are adequately supported with time and training to enable 'just-in-time' peer support for other practitioners.</li> <li>• Learners' level of e-skills can be assessed at the outset of the programme of learning and the results linked to appropriate levels of support.</li> <li>• Support for learners is also available wherever and whenever learning takes place.</li> </ul>	
<i>How well will IT support teams cope?</i>	<p>Consider whether:</p> <ul style="list-style-type: none"> <li>• Training will be needed for IT support teams in understanding a range of pedagogical approaches.</li> <li>• Adjustments will be needed to existing accommodation, e.g. wireless access points and battery charging facilities.</li> </ul>	
<b>Step 3: Managing learning and teaching</b>		
<b>Issues</b>	<b>Commentary</b>	<b>Your next steps</b>
<p><i>How well does teaching and learning meet learners' needs?</i></p> <p>Consider:</p>	<ul style="list-style-type: none"> <li>• Assess whether all enrolled learners have sufficient flexible access to electronic resources and consider the use of mobile devices to address any shortfall.</li> </ul>	

<ul style="list-style-type: none"> <li>• Flexibility and equality of provision</li> <li>• Learners' motivation and participation</li> <li>• Accessibility for learners with disabilities</li> <li>• Learners' progression</li> </ul>	<ul style="list-style-type: none"> <li>• Identify areas of the curriculum where attendance and retention are low. Require managers or lecturers to review the use of voting devices and/or collaborative and exploratory learning activities to improve performance.</li> </ul> <p>The legal requirement to provide high quality learning experiences for all learners will both encourage the use of mobile devices in some types of activity and argue against their use in others.</p> <p>Consider also whether practitioners are prepared for:</p> <ul style="list-style-type: none"> <li>• A diversification of approach to enable all types of learner to take part in learning activities with technology.</li> <li>• Designing accessible learning activities with mobile and wireless technologies.</li> </ul>	
<p><i>How can practitioners be encouraged to adopt more innovative practice?</i></p>	<p>Consider:</p> <ul style="list-style-type: none"> <li>• Laptop/tablet loan schemes to develop practitioner understanding of the potential of mobile learning.</li> <li>• Providing practitioners with access to the network from home to support experimentation with new technologies.</li> <li>• Encouraging use of mobile devices by using wireless-enabled laptops for registration of learners or other routine tasks.</li> <li>• Setting up secondment opportunities and 'champion' roles.</li> <li>• Ensuring that all practitioners feel that new developments are worthwhile. Publicise achievements and encourage</li> </ul>	

	<p>peer mentoring.</p> <ul style="list-style-type: none"> <li>• Making exemplar session plans and learning activity designs available electronically to encourage faster adoption by others.</li> <li>• Involving guidance and learning support teams in new developments so that all aspects of provision are seen as united.</li> <li>• Looking for common benefits, i.e. the use of SMS messages to remind learners of the dates of new terms and assignment deadlines will benefit all practitioners.</li> </ul>	
<i>What training will practitioners need?</i>	<p>Practitioners' requirements for training in use of mobile and wireless technologies will be greatly reduced if they have had experience in e-learning. However, they will still need opportunities to understand when mobile devices are best deployed and how. Consider how:</p> <ul style="list-style-type: none"> <li>• ILT/e-learning champions, mentors and advanced practitioners can spearhead pedagogical developments and pass on effective practice.</li> <li>• IT support can be made flexible, i.e. telephone helplines and 'just-in-time' guidance provided alongside 'just-in-case' tutorials.</li> </ul>	
<b>Step 4: Supporting innovation</b>		
<b>Issues</b>	<b>Commentary</b>	<b>Your next steps</b>

<p><i>How well is e- and m-learning championed by senior managers?</i></p>	<p>Consider whether:</p> <ul style="list-style-type: none"> <li>• Managers are leading by example, e.g. exploring the benefits and challenges of mobile connectivity for their own personal and administrative purposes.</li> <li>• An e-learning manager can report directly to senior managers to keep them well briefed on new technologies.</li> </ul>	
<p><i>Review whether the following are drivers of or barriers to innovation with mobile and wireless technologies in your institution:</i></p> <ul style="list-style-type: none"> <li>• Internal self-evaluation</li> <li>• Learners' expectations</li> <li>• Assessment and/or validation procedures</li> <li>• Legal compliance issues</li> <li>• Procurement strategies</li> <li>• Infrastructure development</li> <li>• Design of learning spaces</li> <li>• Network reliability and security</li> </ul>	<p>Consider:</p> <ul style="list-style-type: none"> <li>• How decisions are made about these issues.</li> <li>• Whether the views and experiences of practitioners and learners are taken into account.</li> <li>• Where barriers are identified, whether these are addressed at the appropriate level, and promptly.</li> <li>• Whether constraints are allowed to become stumbling blocks.</li> <li>• Whether effective practice in other institutions or that found within teams in your own institution are used as a driver for innovation.</li> <li>• Whether the institution has established a commitment to self-improvement in all aspects of its provision.</li> </ul>	
<p><i>How can innovative practice be encouraged and disseminated to others?</i></p>	<p>Consider:</p> <ul style="list-style-type: none"> <li>• How training events are best run and when.</li> <li>• Whether training will take quality assurance into account.</li> <li>• What measures are in place to encourage late adopters</li> </ul>	

	as well as innovators.	
<i>How will we know what still needs to be done?</i>	Consider how:  All practitioners and support staff can take part in evaluating the use of mobile and wireless technologies and make suggestions for improvements.	

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## Innovative practice with e-learning

### A practitioner's planning tool for use of mobile and wireless technologies

This planning tool can be used to assist practitioners in planning to implement practice using mobile and wireless technologies. It covers four separate areas which appear as steps in the planning process:

- Your learners and their experience of learning with technology.
- The kind of learning and teaching you are involved in.
- The infrastructure you will be working with.
- The opportunities you have to develop and disseminate skills and expertise.

#### Points to note:

This tool could also be used to evaluate practice with mobile and wireless technologies to identify ways in which the quality of the learners' experience has been improved, or could be improved further. Points for further action could then be highlighted.

When planning the use of mobile and wireless technologies, remember that the focus should be on the learner and the quality of the learning experience, not on the technology.

All tools in this publication can be downloaded from the CD-ROM and amended to suit individual circumstances.

Step 1: Learners and their experience of learning		
Issues	Commentary	Your next steps
<p><i>What are the characteristics of the learners you will be working with?</i></p> <p>Review:</p> <ul style="list-style-type: none"> <li>• Their programmes of study and qualifications sought.</li> <li>• Their mode of learning (face-to-face, distance, virtual).</li> <li>• Their ICT skills and likely confidence in using technology.</li> <li>• Their skills in independent learning.</li> <li>• Their skills in collaborative learning (i.e. capacity to work with others).</li> </ul>	<p>Finding an alignment between the learners, the learning environment and the intended outcomes is fundamental to successful learning experiences. Use the case studies and the 'Opening the box section' in the publication or CD-ROM to explore uses of mobile and wireless technologies that will match the needs of your learners and the outcomes you are aiming for.</p> <p>Identify groups of learners who would be most likely to benefit from mobile and wireless learning, then consider their characteristics. Making learners the starting point in your preparations will ensure that any use of mobile and wireless technologies will add value to the learning experience.</p>	
<p><i>How will learners' skills be assessed and developed?</i></p> <p><i>What steps can you take to ensure that learners using technologies will be appropriately trained and supported?</i></p> <p><i>How are learners with non-typical needs supported in their use of technology?</i></p>	<p>Consider how, before the use of any device, you will:</p> <ul style="list-style-type: none"> <li>• Identify those learners who could be disadvantaged through inexperience with mobile and wireless technologies, or who may require additional support.</li> <li>• Liaise with IT and learning support teams to ensure an effective learning experience for all learners.</li> <li>• Develop the confidence of inexperienced learners by using peer support.</li> </ul>	

<i>Are there learners who would find mobile and wireless technologies particularly beneficial, or particularly difficult to use?</i>	<p>Consider:</p> <ul style="list-style-type: none"> <li>• Whether learners will have disabilities or learning difficulties and prepare to support them with additional resources, e.g. portable clip-on keyboards, magnifying tools to assist visually impaired learners using PDAs, or other assistive devices.</li> <li>• Which learners could gain from use of mobile and wireless technologies e.g. those with mobility problems.</li> </ul>	
<i>How will learners give feedback on the use of mobile and wireless technologies?</i>	<p>Learners' evaluations of the activity and of related management and support systems will be valuable. Consider how:</p> <ul style="list-style-type: none"> <li>• Learners will be able to assess the effectiveness of the learning activity.</li> <li>• Contribute ideas for future activities.</li> </ul>	
<b>Step 2: Learning and teaching</b>		
<b>Issues</b>	<b>Commentary</b>	<b>Your next steps</b>
<p><i>Does your institution have an e-learning strategy, or a teaching and e-learning strategy which incorporates e-learning?</i></p> <p><i>What aspects of the strategy have a bearing on the courses/modules/units that you deliver?</i></p>	<p>Review:</p> <ul style="list-style-type: none"> <li>• The strategic e-learning and/or teaching and learning aims for your institution, department, faculty or team.</li> <li>• Evaluate how mobile and wireless learning could assist both institution-wide and local targets, e.g. in widening participation, improving attendance, and increasing motivation.</li> </ul>	

<p><i>Which elements within your courses, modules or units of learning would benefit from uses of mobile and wireless technologies?</i></p> <p>This will depend on:</p> <ul style="list-style-type: none"> <li>• The learners</li> <li>• The outcomes</li> <li>• Access to technologies and e-learning resources</li> </ul>	<p>Mobile devices can be used as a small element within a sequence of learning activities or as the dominant mode of learning. Look at the case studies within this publication for ideas on how mobile and wireless technologies can address specific challenges. Consider:</p> <ul style="list-style-type: none"> <li>• Which elements of the curriculum could be best supported via mobile and wireless technologies.</li> <li>• Whether learner surveys and course data could indicate other possible areas for use of mobile and wireless technologies.</li> </ul>	
<p><i>Who will you need to discuss your plans with?</i></p> <p><i>What information will they need and when?</i></p> <p><i>What will you need them to do?</i></p>	<p>Identify others within the institution who you may need to consult, inform or involve in any aspect of the planning and implementation. Consider the benefits of:</p> <ul style="list-style-type: none"> <li>• Presenting your ideas first to a curriculum planning group, head of faculty or department for evaluation.</li> <li>• Involving e-learning champions, learning technologists and staff development managers.</li> <li>• Discussing implementation issues with the IT support team.</li> <li>• Checking systems for equipment management, i.e. policies and instructions for use, booking, maintenance and battery charging arrangements.</li> <li>• Making learning support teams aware of planned use of mobile devices in the case of individual learners.</li> </ul>	

<p><i>What are the aims of the activity you are planning?</i></p> <p><i>What are the intended outcomes for learners?</i></p>	<p>Consider how you will:</p> <ul style="list-style-type: none"> <li>• Identify the aims and intended outcomes of an activity.</li> <li>• Investigate how the use of mobile technologies can be coordinated with use of other e-learning technologies, such as email, discussion lists, blogs or a VLE to extend the range and quality of the activity.</li> <li>• Document the aims and outcomes carefully to support any benchmark data produced (e.g. on attendance) and to provide evidence of impact on learners.</li> <li>• Ensure that the planned activity will meet the needs of all learners, including those with disabilities.</li> </ul>	
<p><i>What specific technologies will your learners use in this activity?</i></p> <p><i>How will these technologies add value to the learning outcomes?</i></p> <p><i>How will you evaluate the degree of success?</i></p>	<p>Consider:</p> <ul style="list-style-type: none"> <li>• Looking through case studies to make sure that you are using the right mobile technologies for the purpose.</li> <li>• Checking that you have designed the activity so that it fits with assessment criteria.</li> <li>• Identifying appropriate ways of evaluating the activity and the use of technologies.</li> </ul>	
<p><i>What learning resources will you require?</i></p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• Access to existing resources.</li> <li>• Production of purpose-built resources.</li> </ul>	<p>Case studies in this publication illustrate creation and adaptation of resources and software for mobile devices. Consider preparing by:</p> <ul style="list-style-type: none"> <li>• Identifying gaps in existing e-learning resources.</li> <li>• Identifying who in your institution could assist you in the development of further resources.</li> <li>• Using and adapting others' ideas where possible.</li> </ul>	

Step 3: Technologies and infrastructure		
Issues	Commentary	Your next steps
<p><b>Mobile devices</b></p> <p><i>What types of activity do you want to use mobile devices for?</i></p> <p><i>What will be your requirements from the devices?</i></p> <p><i>Who may be able to help you make appropriate decisions?</i></p>	<p>Consider:</p> <ul style="list-style-type: none"> <li>Discussing plans with your IT team so that they can research the best option for your purpose, or assist you in making best use of available devices. For example, you will need to know whether connectivity will be vital to the outcomes of the activities you are planning, and whether you can make bulk purchase of SMS or MMS messaging with the institution's existing network provider to cut costs.</li> <li>How to develop pedagogically sound uses of mobile technologies by working with learning technologists, e-learning champions, advanced practitioners and e-learning coordinators, as appropriate.</li> <li>Using discussion lists to get in touch with a wider community of practitioners to help you find solutions to problems or discover new ideas.</li> </ul>	
<p><b>Wireless networks</b></p> <p><i>How can you make most use of a wireless network if one is available?</i></p> <p><i>What further developments would make a difference to your learners?</i></p>	<p>Use the case studies in this publication to explore ways in which a wireless network can assist learner-centred approaches.</p> <p>Recognise that:</p> <ul style="list-style-type: none"> <li>Network managers may not know about your needs and experiences with the network unless you tell them.</li> </ul> <p><i>(please turn over)</i></p>	

	<ul style="list-style-type: none"> <li>You will need to look ahead and identify your requirements for the next academic year to discuss with IT teams and curriculum advisory groups.</li> <li>You will need to work together with other practitioners to ensure that a new technology is effectively embedded.</li> </ul>	
<p><i>What support systems would need to be set up in order to use mobile devices?</i></p>	<p>Consider who will have responsibility for the following:</p> <ul style="list-style-type: none"> <li>Battery charging facilities.</li> <li>Equipment monitoring, including reconfiguration of settings after use.</li> <li>Security of equipment.</li> <li>Extensions to acceptable use policies and health and safety information to cover misuse, damage, theft or injury.</li> </ul> <p>These may not be your immediate responsibility, but you will need to be aware of these requirements when planning for learners' use.</p>	
<b>Step 4: Planning for skills development</b>		
<b>Issues</b>	<b>Commentary</b>	<b>Your next steps</b>
<p><b>Learners</b></p> <p><i>What training is needed for your learners?</i></p> <p><i>How can they access support and training if not on the main campuses?</i></p> <p><i>Can they support each other in the use of mobile devices?</i></p>	<p>Skills for e- and m-learning will involve research skills, time management, independent study and communication skills as well as technical skills. Consider:</p> <ul style="list-style-type: none"> <li>How learners, including those not able to attend face-to-face classes or travel to main campus sites, will be supported when acquiring these skills.</li> </ul>	

<p><i>What support is there for learners?</i></p> <p><i>Is there guidance for learners in acceptable uses of mobile and e-learning technologies?</i></p>	<p>Consider:</p> <ul style="list-style-type: none"> <li>• How those working off campus will access IT support.</li> <li>• Whether a variety of different routes to information is desirable, e.g. telephone helpline, online guides, handbooks.</li> <li>• Learners will receive induction into their rights and responsibilities when downloading resources, borrowing equipment, or using their own mobile devices for learning activities.</li> </ul>	
<p><b>Practitioners</b></p> <p><i>What opportunities are there for you to:</i></p> <ul style="list-style-type: none"> <li>• Become technically proficient in resource creation for mobile devices?</li> <li>• Become effective at embedding m-learning and e-learning into your practice?</li> <li>• Disseminate your skills to others?</li> </ul>	<p>Many institutions have learning technologists, e-learning champions, advanced practitioners or mentoring schemes. You may be already holding such a post; if not, consider:</p> <ul style="list-style-type: none"> <li>• Discussing your ideas with staff in those roles to develop further skills.</li> <li>• Asking for, or setting up workshops to develop pedagogically sound uses of mobile and wireless technologies.</li> <li>• Using the intranet, an online newsletter or a blog to share achievements and new skills with others.</li> </ul>	