ICT IN EDUCATION

Workshop Report

International Workshop on Mobile Learning for Expanding Educational Opportunities
16 -20 May 2005, Tokyo, Japan

mobile learning

for Expanding Educational Opportunities

United Nations Educational, Scientific, and Cultural Organization
UNESCO Bangkok

ADB Asian Development Bank Institute
Tokyo, Japan

MOBILE LEARNING for Expanding Educational Opportunities

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Preface

The countries of the Asia-Pacific region are increasingly discovering the potential of information and communication technologies (ICT) to expand educational opportunities and accelerate national socio-economic development. ICT applications and mobile devices are increasingly recognized as strategic tools that have the potential to enable global access to educational materials and improve the quality of education.

By transcending physical and spatial constraints, ICT and mobile devices bring unprecedented educational opportunities to people of all socio-economic levels. Devices such as Personal Digital Assistants (PDAs), laptops, Pocket PCs, and mobile phones can be utilized as mobile learning tools to provide interactive content in previously unreachable and remote locations. At the same time, conventional classroom approaches to learning are being supplemented by learner-centred anytime-anywhere learning, with the potential to increase participation and school retention rates.

Many nations have developed e-learning and m-learning strategies, and are rapidly expanding the use and knowledge of ICT in educational activities by incorporating ICT into lesson plans, teaching methodologies and curricula, and devoting funds to procuring ICT-related resources. However, successful implementation of e-learning and m-learning programmes involves careful planning, and also faces an array of challenges.

The *International Workshop on Mobile Learning for Expanding Educational Opportunities* was an opportunity for the participants to gain a better understanding of what m-learning is and what it can offer. The workshop also enabled participants to build their capacity in terms of planning and implementing m-learning and e-learning programmes in their countries. In particular, the workshop assisted the participants by providing guidelines for defining priorities and for undertaking activities to introduce m-learning in educational systems. Representatives from countries in the Asia-Pacific region were able to share their experiences regarding the implementation of e-learning or m-learning programmes, and discuss issues and options related to implementation. The workshop participants also developed, shared, discussed and submitted proposals for implementing m-learning in their countries.

The workshop was organized by the Asian Development Bank Institute (ADBI) and the United Nations Educational, Scientific and Cultural Organization (UNESCO). The organizers would like to thank the Asian Development Bank (ADB); Paradise Patent Services; Pacific Resources for Education and Learning (PREL); Asia-Pacific Satellite Communications Council; Hewlett-Packard Asia Pacific Pte Ltd; Microsoft Corporation; and International Business Machines (IBM) for co-sponsoring this workshop.

Peter McCawley
Dean
Asian Development Bank Institute

Sheldon Shaeffer
Director
UNESCO Bangkok

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Abbreviations

ADBI	Asian Development Bank Institute
ADL	Advanced Distributed Learning
ADTA	Advisory Technical Assistance
ALS	Alternative Learning System
ASEAN	Association of Southeast Asian Nations
BCC	Bangladesh Computer Council
CAP	Community Access Points
CD-ROM	Compact Disc-read Only Memory
CIO	Chief Information Officer
CKO	Chief Knowledge Officer
CPU	Central Processing Unit
DMB	Digital Multimedia Broadcasting
DTH	Direct To Home Players
DVD	Digital Video Disc
ELLS	English Language Learners
GDLN	Global Development Learning Network
GPS	Global Positioning System
IBM	International Business Machines Corporation
ICT	Information and Communication Technology
IDRC	International Research Development Council
IP	Internet Protocol
IPR	Intellectual Property Rights
IT	Information Technology
ISTE	International Society for Technology In Education
LAN	Local Area Network
LMS	Learning Management System
Mbps	Megabytes of data per Second
MHz	Megahertz
MoEYS	Ministry of Education, Youth and Sport
MONE	Ministry of National Education
NIE	National Institute of Education
NIE	National Institute of Education Singapore

NGO	Non-governmental Organization
NREN	National Research and Education Network
NTA	Nanyang Technological University
PAMA	Permanent Assigned Multiple Access
PAN	Personal Area Network
PC	Personal Computer
PDA	Personal Digital Assistant
PPTA	Project Preparation Technical Assistance
PREL	Pacific Resources for Education and Learning
QOS	Quality of Service
RETA	Regional Technical Assistance
RFID	Radio Frequency Identification
SCAN	Supercourse Asia Network
TA	Technical Assistance
UNESCO	United Nations Educational, Scientific and Cultural Organization
USB	Universal Serial Bus (plug and play interface for add-on devices)
USQ	University of Southern Queensland
VCD	Video Compact Disc
VOIP	Voice-Over Internet Protocol
VSAT	Very Small Aperture Terminal
WAN	Wide Area Network
WiFi	Wireless Fidelity
WiMax	World Interoperability for Microwave Access
XML	Extensible Markup Language

Part One

International Workshop on Mobile Learning for Expanding Educational Opportunities

I. INTRODUCTION

A. Partners

The *International Workshop on Mobile Learning for Expanding Educational Opportunities* was organized by the Asian Development Bank Institute (ADBI) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) with the support of the Asian Development Bank (ADB); Paradise Patent Services; Pacific Resources for Education and Learning (PREL); Asia-Pacific Satellite Communications Council; Hewlett-Packard Asia Pacific Pte Ltd; Microsoft Corporation; and International Business Machines (IBM) in response to the many activities to introduce e- and m-learning services that are currently being sponsored by governments in the Asia-Pacific region.

B. Objectives

The objectives of the workshop were to highlight the benefits of m-learning and to provide specific recommendations about how to develop strategies for the implementation and sustainability of m-learning.

Mobile Learning

Benefits:
M-learning has the potential to improve efficiency in the education sector and expand educational opportunities to underserved communities in remote areas. However, there are a multitude of challenges faced when introducing and implementing m-learning. For example, infrastructure is often underdeveloped, and poor and rural communities lack access to ICT and knowledge of its usage.

Prerequisites:
Before m-learning programmes can be implemented, infrastructure must be established, ICT services expanded, innovative policies administered, curriculum and content developed, school administrations reorganized and teacher training conducted.

While the benefits of m-learning are growing, there remains a need for better understanding of the impact and role of ICT-enabled education. It is necessary to build awareness among national and local government policymakers and rural communities in order to comprehend the benefits that m-learning can provide and, most importantly, address the inequality in access to education and to ICT.

In support of that goal, the specific objectives of the workshop were as follows:

a) To review recent trends of mobile and wireless learning programmes
b) To examine issues in introducing mobile learning programmes in rural and remote areas
c) To identify policies and strategies conducive for mobile learning
d) To draft action plans/project proposals to introduce mobile learning

As well as increasing awareness about the benefits of m-learning, the workshop encouraged sharing of knowledge and experience on the subject. Given the extent of resources required in implementing m-learning, sharing of knowledge and experience could help developing countries in the region to reduce costs and time required to develop suitable m-learning programmes, devices, and content.

C. Opening Remarks

The workshop was opened on 16 May 2005 at the Asian Development Bank Institute (ADBI) in Tokyo. Representatives from ADBI and UNESCO made opening remarks, as summarized in the boxes below.

Making ICT Relevant to Developing Country Needs

ADBI is a think tank that aims to promote development and tackle poverty across the region. ADBI conducts research, workshops, capacity-building, and outreach, all of which are funded by the Government of Japan.

Current technological changes and the rapid progress in ICT are largely beneficial and have a positive impact on many lives. However, many aspects of this technology are developed in rich countries and are not particularly suited to the needs of developing countries. Therefore, it is necessary to think about the way this technology can be used in developing countries to promote development. ICT needs to become more client-oriented and less supply-driven in order to respond to the needs of people in developing regions. Extending ICT and ensuring access to ICT is an extremely challenging task. In this context, the participants of the workshop have a critical role to play as the voices of the developing countries, and must tell suppliers of technology and development organizations whether the needs of the people are being met adequately.

Mr. Peter McCawley, Dean, ADBI

Workshop Objectives and Outputs

The four main objectives of the workshop can be summarized as follows:
- to review recent trends of mobile and wireless learning programmes,
- to examine issues in introducing mobile learning programmes in rural areas,
- to identify policies and strategies conducive for mobile learning,
- to draft project proposals to introduce mobile learning programmes in participating countries.

The following schedule will enable us to accomplish these objectives:
Day 1: Share country experiences
Day 2: Examine issues
Day 3: Case studies with demonstrations
Day 4: Policies and strategies
Day 5: Presentation of project proposals

The five expected outputs of the workshop are:
- Project proposals to introduce mobile learning
- Proceedings CD-ROM
- Workshop report
- Lecture CD-ROMS
- Networking

Mr. Jeoung-Keun Lee, Senior Capacity-building Specialist, ADBI

Examining M-learning as an Educational Tool for Development

Thanks go to Mr. Lee, Senior Capacity-building Specialist, ADBI, for taking action after the 2004 workshop on e-learning and turning the idea of an m-learning workshop into a reality. Such workshops facilitate exploration of the potential of m-learning and enhance understanding of the opportunities/risks associated with using such technologies in education.

When examining m-learning, several important questions should be considered:

- What kind of technological tools are we talking about?
- What kind of learning can take place with these devices?
- Can m-learning bring cost-effective, relevant learning opportunities to the poor and to those in rural areas?
- Who can use which tools and for which educational purposes?

In discussing e-learning and m-learning, it is important to remember that while technologies remain a tool in education and can supplement the teaching-learning process, they are not a replacement for teachers.

Mr. Cédric Wachholz, Chief, ICT in Education Unit, UNESCO Bangkok

D. Participants

Participants from 12 countries in the Asia-Pacific region attended the workshop. Resource persons from the workshop included experts from academic institutions, development agencies, government ministries, non-profit companies, and multinational corporations such as Hewlett-Packard Asia Pacific Pte Ltd, Microsoft, and IBM.

E. Elected Officers

The workshop elected the following officers:
Chairperson: Mr. Ashok Kumar Singh (India)
Vice-Chairperson: Dr. Tayyaba Siddiqui (Pakistan)

II. WORKSHOP PROCEEDINGS

A. Opportunities and Issues of M-learning in Asia-Pacific Development

Mr. George Darby, President, Paradise Patent Services

This paper will address the topic of technology infrastructure, and focus on the opportunities and policy issues encountered in "mobile learning" (m-learning). While various types of mobile devices can be used in m-learning, this presentation refers specifically to Pocket PCs.

M-learning depends upon the broader phenomenon of Internet Protocol (IP) convergence, when data, voice and video all travel over a single channel. The devices sitting on the IP network, such as the internet, convert the packet that belongs to a voice or data exchange or video into the appropriate presentation. M-learning devices have now been developed so as to have the required screen resolution and auto-handling capability to use normal web content.

M-learning combines two new technologies: WiMax and Pocket PC. WiMax provides wireless local area network connection, has a range of up to 30 kilometres and can carry up to 54 megabytes of data per second (Mbps). WiMax provides IP multimedia services and will accelerate IP convergence because it brings these high data rate services to a relatively inexpensive portable computer device (the Pocket PC). IP multimedia services include web content, streaming video, voice over IP (VOIP), and wireless links to video projectors. The Pocket PC central processing unit (CPU) can accommodate up to 634 megahertz (MHz) and enable simultaneous audio and video. Pocket PCs can use satellite or wire line connectivity, or simply a DVD to deliver content. Advantageous features of Pocket PCs are: XML micro browsers; touch sensitive screen; excellent audio quality; integral WiMax and Bluetooth; software-compatibility; e-books; and integral voice-over internet protocol (VOIP).

Use of WiMax Pocket PCs for m-learning can enable teachers and learners to overcome the resource constraints faced in remote and developing communities. Problems with some e-learning formats and distribution architecture that are encountered in the Asia-Pacific region include: distance; the high cost of desktop computers, wire line, and broadband connection; and the expense of installation, maintenance, storage and repair. The WiMax bandwidth (54 mbps) can reach rural areas, even in areas of difficult terrain. Satellite technology enables data to be accessible in remote areas in which teachers do not have access to libraries and an extensive array of teaching material. The Pocket PC devices themselves and the WiMax hotspots are affordable, and the cost of maintenance, storage and repair is low. An additional limitation of traditional e-learning equipment is that desktop computers require a high level of IT literacy and training. M-learning is a revolutionary alternative because it involves sophisticated technological devices (based on a wireless network) that can be used by untrained persons.

For content authoring, it is important to consider and know the skills of the user. If the device has multiple audiences or users then decisions in content authoring must also take into account the varying learning styles of each learner.

M-learning offers numerous opportunities but also poses related policy issues. Decisions must be made as to whether m-learning is a supplement to traditional classroom education or an alternative approach to mainstream education. Alternatively, m-learning could be utilized solely for special education for students with learning disabilities, or only in ICT courses. In educational administration, m-learning can assist in designing curricula, supporting school administration, and training teachers. Once m-learning and its broadband network is set up, the network backbone can be utilized for other services such as e-government and dialogue between government and citizens, and can enable the development of e-communities. The Pocket PC can additionally be used for preventive medicine and emergency communications.

Four key operational issues need to be addressed in the development of m-learning programmes and provision of m-learning devices:

1) How to pay for infrastructure and curriculum
2) Do content and VOIP servers (telephone service) connect to the Internet
3) Electricity
4) Inventory control (anti-theft)

Possible sources of revenue for the deployment and maintenance of m-learning programmes include:

- VOIP – people will pay for telephone service
- M-commerce – people will buy goods and services using Pocket PCs
- E-mail and web browsing – people will pay for Internet access
- Private network – businesses will pay for network services

The key policy issues in m-learning are:

- M-learning as the agent of change in education
- VOIP services within a nation's telecom policy and regulations
- MSP services and existing ISPs within telecom policy
- Private network services
- Process of determining priorities

While adapting to m-learning requires significant effort for those who have only a basic level of IT skills, and therefore there can be resistance to it in some countries, such resistance to change can be overcome by initially only using m-learning in special education courses or ICT courses, then gradually using them in mainstream education as they gain acceptance. In addition, because older teachers may be more resistant to adopting ICT and m-learning, ICT training is vital for all teachers. However, as a fellow workshop participant Mr. Deshpande, has indicated, m-learning does not require teachers to become ICT experts, they only need a limited level of ICT experience to be able to operate particular devices and use them as a tool to deliver educational content. It is clear that teachers will use the technology if they recognize that it enhances learning content and improves the quality of education. It is important to make teachers aware that m-learning is a natural extension of mainstream learning, and can meet student's needs and bring benefits.

B. Developing Action Plans for Mobile Learning

Dr. Jeoung-Keun Lee, Senior Capacity Building Specialist, ADBI

This paper provides a brief overview of the functions and history of the Asian Development Bank (ADB) and gives recommendations for writing project proposals relating to m-learning.

The main functions of ADB are to: provide technical assistance, offer advice, provide training, and furnish loans. There are four types of loans: project loan, sector loan, programme loan, and private sector loan. The types of technical assistance (TA) provided are: project preparation technical assistance (PPTA), regional technical assistance (RETA), advisory technical assistance (ADTA), and small-scale technical assistance. Since the inception of the Bank, priorities have been set as follows:

Time Period	ADB Priority
1960's	Feeding people
1970's	Providing energy
1980's	Protecting the environment
1990's	Focusing on people
2000's	Fighting poverty

ADB has invested a total of US$5.3 billion in education sector development since 1970. The priorities for the education sector are: reducing poverty; enhancing the status of women; and providing the knowledge, attitudes, and skills essential to pro-poor sustainable economic growth.

The ADB policy on e-development focuses on creating an enabling environment by fostering development of innovative sector policies; strengthening public institutions; and developing ICT facilities, infrastructure and networks. The e-development policy focuses efforts on building human resources to improve knowledge and skills, and promoting ICT literacy and lifelong learning through e-learning and awareness programmes.

The cycle of an ADB project consists of six stages, which are:

1. Identification
2. Preparation
3. Appraisal
4. Loan negotiation and board approval
5. Implementation
6. Evaluation

The time from the identification stage to evaluation can take a maximum of 10 years. The preparation and completion of a project with ADB follows specific bureaucratic procedures.

The creation and implementation of a project in the education sector consists of the following steps:

Step 1: Assess performance in education sector
Step 2: Identify constraints and issues in education sector
Step 3: Analyze cause-effect relationships to identify factors of low performance
Step 4: Search for opportunities and solutions
Step 5: Establish an objective for the project
Step 6: Design project by tackling causal factors (use the project framework)

In cases where much time, say five years, is needed to approve an ICT-related project, then it is possible that the particular technology in question could be obsolete by the time the project is ready to be implemented. It is important, therefore, to consider the time required for approval when submitting any project proposal. Although hardware and infrastructure expenditure can be deployed rapidly, components such as teacher training and content development often take longer. The time required is reduced when a policy and plan coordinates all these different inputs effectively. One way to accelerate the implementation of a project in the education sector is to use standardized procedures or curricula. Another means is to repair existing facilities (laboratories, schools, etc.) instead of building new ones.

It is recommended that project implementation follow a phased approach, including pilot testing. Such an approach is recommended because while a project or experience may work successfully in one part of a country, it might not be feasible or appropriate in a different region of that country or internationally.

The rate of failure of projects undertaken by ADB is relatively low because ADB conducts advisory technical assistance, or pilot testing, which builds capacity and holds consultations and discussions with stakeholders. ADB provides technical assistance in order to build the capacity of local governments, thereby enabling them to have the ability to select appropriate measures and equipment for ICT projects.

The project framework is a tool to summarize the project proposal. The project framework should include the following:

- **Impact or goals**. Long-term development vision in education sector. Other projects and interventions in addition to this project may contribute to the impact.
- **Outcomes or objectives.** Improved status after project and focus of project design. The result that must be delivered by the end of the implementation.
- **Output.** Describes the physical or tangible deliverables to be achieved such as buildings constructed, policies formulated, schools operated etc.
- **Activities.** Tasks that must be undertaken to produce each output such as: establishing regulatory framework, putting in place mobile learning units, developing courseware, improving information network, mobilizing equipment and software, conducting teacher training.
- **Performance targets/indicators.** Define sector performance objectives to be attained. Success, quality, quantity, time, and location.

- **Inputs.** Consultants, equipment, training, staff, resources, private sector contributions, funding, operation and maintenance costs.
- **Assumptions and risks.** Assumptions are positive factors essential to the project's success, but outside of the project's control. Risks are what are most likely to go wrong.

In conclusion, listed below are a number of recommendations for writing a persuasive project proposal:

- Know your donors and your potential funding sources.
- Select the right topics to match the priorities of the funding agency's agenda.
- Share information with partners, stake holders, and donors.
- Explain clearly why the project is important and why the funding agency should finance it.

C. Key Questions on M-learning

Mr. Cédric Wachholz, Chief, ICT in Education Unit, UNESCO Asia and Pacific Regional Office for Education

The first step in developing a m-learning project in a country is to map the national vision with a clear understanding of the country's goals, plans, and educational context, as well as an analysis of the dynamics of change in administration. The second step is the identification and analysis of areas for ICT intervention in education. It is critical to establish and define the educational objectives.

When analysing areas for ICT intervention in education it is important to think about how m-learning could be used to facilitate the goals in each of the following categories:

- Expanding educational opportunities
- Increasing efficiency
- Enhancing quality of learning
- Enhancing quality of teaching
- Sustaining lifelong learning
- Facilitating skill formation
- Advancing community development
- Improving policy planning and management

Depending on the context, m-learning can be useful in all of the above areas. For example, it can support the expansion of educational opportunities (access to education) because it can be used to deliver educational opportunities to a range of types of people, including women who face social barriers to education; populations living in remote rural areas; and working adults whose time is limited. Likewise, if the goal is sustaining lifelong learning, m-learning is useful as it can provide convenient, user-centred learning.

Successful project implementation must also take into account the following key parameters:

- Infrastructure (hardware, maintenance)
- Content (curriculum, software, assessment)
- Personnel (need to be committed and trained)
- Financial resources, sustainability
- Piloting and evaluation

In a workshop activity, participants analysed m-learning and developed questions and issues relating to each of the categories of educational goals and key parameters presented above. The participants generated the following list:

Expanding educational opportunities (access)

Challenge: to reach individuals and groups that are historically underserved such as girls and women, rural populations, adult workers, and persons who cannot go to learning centres (due to distance, expense, and other obstacles).

Increasing efficiency

Issues: dual shift school-systems, multi-grade schools, small urban or rural schools, flexibility in learning schedule.

Enhancing the quality of teaching

Issues: difficult profession, no one-shot training, continuum including initial training, lifelong upgrading, and connecting.

Enhancing the quality of learning

Challenge: to motivate and engage learners, bring life to concepts and processes, foster inquiry, provide flexibility, allow application of information, bring the world into the classroom, offer collaborative opportunities and communication, offer individualized learning.

Sustaining lifelong learning

Issues: modern society demands constant updating, the "educated" can become obsolete, the life-cycle pattern is changing.

Improving policy planning and management

Issues: management of institutions and systems, management of policymaking including storage and analysis of data, construction and assessment of policy scenarios, and tracer studies or tracking systems.

Financial resources, sustainability

Issues: Acquisition of hardware and software, installation and configuration, connectivity, maintenance, supplies, utilities, retrofitting of physical facilities, replacement costs, acquisition and creation of content materials, training of staff, testing, evaluation, and adjustments.

D. Mobile-Campus Solutions

Mr. Yasunori Akenaga, Senior Manager, Wireless Broadband and Sensing Solutions, IBM Japan

This presentation begins with a brief historical overview of information technology (IT) revolutions and developments in ICT, then discusses the impact of recent ICT developments on educational institutions and provides a summary of the challenges these institutions face and recommendations for addressing those challenges.

Historical Overview

The mainframe was the first information technology revolution, enabling organizations to process data quickly and efficiently. This was followed by the advent of Personal Computers (PCs), which enabled rapid personal data manipulation and further raised efficiency and effectiveness in information processing. The internet revolution led to momentous developments in communication and exchange of information. In addition, during the internet revolution the concept of e-business was introduced. E-business has improved intra-organizational productivity; streamlined business processes between organizations, and introduced new business models such as supply chain management. More recently, pervasive wireless technology is enabling the launch of the on-demand era. The on-demand era means that IT technology is expected to enable the following activities:

- Real-time sense and response to core applications.
- Access to mission-critical data from any location.
- Connect people, data and processes on demand.
- Decision-making and communication without human intervention (autonomic computing).

Information Technology Revolutions	
Time period	**Changes in IT**
1960's	Mainframe revolution
1980's	Personal Computer revolution
1990's	Internet revolution
Present	Pervasive or ubiquitous revolution

Impact of Recent ICT Developments on Educational Institutions

Modern ICT has had a significant impact on university campus systems. In the past, the face-to-face campus culture was the norm. Universities had a mixture of voice and data communication networks including wired, wireless, LANs, and hotspots that were unconnected and uncoordinated. The population on campus was a captive audience meaning that it functioned in a relatively closed environment. Today, however, in many university campuses, wired and wireless technology is creating a community of connected constituents. An increasing majority of students are using wireless devices such as notebook PCs and PDAs. Today's students are more technology savvy then the university staff and officials, and they expect their needs to be met anywhere, anytime and with any device.

Challenges

There are a number of challenges involved in meeting the needs of today's students:

1. Mobility Challenges

- Connectivity
- Authentication and authorization
- Security
- Voice/data access
- Device management
- Scalability
- Services including messaging services, location awareness, intelligent notification

2. Device Challenges

- Unique device capabilities
- Varying programming models
- No dominant standard
- Wide range of target environments

3. Application Challenges

- Content aggregation
- Customization and personalization
- Application reuse
- Multi-device capability

Opportunities

In order to meet these challenges, the following opportunities should be pursued by educational institutions:

- Developing new business models that will increase revenue for the institution
- Future-proofing the campus network infrastructure
- Focusing on the integration of essential public safety solutions
- Selecting the best vendor partners and alliances to ensure multi-device (internet, phone, PDA, etc.) application access
- Differentiating the college/university to ensure competitiveness in the marketplace
- Improving the "braking distance" necessary to lower IT costs and quickly align IT with changes in funding and budgeting
- Increasing the value of the relationship between the institution and the surrounding community

Wireless Solution Roadmap

The diagram below depicts a campus wireless solution roadmap (Figure 1). The right side of the model, from stage A to stage D, displays the services provided by the IT service-company to support the development of each phase on the left side of the chart. The phases can be combined to increase speed to market. This solution roadmap defines an iterative approach to solution development that provides business value checkpoints that ensure the sustained business viability of the solution. In addition to the phased-approach roadmap, campus services can be enhanced by instituting adequate infrastructure. The campus infrastructure needs to support and impart application delivery and messaging, commerce, personal safety and security, and digital media.

Mobile technology and advanced ICT can extend self-service web applications into a multitude of student services and departments such as finance, registration, grades posting, and alumni events. It is important to deliver these capabilities in a low cost self-service mode while increasing community exposure and level of service. Local commerce should also be considered. On campus and off campus transactions through the university can generate revenue while building brand loyalty for the university.

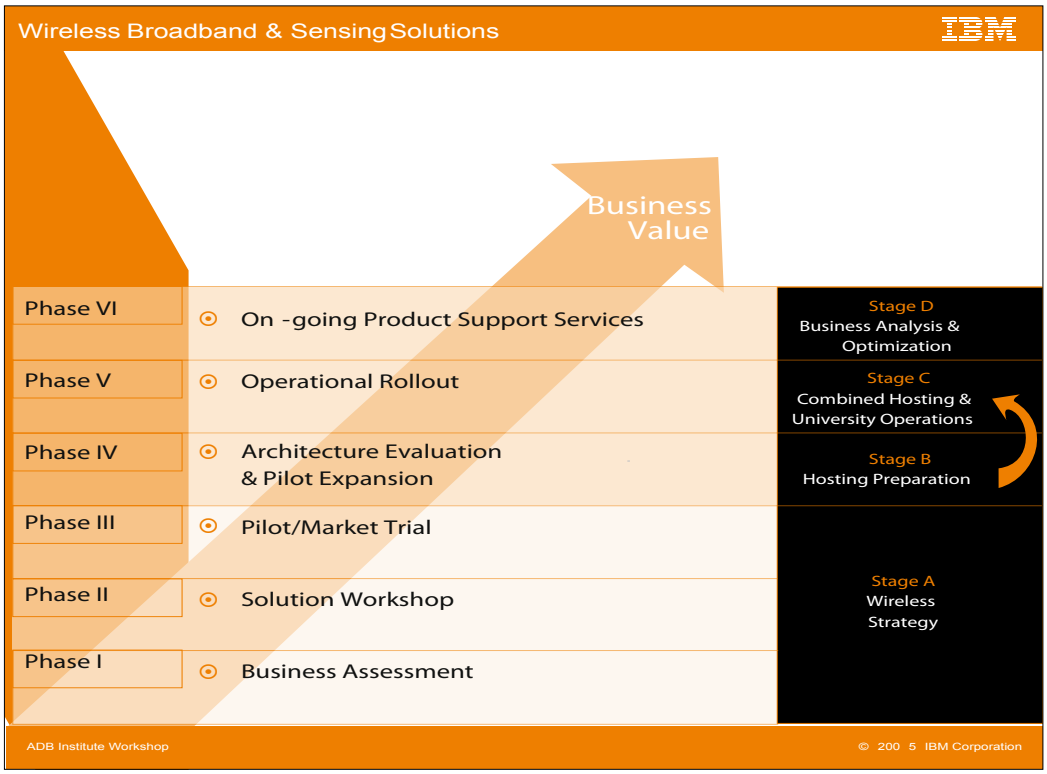


Figure 1: Campus wireless solution roadmap

Examples

A number of examples can assist in demonstrating the benefits of harnessing wireless technology. At Wake Forrest University, for example, cellular coverage was extended using third party neutral hosting which enabled the university to address the explosive use in cell phones while supporting a revenue-generating cellular business model. The university additionally supported a revenue-generating business model for low-cost broadband to the university and the community, and tied the multiple infrastructures together with a mobility-enabled framework that leveraged the existing networks. In another example, the University of Central Arkansas provided a new range of services to both students and faculty, including instant access to financial aid, grades, and registration by shifting its telecommunications business model to fully embrace wireless technology. Another example of utilizing wireless technology on campus is that of the Canyon Independent School District which took advantage of wireless technology to overcome the challenges posed by geographic distance and difficult terrain that had prevented residents of this region from accessing educational facilities and services.

E. Why We Need to Cultivate E-learning Professionals

Mr. Kazuyuki Shinkai, Enterprise Solutions, Mizuho Information and Research Institute

Judging from the country reports presented by workshop participants, there are three leading issues in expanding e-learning and m-learning:

- ICT infrastructure
- Financial resources
- Human resources

This presentation is related to the third issue: human resources.

There are numerous definitions of an "e-learning professional". An e-learning professional can be any of the following positions:

- Learning manager
- Chief learning officer
- Instructional designer
- Contents developer
- System developer
- Tutor
- Course Mentor
- Instructor
- Consultant

The activities of an e-learning professional can be placed within certain categories, including:

- Analysis – defining the needs and constraints
- Design – specifying learning activities, assessment and choose methods and media
- Development – beginning production, formative evaluation, and revision
- Implementation – putting the plan into action
- Evaluation – evaluating the plan from all levels for next implementation

An examination of the e-readiness of e-learning professionals in the 13 Asian countries that are part of the Asia e-learning network shows that in Japan the concept of instructional design is widely recognized. However, it is not widely applied in Japan, especially in employee-training enterprises because e-learning is only implemented if it directly helps to cut costs. An additional reason for the lack of e-learning instructional design is that Japan is a densely populated country with numerous schools within a small area, and there is therefore little need for distance learning.

In Vietnam and countries of similar e-readiness, e-learning is not yet at a practical stage. E-learning professionals in Vietnam are classified as content developers, instructors, or IT specialists. In the Philippines e-learning professionals are: academic support staff, including instructional designers and teachers; administrative support staff; technical support staff; and management staff. In more ICT-advanced countries such as Singapore there are some differences. For example, the Nanyang Technological University (NTU) classifies e-learning professionals into three categories: front-end, including teachers mentors, tutors, teaching assistants; mid-end, including subject experts, instructional designers; and back-end, including system administrators and Learning Management System (LMS) administrators.

The role of e-learning professionals is to support learning. Implementation of e-learning is not the end goal. E-learning professionals are important because they guide, manage, and encourage students. E-learning professionals can gain skills through university courses, or through government and business training.

Analysis and evaluation are important factors when developing e-learning courses. There is a need to ensure that courses are appropriate to the needs and cultural conditions of each country. Ongoing analysis and evaluation of e-learning courses is required, so that they remain relevant and are continually improved. Any obstacles to such improvement should be identified and overcome. In many cases, for example, the lack of financial resources and budgetary planning are a major obstacle, because once the course contents are developed, the lack of financial resources impedes improvements to the course.

F. Exploring M-learning: Academic Initiatives in North America and Europe

Ms. Judy Brown, Director, Academic ADL Co-lab, University of Wisconsin System

There have been many changes and significant progress in mobile technology since I bought my first mobile device in 1979. Below I will give a brief overview of the history of mobile devices, then discuss their potential for use in the classroom and provide examples of projects that are underway to introduce m-learning devices in educational institutions.

History of Mobile Devices

Modern mobile devices began with the Apple Newton in 1993, followed by the Palm Pilot in 1996. Five years later the Pocket PC and the introduction of flash player were the next significant introduction, and have since been used for educational purposes. The next major development occurred when cell phones gained the capabilities of personal digital assistants (PDAs) and merged connectivity.

The different types of connectivity available through mobile devices are: wide area network (WAN), local area network (LAN), and personal area network (PAN). Within the field of education it was originally envisioned that handheld devices could serve as computer replacements in which full courses could be delivered. However, to date only individual applications and teacher training has been successful, as well as data collection, mainly in the scientific and medical fields.

Currently, there are a multitude of devices available for mobile learning, ranging from PDAs to video players to cell phones. Add-ons to mobile devices such as cameras, barcode readers, and Global Positioning Systems (GPS) are also popular.

Mobile Devices in the Classroom

While students are initially enthusiastic about new mobile devices when they are introduced in the classroom, students quickly realize their limitations and difficulties. However, mobile devices are readily accepted.

There is a wide selection of applications available, several of which are suitable for, and useful in, the classroom. For example, the University of North Carolina has developed a mobile device classroom-response system in which all students can answer the teacher's questions, thus enabling a teacher to monitor the level of each student's understanding. Mobile devices are also being used to improve communication and efficiency at the University of California, San Diego where location-based information is available on handheld devices, enabling staff and students on campus to locate each other immediately. At some universities, mobile devices are actively encouraged. Medical schools are especially active is utilizing handheld devices. At the University of South Dakota, for example, all freshmen and medical school students were given handhelds and the use of these devices has been successful in several subjects. Similarly, at Duke University all freshmen were given Apple iPods, which were used to store course content, music appreciation, poetry, and readings. Other possibilities for the use of mobile devices in education are e-books, GPS and audio devices.

M-learning Projects

There are a number of m-learning projects underway which aim to utilize mobile devices to improve learning. One such project is the "m-learning.org" project, sponsored by the European Union, which was initiated in 2001 and completed in 2004. This project targeted unemployed, underemployed, and homeless youths. These youths were provided with handheld devices that also functioned as phones. A variety of courses such as driving courses and language courses using SMS were administered. The findings of the project were that m-learning helps learners to improve literacy and numerical skills, remain focused, and to identify areas where they need support; raises learner confidence; encourages independent and collaborative learning; removes formality from the learning experience; and helps combat resistance to use of ICT.

Another significant European m-learning initiative was one which focused on developing a common core of content which would be shared among European countries, ensuring interoperability, open standards and quality measurement of materials.

There are also several ongoing projects that are exploring future possibilities of m-learning. These may not be applicable to early stages of development of m-learning, but are interesting to think about and learn from. Some projects currently being implemented explore augmented reality such as superimposed information diagrams and scientific role-play programmes.

References and Recommendations

A useful source of reference for information about m-learning is the www.mLearnpedia.com website. This site has a range of types of information, including about free and open-source software.

It is recommended that m-learning content be translated into various local languages so that teachers and learners can benefit from the new technology. Without translation into local languages, even those students fortunate to have access to the technology are restricted by language barriers.

G. Satellite-Based Distance-Learning Network

Mr. Eui K. Koh, President, The Asia-Pacific Communications Council

This paper examines the contribution that satellite technology can make to distance learning. There are several mechanisms, including fixed telephone systems and WiMax , that can deliver digital content. Satellite technology plays a complementary role to such delivery mechanisms because satellites enable wide coverage.

Satellites are a valuable means of enabling wide distribution of educational content. In addition, satellite technology is a viable and effective form of education technology for the Asia-Pacific region because satellites are easy to install, are scalable for growth, and provide affordable communication capacity. There are many opportunities for acquiring affordable satellite capacity in Asia as there are numerous competing satellite operators within the Asian region. In certain countries, however, some regulatory hurdles exist.

Satellite service applications in Asia include broadcasting and video services. Satellite also enables broadband services and direct to home players (DTH). In some countries, such as Japan, DTH subscription provides educational programmes for those studying for college entrance exams.

Broadband satellite applications have the potential to facilitate distance learning because they provide intranet, LAN, and WAN connectivity; provide access to the internet for remote and underserved areas; enable VOIP; and facilitate commercial services including enterprise video distribution. Satellite broadband services are currently used in distance medicine programmes. In addition, this technology enables digital media streaming and is utilized for monitoring and control of traffic and natural disasters. Direct to home (DTH) and broadband services are readily available in Asia.

Very small aperture terminals (VSATs) are satellite dishes that are sized between 1.2 and 2.4 metres wide. VSAT Internet Protocol (IP) applications enable rapid mobility. The application of such terminals is extremely useful for e-learning, e-government, and e-business. VSAT technology has progressed rapidly and currently the Digital Video Broadcast – Return Channel via Satellite (DVB-RCS) two-way service standard is utilized for interactive communication between students and teachers.

Satellite digital multimedia broadcasting (DMB) is a new concept in broadcasting services, characterized by three key differentiators: mobile; personal media; and interactive, including video, audio and data. Content is aggregated at the satellite DMB centre and then sent to the satellite on Ku-band, and downloaded to the terminal through an S-band link. User terminals for satellite technology are numerous and include: car navigation combo terminals, mobile phone combo terminals, mobile television terminal and portable digital assistants (PDAs). DMB via satellite is ideal for mobile learning.

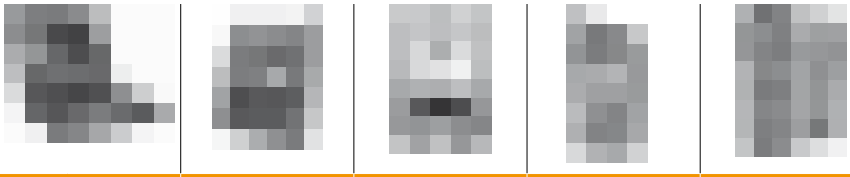
From the points made above it can be concluded that satellite applications are a viable option to complement PDA or WiMax applications for m-learning in the Asia-Pacific region.

H. Introduction to Mobile-Learning Tools

Mr. William Horton, President, William Horton Consulting, Inc.

This paper provides an overview of the tools needed to create, offer, and access mobile learning. Mobile learning or e-learning tools are the result of two converging technologies: computers and mobile phones. Numerous platforms are available, each with its own advantages, technical specifications, and cost (see Figure 2 below).

Typical Technical Specifications



	Wireless Laptop	Tablet	PDA	Smart Phone	Mobile Phone
Weight	<2 kg	1.8 kg	0.2 kg	0.1 kg	0.1 kg
Processor	*****	****	**	**	*
Memory	2 GB	1 GB	192 MB	64 MB	4 MB
Storage	80 GB	60 GB	2 GB	-	-
Display	1400 x 1280	1024 x 768	640 x 480	220 x 176	200 x 150
Battery	3-5 hrs	3-5 hrs	6-8 hrs	8-12 hrs	4-10 hrs
Wireless	b, g, BT	b, g, BT	b, g, BT	phone, BT	phone
Cost (USD)	$2000	$1500	$800	$400	$200

Figure 2: Range of platforms

A wireless laptop computer offers the greatest capabilities, including maximum storage and a standard PC platform that enables conventional e-learning and web content. However, a wireless laptop is often not suitable for use by small children, and does not permit e-learning while moving.

A tablet computer has full computer capabilities without the keyboard and has been especially successful for teaching and learning of visual subjects. Its major drawback is that the screen scratches too easily.

A personal digital assistant (PDA) and Pocket PC are portable and can have many add-ons, but might not be compatible and incur high costs. The smart phone is a PDA with some mobile phone features or a mobile phone with PDA features. It is advantageous because it is a small device to carry, but the display size is limited. The mobile phone is the least expensive alternative, adequate for exchange of simple messages. In addition to these platforms are some unusual devices such as wearable computers, music players, in-vehicle computers, and I-pods that carry data.

Wireless networking is a feature that can be added or built into the system. Bluetooth wireless is a wireless connection to a local device. It exchanges and synchronizes data so can be utilized for interactions between students and teachers, and is useful for connecting to peripheral devices.

A Global Positioning System (GPS) is a hardware device that guides learners to locations and objects, records data, and teaches navigation skills. Another hardware device is a data probe, which hooks onto the device and is used for real-time data collection with sensors for temperature, air and light.

Radio frequency identification (RFID), another hardware device that can be used for m-learning, is a reader on the mobile device that will detect and retrieve data such as lesson plans from a designated object. Still and video cameras can also be used in m-learning as they offer multiple functions to capture data.

Web browsers and Macromedia flash are the most common type of software used in mobile devices. Additional programmes to consider are Acrobat PDF, readers for MS office, Power Point converters and media players.

When selecting hardware devices and software for m-learning, it is important to be cautious about the following issues:

- Battery life.
- Health concerns – eyestrain, repetitive strain, radio emissions.
- Intellectual property protection.
- Theft of devices.
- Theft of identity.
- Privacy – access to student records.
- Cheating.
- Cost of updating technology.

One cost effective method for updating technology is mixing and matching parts between different devices to build a functioning usable computer. In order to upgrade, hardware equipment must be modular so that units can be added together to make the system larger, improve the capabilities, or expand its size. In project planning it is important to consider the record of companies in supporting older products.

In conclusion, below is a list of guidelines for selecting the appropriate mobile technology for e-learning:

- Start with your educational goals: what sort of technology is required?
- Do not forget learners: what are their needs, how does the technology assist them?
- Pick a practical platform.
- Choose tools that have been proven to be useful.
- Budget for peripherals, software and maintenance.

I. IT for M-learning in Developing Countries

Mr. Vinay L. Deshpande, Chairman & CEO, Encore Software Ltd., Managing Trustee, The Simputer Trust

The designers of current mobile technologies do not necessarily consider the conditions in developing countries when designing, so their products are not always applicable in the developing world. However, there has been research into the technological needs of people in developing regions, and this paper will discuss some technologies and devices that are suitable for conditions in the developing world.

Today's personal computer (PC) is a general-purpose machine which integrates computing, VCD/DVD functions, TV, and audio system. Because of this complexity this machine is not suitable for some developing regions. It is no longer useful for many simple day-to-day tasks. Most of the capacity and capabilities remain unused and the excessive complexity has made software "buggy" and unstable. Most importantly, the complexity makes the learning cycle too difficult and time-consuming for those living in developing regions. Other disadvantages of current PCs are the continuous threat of viruses due to security lapses, and the need for a continuous power supply, something which is often not possible in unstable and rural regions. In addition, there is the issue of cost. Most advertisements for PCs hide the real cost of ownership. PC owners must pay for hardware, software, power supply and maintenance costs. They also face the cost of internet connection, which can often be very high in rural areas. Furthermore, the primary interface is generally in English, not in local languages. For the reasons listed above, normal PCs are unsuitable for three quarters of the world's population.

The developing world needs technology with the following characteristics:

- Simple, easy to use, affordable technology.
- Independent of mains power-supply.
- Rugged, dust resistant.
- Shareable.
- Fitted with multi-lingual capabilities.
- Useful – must make an impact on daily life for education, earning a living, and communication.

Given these special needs, the desirable features for a computer are:

- Affordable.
- Battery operated; rechargeable.
- No moving parts.
- LCD screen which requires less power.
- Touch screen with pictorial icons.
- Printer interface.
- Internet connectivity with built in modem.
- Intuitive user interface making a manual unnecessary.
- Built-in software including word processing, e-mail, browser, multilingual capability, local language text-to-speech, multimedia.
- Memory expansion capability–application software on USB flash memory stick.

With an understanding of the particular needs of people in developing regions, designers developed a simple mobile device, the Encore *Simputer* (see Figure 3).

It is a low-cost Linux-based local language computing device with multiple input and connectivity options, and has the following features:

- A smart card facilitates sharing while maintaining privacy of data.
- Icon graphics make it easy to use.
- Voice feedback in local languages does not require the user to be literate.
- Touch is the primary input, image and sound are the primary outputs.
- It runs on two AA batteries because these are commonly available in developing regions.
- A large and flexible memory of 64 MB DRAM, in 144MB flash means that user data is never lost even when batteries are empty.
- One of the most important attributes is that the applications can be platform independent, hardware is not needed.
- The Simputer can accept and export files to and from Windows as well as view PowerPoint.

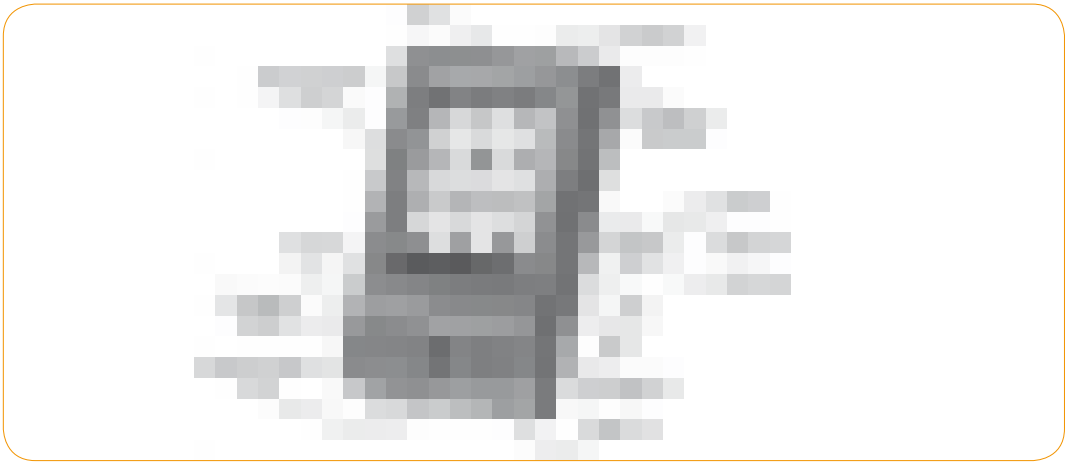


Figure 3: The Encore Simputer

Another computer device similar to the *Simputer*, but larger in size is the *Mobilis*, a mobile desktop computer. The unique features of the Mobilis are:

- Portability and small size.
- Downloadability for upgrades and files transfers.
- Multi-language capability – can be easily adapted to other languages, has indigenous and multilingual text-to-speech engine .
- Optional GPS, GPRS built-in.
- Low power consumption – battery operation and enhanced operation using solar power.

Typical *Mobilis* applications in education are:

- Electronic book reader for educational content
- Access to digital libraries
- Storage for "Electronic Books"
- Streaming and animated content
- Personalized learning
- Text-to-speech for various applications

The cost of the *Simputer* is about US$225.00, and the *Mobilis* with all wireless capabilities is US$400.00.

J. Designing Courseware for Mobile Devices

Mr. William Horton, President, William Horton Consulting, Inc.

This paper examines design factors and guidelines for m-learning projects.

Successful m-learning projects always start with clear goals that have worthwhile and achievable purposes. Some of these goals are outlined below.

Goals of instituting m-learning	Description
To learn from the world.	In m-learning, learners learn from a variety of sources including objects such as exhibits in museums; locations and environment; and experts including discussions with parents and teachers.
To maintain physical and mental health.	M-learning can reduce physical strain caused by school bags; provide exercise; change scene and environment; and provide a variety of learning experiences.
To enable learners to learn when and where they are, utilizing their time more efficiently.	M-learners can set their own time and pace of learning.
To reduce the costs of infrastructure.	Mobile learning does not require the facilities and physical materials that traditional classroom learning requires.
To enhance the delivery of outdoor subjects and foster the development of skills practiced outside the classroom and office.	M-learning can give hands-on experience in any setting.
To prepare people for future communications technology and computing.	The accessibility of m-learning can give people greater awareness of new communications technology and prepare them for change.

Once worthy goals are established, the next step is to ensure that m-learning software is designed for the learners rather than the devices.

First, it is important to evaluate learner needs by examining their technical skills, experience with computers, and task-performance ability.

Second, the m-learning programme should be designed for the specific conditions in which the learning is intended to occur. Conditions that must be taken into account are noise, vibration, brightness, dust, moisture, and temperature.

Third, it is important to give the learner alternatives so that they can choose how they consume information, for example a choice of pictures, audio and written content. Here it is important to design reading formats so that they are easy to read.

Finally, consider how the learner's time will be used and try to ensure that they can learn efficiently and minimize non-learning time, including time spent moving between locations, equipment failures.

In pilot projects, it is recommended that learners be tested on how efficiently they utilize m-learning, remain interested, communicate freely, and smile.

Designers of m-learning software must ensure that the courseware works on the device chosen for the delivery. Specific guidelines for device designing are:

- fit text within the screen
- ensure graphics display is clear
- use rich media appropriately
- enable downloading
- make interaction easy
- use space for meaningful content

In designing m-learning for teaching, the question is: are the learning activities likely to accomplish learning objectives? Materials that work in the classroom may not necessarily be effective when put into m-learning devices. The content for mobile learning might differ greatly from the content used in traditional classroom curriculum because mobile learning entails doing activities rather then absorbing knowledge. M-learning enables participatory simulations in which learners enact rather than just watch the simulation of processes such as chemical reactions or political relationships. M-learning can carry out an informational strategy in which learners are taught to find the information rather just receive the information. Discovery learning is another possibility in which learners observe and collect data, analyze, then develop principles and concepts. Mobile learning can therefore enable new styles of learning such as collaborative learning in which learners share, compare, and refine ideas.

It is likely that the first deployments of mobile learning might be best for providing information to support the traditional curriculum, rather than replacing the traditional curriculum. And to ensure the acceptance of m-learning, it may be best to use m-learning in teacher education, then gradually expand the use of m-learning to classrooms and to community-learning centres.

The guidelines for the design of m-learning software can be summarized as follows:

- Design good content first
- Fit the learning to the learner and then to the device
- Keep learning efficient
- Make the learning experience reliable
- Accomplish worthy goals

K. Institutional Responses to Developments in M-learning

Associate Professor Alan Smith, Director, Distance Learning and E-learning Centre, University of Southern Queensland

This paper provides a perspective of m-learning based on the experience at the University of Southern Queensland (USQ), Australia, and recommends strategies for the implementation of m-learning, including how to build upon existing resources, and how to cope with uncontrollable factors.

Technology has the capacity to enable millions to gain access to higher education institutions. Technology changes rapidly and continuously, and these institutions are just beginning to cope with those changes.

The University of Southern Queensland is one such institution. It has three campuses situated 500 kilometres apart. With the advent of e-learning, the student population of 25,000 is spread across 100 countries with 75 per cent studying off campus. All students must therefore engage in e-campus activities.

Offering e-learning courses and supporting both on-campus and off-campus students through internet delivery systems poses significant issues. The first issue is accessibility. As a transnational educator, the University hopes to increase international access, become part of the global marketplace in education, enable learning at any time and any place, and increase flexibility in employment and study options. However, the University had to face difficulties relating to the indirect streaming of learners, and manage low bandwidth and high costs in many regions.

In response to the factors affecting accessibility the following strategies were undertaken:

- Re-examine institutional directions, priorities, and policies – no individual or faculty-based decisions.
- Plan the transition periods for the technology innovations.
- Review the number of courses and programmes, and avoid random acts of innovation.
- Incorporate new technologies progressively into traditional teaching and learning environments.

These strategies resulted in the foundation of a wireless network, interface, and portal that provide all students instant and easy access to the system within the university.

The second issue was the infrastructure and technical environment. Re-designing and rebuilding ICT infrastructure generated considerable improvements in portability, storage, capacity, speed, audiovisual quality, interoperability of components, and appeal. However, the university found that it was difficult to develop an infrastructure compatible with technological changes with existing financial funds. In addition, the system and infrastructure had increasing security threats such as spam and viruses, and due to difficult weather conditions in the area, the university had to ensure continuous power supply and back-up generators. The institutional responses to these infrastructure issues were to:

- Increase technical infrastructure spending.
- Coordinate purchasing of hardware and software.
- Forward planning of architecture – robust, reliable connections.
- Address variations between campuses and centres.
- Develop partnerships with technical providers and vendors.
- Introduce new positions such as Chief Information Officer (CIO) and Chief Knowledge Officer (CKO).

Transformation of the organizational structure of the university was critical to the successful establishment of the university as a transnational e-learning educator. The responsibility for supporting e-learning services had to be organized and clearly defined. Therefore, the university created the Global Learning Services Division. The Division integrated the functions of the Distance and e-learning Centre, Information Technology Services, and the Library. The Division also re-examined course materials and enabled automatic renditions, and developed ongoing relationships with various vendors.

The third issue is teaching and research. New technology can create new learning and teaching environments as well as mechanisms for accessing resources.

Negative impacts of new technology on the area of teaching and research include:

- Transfer of costs to students.
- Plagiarism and collusion.
- Time-consuming investment in staff training.
- The need to teach students how to evaluate quality of internet material.
- The need deal with recalcitrant lecturers and random innovators.

The institution responded to these particular challenges by:

- Increased staff development activities.
- Redesigned course materials.
- Revisiting traditional delivery methods.
- Reviewing semester lengths, assessment methods.
- Research into ICTs, learning styles, study patterns and habits.

The university has introduced a range of initiatives such as federated searching, new basis of teaching, content repositories, a digital thesis programme, and an e-prints repository for staff publications.

The fourth issue is support for technologies. The university has developed an upgraded customer relationship management system (CRM) to provide better services to students. Support for technologies also necessitates increased investment in engaging and training staff; more robust technologies; and recognizing that learning takes place 24 hours a day, 7 days a week, 365 days a year.

Challenges that have arisen include:

- high expectations of students for immediate solutions;
- inappropriate uses of technology;
- inconsistent levels of support;
- the need to establish mirror networks in several countries.

In order to resolve such challenges, the university undertook the following measures:

- Coordinated centralized approaches to ICT support and strategies;
- considered outsourcing options;
- developed new organizational structures, policies, planning, and procedures for technology support.

The fifth issue is quality of education. In recent years there has been a greater emphasis on quality within the Australian educational system, thus people expect high-quality learning resources and online resources. A quality system requires that the university deal with copyright and intellectual property issues, maintenance and upgrading of learning resources.

The plan towards implementing a higher quality system includes: guidelines, templates and processes; integration of interoperable systems and applications; quality systems; accreditation and endorsements from outside bodies; and a quality assurance framework.

At the University of Southern Queensland the cost of face-to-face courses, online courses, or traditional distance classes is the same because the quality of the learning experience is the same. The university has worked extensively to ensure that all educational materials and courses meet each faculty's high quality standards.

The sixth issue is managing and setting technology expectations. The key is to establish a framework in which technology expectations can be met through a consistent approach. Managing technology expectations requires the institution to constantly revise policies and processes, and provide various orientation programmes in which to communicate expectations with students.

The lessons on m-learning that have been learned at the University of Southern Queensland can be summarized as follows:

- Develop a framework for m-learning appropriate for your own context
- Don't be seduced or consumed by new developments in technology

- Collaborate
- Learn from the successes and failures of others
- Use mentors and consultants as catalysts

E-learning and m-learning have changed, and will continue to change traditional approaches to teaching, learning, student support, and administration. Thus, it is critical to develop an institution wide approach which focuses on:

- Policies and systems.
- Regular review and upgrading of infrastructure.
- Centralized coordination of services.
- Establishing quality standards.
- Setting expectations and communicating them effectively.

It is important to remember that technology is only a means to an end. It must be used wisely to develop systems and approaches which promote quality education provision.

L. Case Study and Demonstration: NEARStar English as a Second Language

Mr. David C. Brauer, Director of Information Technology, PREL
Mr. Tony Tung, Director of NEARStar Programme, PREL

NEARStar is the Network for English Acquisition and Reading, Star Schools programme. It is an interactive, web-based multimedia programme designed for students who are in the beginning stages of English language development (oral and reading). This unique e-learning teaching method merges reading-skill instruction with early English language development, specifically linking what students can understand, to what they are presented with in print. English language learners (ELLs) learn featured vocabulary words and phonemic skills from engaging activities, animated chants and songs, and interactive online books that provide repeated exposure and focused practice. At the same time, real-time monitoring and assessment provides teachers with the data and resources they need to help students succeed.

NEARStar has received numerous awards due to the following factors:

- Emphasis on curriculum rather than technology.
- Research-based curriculum.
- Merged pedagogies of reading and English Language Development.

The NEARStar programme was developed by internationally recognized reading expert, Dr Elfrieda Heibert who discovered that reading skills are acquired more successfully when the rate of introduction to new words is lowered and the rate at which new words are repeated is increased. The NEARStar programme is also based on the finding that successful English language acquisition requires high-meaning words with images, phonetically regular words, and high frequency words; and that songs, chants, and poems greatly enhance phonetic awareness.

The programme designed for students who were falling behind academically in English involved five key design guidelines, as follows:

- Active engagement and immediate participation in a supportive environment accelerates learning.
- Content of proficient reading for ELLs consists of the same five domains as that of English speakers: phonemic awareness, word recognition, fluency, vocabulary, and comprehension.
- ELLs need repeated exposure to content, especially vocabulary, for steady language development.
- Books with the appropriate instructional level and with engaging pertinent content are a primary source for acquisition of English vocabulary, background knowledge and syntax.
- Technologies provide opportunities for ELLs to experience models of English and different concepts and gain various means of access.

The NEARStar programme incorporates the following principles of interactive learning:

- Situated learning including immediate environment.
- Practice and feedback.
- Learning by doing.
- Learning from mistakes.
- "Tell me, show me, let me do it".

Research indicates that teachers in the traditional classroom setting did not have sufficient time to implement the numerous lesson requirements and were not trained or certified to teach students whose first language was not English. It was clear that technology could serve as a solution by providing an additional teacher. Furthermore, multimedia (audio and visual) technology would help students to become interested in the content. In addition, computer software would be useful in assisting students who struggle with reading difficulties by enabling them to be active, self-directed learners. Computer software could also be used to display animation, facilitate the collection of data, and create administrative and assessment tools such as a roster system, lesson plans, class assessment reports, and online libraries.

NEARStar is based on proven effective technology designed for English Language Learners (ELLs) from Kindergarten to third grade. It addresses reading and language development needs using a combination of interactive technology, online printable books, and traditional print materials. The curriculum is carefully crafted around the language and literacy needs of ELLs, including carefully sequenced lessons, ongoing assessment, and printable progress reports. NEARStar permits web-based delivery; macromedia flash XML for communication with database; flash for Pocket PCs which provide high quality visual effects; WiFi wireless communication, and WiMax in the very near future. The WiFi-enabled video projector used to provide demos of NEARStar, for example, does not require high-end or expensive hardware to deliver the content to a classroom.

Evaluation of the NEARStar programme

In recent years, the United States (US) government has placed increasing emphasis on empirical evaluation of educational programmes. Consequently, NEARStar designed a quasi-experimental evaluation of the effectiveness of the programme. Experimental sites were selected, based on specific criteria, to ensure that valid and reliable conclusions could be drawn. These included: the representation of key language groups; geographic representation across the US; and a range of urban, suburban, and rural schools. The assessment was conducted by a team of independent external evaluators and included teacher surveys and student progress monitoring. Multiple methods for data collection were used, including a series of individual and group standardized assessments of reading and language acquisition skills designed to assess the effects of NEARStar on student reading and language acquisition. At the end of three years, and after being pilot tested by over 7,500 students, the results of the evaluation were:

- ELLs using NEARStar increased their sight word recognition by more than twice the control group.
- Texts with good Critical Word Factors had a significant positive impact on reading speed, accuracy and comprehension.
- Content was found to be culturally relevant and age appropriate.
- Software interface was found to be effective when used independently by ELLs.
- Teachers and principals consistently identified NEARStar as a high-quality educational resource for ELLs.

Content changes as a result of the assessment included: shortened time span on some of the assessment games; reduction of number of questions or animations; and game changes based on students preferences or mousing abilities.

The demonstration of NEARStar in this m-learning workshop was the first time that NEARStar has been used as a mobile learning programme on Pocket PCs. Until now it has only been deployed as an e-learning programme. However, options for using it for m-learning are being explored.

M. HP in Education: Teaching Tomorrow's Leaders

Mr. Alvin Chan, Regional Marketing Manager,
Public Sector, Health & Education, Asia Pacific & Japan

The aim of this paper is to provide a holistic view of m-learning. The education scene has evolved significantly, especially in the learning process, with the emergence of new forms of ICT.

The purpose of e-learning and m-learning is to transform the student experience. Technology enables a student-centric learning experience and the ability to provide students with new and innovative learning solutions. However, student-centric learning requires an understanding of a child's definition of a positive learning experience, specifically, what it means when a child says they had a great day at school.

ICT can provide innovative ways of addressing ongoing problems within education. In Spain for example, where truancy is a major problem, an estimated 35% of students skip at least one class a week. To address this issue, the Spanish education ministry provided over 2000 high-school teachers in Madrid with handheld computers (HP iPAQ Pocket PCs) to to allow monitoring of attendance and performance of students. Parents were alerted via SMS or e-mail when a child skipped class without any valid reasons, enabling parents to be instantly informed and action to be taken.

An example of using ICT to enable better learning is a programme in New Zealand called "Children Have Ownership of Schooling" (CHaOS), at Brooklyn School in Wellington. The three-year project focuses on the use of new and emerging technologies to enhance students' ability to gain ownership and control over their pace of learning. One of the studies included in this programme includes the use of the Tablet PC to improve numeracy and literacy skills in junior schools.

In India and South Africa, areas in which access to education and resources is limited, Hewlett-Packard (HP) has initiated an I-community project by making ICTs available. This project requires ongoing engagement and communication between the government and NGOs. In Kuppam, India, HP is providing hardware, technical training, and teaching rural villagers to use ICTs and the internet to acquire agricultural information to improve crop yields, and also how to use digital photography. Equipped with new knowledge, the villagers are able start up new enterprises. In this project the villagers are the change agents.

Teaching and learning technology has evolved from having just one computer in the classroom to establishing a full school network, to a virtual school, and eventually to m-learning.

Another example is the "Classroom 2000" project in Northern Ireland. This project involved delivering wireless technology, infrastructure, connectivity, hardware, software, and applications for all schools and universities throughout Northern Ireland. The technology infrastructure had to meet the demands of 330,000 pupils and 20,000 teachers in 1,200 schools and universities. All individual school networks were linked into the online data centre through a single adaptive infrastructure. As a result, e-mail addresses and internet access was made available to all teachers, students and family, both at school and at home.

With new technology, new resources for learning and research are becoming available. New forms of learning, for example based on collaboration through e-mail and video conferencing, are more engaging and stimulating for students.

Learning institutes need the equipment and software to be able to provide students with new learning experiences. Companies such as HP are providing higher education institutes with infrastructure for e-learning and m-learning.

For example, at the National Institute of Education (NIE) in Singapore, HP enabled the transformation of the institute from a silo-centric department culture to a student-centric service organization. A student-teacher web portal platform was created to allow students to access their curriculum and project materials easily and allow teachers and students to interact online.

N. Future M-learning Opportunities

Ms. Judy Brown, Director, Academic ADL Co-Lab,
University of Wisconsin System

This paper provides a brief description of the Academic Advanced Distributed Learning Co-Laboratory (ADL Co-Lab) and discusses the future of mobile learning technologies.

Academic ADL Co-lab

The Academic ADL Co-lab is an applied research organization that is looking into opportunities for education involving ICT. The vision of the Academic Co-Lab is to provide access to the highest quality education – including training and performance aiding – tailored to individual needs, delivered cost-effectively, anytime and anywhere.

As shown in Figure 4, the initiatives undertaken by the Academic ADL Co-Lab are based on firm standards to ensure inter-operability and reusability The next step involves building compelling content, followed by the creation of repositories for this content. The next stage involves producing games and simulations which allow performance before competency. The final stage is anytime-anywhere mobile learning.

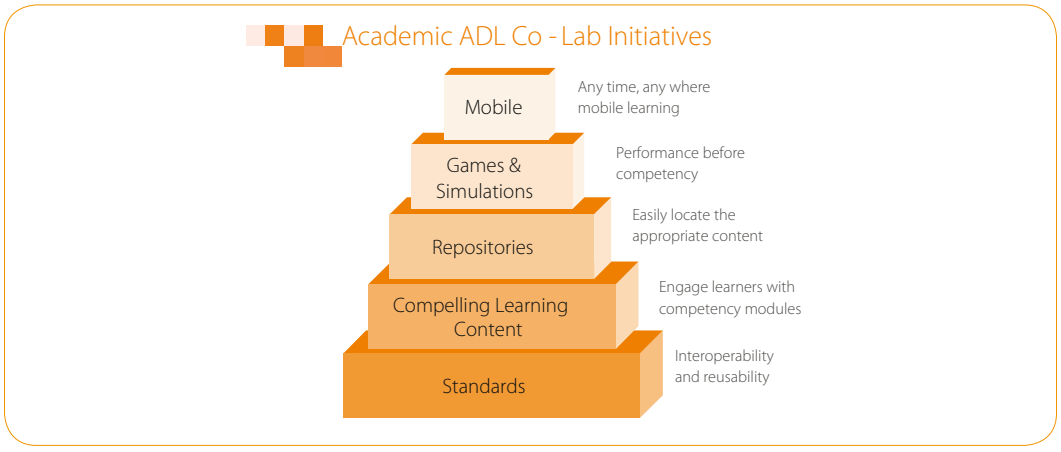


Figure 4: Academic ADL Co-Lab Initiatives

Current Trends in the Mobile Device Industry

It is possible that within 10 to 20 years there will be one global mobile campus. Devices are rapidly evolving, size is decreasing, capabilities are increasing, and cost is decreasing. However, battery life is still an issue for it needs to be extended. The imminent arrival of the Windows Mobile 5 will include hard drive support and a 30 per cent increase in battery life which will alleviate the problem of loss of information in Pocket PCs.

Other less-common devices being developed include wearable devices, watch computers, and handheld PCs for the visually-impaired and mid-range devices such as the OQO Ultra Personal Computer (ultrasmall portable PC) . Examples of forthcoming devices that could truly impact learning and lives include: the talking pen-top computer which can draw a calculator and translate Spanish; pocket projectors that eliminate the need for a screen; and handheld game players which offer large video capabilities.

Also, research initiatives such as that by the MIT Media Lab to develop a US$100 laptop, are contributing to the potential for m-learning. This project is based on the belief that developing countries should be able to have access to the same technologies as other regions of the world. The $100 Laptop will be a Linux-based, full-colour, full-screen laptop, use innovative power sources (including wind-up), be WiFi- and cell phone-enabled, and have Universal Serial Bus (USB) ports.

Audio and video also offer future possibilities for m-learning. *iPods*, for example, are proving to be more than a means of playing music on the move. Podcasting is a relatively inexpensive means of storing audio files of information. This is an example of the opportunities that innovative devices and technological developments can provide for improving learning quality and education in the future.

Advantages of M-learning Devices

M-learning is:

- Continuous: where learning is not dependent on time and place.
- Relevant: where content, curriculum and tools are current and relevant.
- Adaptive: where instruction adapts to the needs of the individual student.

Mobile devices can useful in education for several reasons, including:

- Devices can be used when needed or when there is available time.
- Modular content.
- Wireless access.
- Automated delivery.
- Convenience.
- Performance.
- Information on-demand.
- Personal and responsive.

Recommendations

Below are a number of recommendations for harnessing the potential of mobile devices to enhance teaching and learning:

- Look for opportunities; follow the market and be ready to move.
- Focus on user context and needs.
- Build content in modular formats.
- Assess readiness and begin with pilot initiatives.

O. An Internet-Based E-learning System, Supercourse, and a Proposal of Supercourse Asia Network (SCAN)

Dr. Hiko Tamashiro, Professor and Chair, Hokkaido University, Graduate School of Medicine

Although education is a key enabler of economic development and success, health is an equally important prerequisite for sustainable development. This paper provides a comprehensive overview of Supercourse, and a proposal for a Supercourse Asia Network.

The origins of Supercourse are with the Global Health Network in social medicine and public health at the University of Pittsburgh. Supercourse is a global library of lectures in which PowerPoint lectures and e-materials on social health, medicine, and statistics are available in multiple languages for free. Supercourse provides support for continuing education and teachers worldwide. It is a teaching support system, differing from a traditional distance education system, in that it aims to teach the teachers.

Approximately 1,500 lectures are provided by more than 1,000 authors from 134 countries. The quality of the contents and lectures is ensured by quality control measures based on continuous statistical analysis of customer feedback. Supercourse also delivers just-in-time lectures and information on public health issues worldwide. The fields covered by the Supercourses are: health, environment, sustainable development, epidemiology, pathology, rehabilitation, veterinary preventive medicine, and behavioral sciences.

The benefits of Supercourse are:

- It can provide lectures on a range of subjects.
- Fosters opportunities to work together.
- Mutual exchange of information among public health researchers, public health practitioners, physicians, teachers, and students.
- It is an efficient, fast, and inexpensive channel of information exchange.

Supercourse Asia is currently in the proposal stage. Supercourse Asia would be a regional library of lectures, relevant to the region in terms of languages and content. The proposal came about as a result of the third Japan and Pacific Islands Forum held in Okinawa.

Supercourse Asia would be managed through the establishment of a Supercourse Asia Network (SCAN). The objective would be to provide the Asia-Pacific region with equitable opportunities for education and for attaining better health. SCAN would involve a regional network of volunteers including students, academics, government, international and regional officers.

Potential members of the network are the member states of Asia, and of the Pacific Islands Forum; regional agencies such as UNESCO, UNDP, UNU, and ADB; regional universities; and local NGOs. The lectures would be provided voluntarily and could potentially provide access to previously unreachable

areas, fostering collaboration across the region. Supercourse Asia is based on the open source model, which allows free redistribution and allows modifications and derived works. The full contents of the Supercourse lectures will be provided for free, and will be accessible in developing countries with limited access to resources.

It is hoped that this project will lead to rapid, on-time, and efficient transmission of public-health and other information, and will help attain better health and quality of life for all through a global village of universal learning.

P. Technology for Teaching and Learning Today: M-learning (Tablet PC) Applications

Mr. Lim Soon Jinn, Deputy CEOI, Heuristix Lab, Singapore

This paper will share ideas on m-learning based on the "Tablet PC project" at Crescent Girls School in Singapore. The, project established a learner-centred, interactive, experiential, and adaptive learning environment.

A Tablet PC differs from a Personal Digital Assistant (PDA) in that it allows the user to write on the screen much like real writing.

The vision for the Tablet PC project, led by Heuristix Lab, was to enhance learning outcomes through the use of innovative technology. Initial explorations into the project began in December 2002. At this time seminars were conducted with teaching staff during which they explored the usage and function of the Tablet PCs. During these preparatory seminars the staff proposed a list of possible software applications for classroom curriculum that could be developed on the Tablet PCs. Many teachers taught themselves how to use the Tablet PC in a short time, while other teachers were trained in two lessons of approximately 1:30 hours each. The teachers' initial involvement and consultations were critical for the successful implementation of the m-learning programme.

In this project, all students were given Tablet PCs to be used in the classroom. Students were able to conduct the following learning activities on their Tablet PCs:

- Take notes in class.
- Communicate using e-mail or instant messaging.
- Draw diagrams.
- Journal writing.
- Map reading.
- Online research for learning.
- Select research topics.
- Prepare student presentations.
- Collaborate with others on class-work.

The initial feedback from teachers and students on the use of Tablet PCs included the following comments:

- Useful in organizing thoughts.
- Felt more natural writing than typing.
- Useful for subjects that require spatial organization, languages, and construction.
- Makes schoolwork more interesting.
- Allows student to learn more independently.
- Enhances knowledge about Information Technology (IT).
- More motivated to do homework.
- Allows more interaction with classmates and friends.

A variety of innovative software applications enhanced the educational process on the Tablet PC. "Fun with Construction", for example, is an application that functions as a mathematical tool, a map reading tool, and a flow-charting tool. "Fun with Virtual Classroom" is used for administrative purposes and classroom management. "Fun with Mind Book" is utilized as a scrap-book, organizer, and mind-mapping tool.

The cost of each Tablet PC is currently around US$1300, while the cost of software for all applications is around $US100. It is advisable for schools to employ a technical assistant to assist in maintaining hardware and trouble-shooting.

The key success factors of the Tablet PC project were as follows:

People
- Strong leadership.
- Well-structured professional development plan.
- Committed stakeholders.

Tools, Infrastructure and Policies
- Custom tools/applications.
- Infrastructure.
- Policies (Operations Flowchart; Values Education; Guidelines for Responsible Use; Anti-Theft precautions).

Future plans for the Tablet PC project are: to create more content applications and to develop a central database that will store the lesson plans.

Q. M-learning Issues and Strategies

Mr. Cédric Wachholz, Chief, ICT in Education Unit, UNESCO Asia and Pacific Regional Office for Education

The biggest challenge in educational planning is to set priorities. Priorities must be set because educational development is faced with an eternal dilemma: the need to increase access and improve quality, but at the same time decrease costs.

UNESCO has developed a toolkit to assist policy makers in every stage of educational planning. This paper provides a brief overview of the UNESCO policy makers' Toolkit.

The toolkit provides a step-by-step guide to educational planning and policy-making, which is a complex process and requires a minimum of several weeks.

In brief, the first step is mapping of the present situation (situational analysis) including the national vision, goals and plans; educational context; existing ICT in education; and analysis of dynamics of change. This analysis of the educational context leads to an understanding of the situation and priorities. An analysis of the dynamics of change includes decision-making modalities, quality making process, preparedness of the ICT sector, and attitudes of decision makers.

The next steps are to: establish educational priority areas; identify areas for ICT intervention; and list the various objectives for each educational level, target population, and curriculum emphasis.

Based on the objectives one can generate possible scenarios. The implications of the scenarios are then assessed according to desirability, implementability, affordability, sustainability, usability.

For further information about the policy makers' Toolkit, visit the UNESCO Bangkok *ICT in Education* website: www.unescobkk.org/education/ict/policy

R. M-learning in Practice

Mr. Christopher T. von Koschembahr, Worldwide Mobile Learning Executive, IBM Learning

This paper discusses how m-learning devices are contributing to achieving educational objectives and provides guidelines for the successful deployment of mobile devices in education.

How mobile devices can contribute to education

M-learning enables the extension of learning such that it weaves itself into a person's work or personal activities, when and where they need it. People with time constraints need small portable learning objects that suit low bandwidth conditions, and these devices must suit a new generation of learners with different expectations. Mobile devices open the possibility for new types of learning activities and can help in be a means of doing quick lessons in free time while travelling. More specifically, mobile devices provide functionalities in three key areas outlined below.

The first area is the notification system, a function that instantly sends an SMS or e-mail. This system is a means of informing and reminding the learner, and communicates information about the next learning activity. For example, such a function was used in a project in South Africa. In this project mobile devices were used to complement postal-based distance learning. An SMS was the only means of informing an individual living in a remote area that the course materials were ready to be picked up at the post office. Thus, this simple notification system enabled individuals to keep up with distance-learning activities, proving to be useful and relevant for people living in remote rural areas.

Second, mobile capabilities can provide access to a learning management system. For example, some mobile phone devices can support a text-based portal through which a student can log-in and complete enrolment for a class or browse a course catalogue.

Third, mobile devices are increasingly providing interactive applications. For example, these devices can facilitate interactive lectures, application-simulations and online discussion boards.

New trends in mobile devices

Leading trends and changes are: device convergence; mobile phones connectivity with Personal Digital Assistants and cameras; connectivity convergence; increasing bandwidth. User interface and device constraints are rapidly changing and solutions are constantly being developed.

Integrating mobile devices in education

Discussions about mobile learning require organizing contents of learning and management of people involved in the learning delivery. The education services needed for successful deployment of mobile learning are as follows:

- Education planning, including training, and skills assessment
- Education content service, including customization, selection of content and delivery
- Define, build, or host e-learning/m-learning infrastructure requirements
- Deploy multiple delivery formats including classroom, e-learning, and m-learning via a blended model
- Training management services, including outsourcing and out-tasking

It is important to remember that m-learning should be part of a blended approach, which includes e-learning and classroom learning.

Partnerships

Successful m-learning deployment is best achieved through partnerships. There are numerous potential partners including: content providers, wireless telecommunication companies (telecos), and governance bodies. For content providers, intellectual property protection must be ensured. For wireless telecos, revenue and increased data traffic are incentives to support m-learning initiatives.

S. The 1:1 Computing Paradigm: Lessons Learned, Wisdom Shared on the Learning Journey

Mr. Bruce Dixon, Chair, International Advisory, Partners in Learning

This paper outlines the fundamentals of m-learning programmes and provide lessons-learned from experiences in m-learning.

It is important to first establish and define a context for m-learning. The focus of m-learning should not be on the technology, but on the content. M-learning enalbes the creation of a personal, relevant and authentic learning experience. Mobile technology expands educational opportunities, increases efficiency, and can enhance the quality of teaching and learning.

Mobile technology can enhance education by providing the ability to display or convey complex concepts such as physics-experiment simulations or the solar system, in rapid, inexpensive ways. A useful tool is digital portfolios, tools that allow educators to chart changes in a learner over time. For further information about the benefits mobile technology can bring to education consult sources such as the *Taking it Global* website and publications by George Brandsford.

While technology is useful in education we should be cautious and continuously evaluate whether the use of the technological devices is delivering a more powerful and effective learning experience than a lesson delivered in traditional classroom mode. The reasons for implanting the technology must be clearly established and students should be expected to produce higher quality results as a result of using this technology.

Fundamentals of an m-learning programme

An m-learning project begins with a clear vision and set of objectives. This vision includes a clear definition of digital literacy. Digital fluency entails knowledge on how to use the tools to construct significant products. Although excellent content is a priority, pedagogy is the critical support factor. The role of the teacher becomes indispensable for they assist in the design of more powerful learning experience for the students. One-on-one learning and teaching is about capturing the unique and different dimensions of each individual learner and personalizing learning in ways never previously possible. Teaching needs to change along three dimensions:

- Teachers must engage with the understanding that their students bring with them.
- Teachers must teach some subject matter in depth, providing many examples in which the same concept is at work and providing a firm foundation of factual knowledge.
- The teaching of meta-cognitive skills should be integrated into the curriculum in a variety of subject areas.

The fundamentals for a one-on-one m-learning programme can be summarized as follows:

- Establish a clear vision, set of objectives and commitment.
- Select an appropriate implementation model.
- Select the appropriate hardware.
- Make professional development the first priority.
- Ensure parent and community participation and liaison.
- Undertake careful infrastructure planning to ensure connectedness.
- Assess all software issues.
- Consider finance options and insurance.
- Ensure careful project management – develop policies and procedures.
- Obtain advice on security.
- Manage programme logistics.
- Build a comprehensive service and support programme.

T. Teacher Training for M-learning

Mr. William Loxley, Principal Education Specialist, ADB

This paper discusses teacher training, teaching and learning processes, and prospects for the use of technologies in education.

The number of students in preschool, secondary school, and tertiary school are increasing rapidly. In order to meet the needs of the growing student population, a large number of qualified teachers is needed. Therefore, it is important to ensure that sufficient numbers of teachers are trained and certified. Teacher training is also an important part of improving the quality of education. Training in technology can assist them to provide relevant information but can also enable teachers to find creative ways to strengthen their classroom processes.

The teaching profession in Asia has many untrained and uncertified teachers, particularly in rural areas. In the Asia and Pacific region, it is estimated that only approximately 25 per cent of teachers are capable of handling new technologies in education. These teachers are generally secondary school and university teachers in urban areas. Approximately 45 per cent of teachers are marginal in terms of certification in technolgy.

New ICT devices are improving access to information and flexible learning, software is proliferating and open source software is emerging. Teachers therefore require access to, and familiarity with, new devices. In addition new pedagogical approaches and adequate working conditions are required.

A teaching workforce profile provides a guide to monitoring the growth of the teacher work force and comparing it with the number of students. Critical factors that should be considered are: teacher retention rate, experience and absenteeism, as well as the physical health of the teachers themselves. An additional consideration is teaching conditions. For example, a lack of basic amenities in the classroom can affect the quality of teaching.

Standards for Teachers

The International Society for Technology in Education (ISTE) has identified six dimensions, or standards, that teachers should master (See Figure 5 below). These standards and guidelines should be incorporated into teacher training and evaluation programmes.

ADB

All classroom teachers should be prepared to meet the following standards and performance indicators.

i	Technology Operations and Concepts: Teachers demonstrate a sound understanding of technology operations and concepts.
ii	Planning and Designing Learning Environments and Experiences: Teachers plan and design effective learning environments and experiences supported by technology.
iii	Teaching, Learning, and the Curriculum: Teachers implement curriculum plans that include methods and strategies for applying technology to maximize student learning.
iv	Assessment and Evaluation: Teachers apply technology to facilitate a variety of effective assessment and evaluation strategies.
v	Productivity and Professional Practice: Teachers use technology to enhance their productivity and professional practice.
vi	Social, Ethical, Legal, and Human Issues: Teachers understand the social, ethical, legal, and human issues surrounding the use of technology in schools and apply that understanding in practice.

Figure 5: The ISTE National Education Technology Standards for Teachers
In addition to ISTE teaching standards, the system requirements identified by UNESCO for ICT Teacher Education should be adopted in order to accomplish effective teacher training.

The system requirements are as follows:

- Shared vision.
- Access to technologies.
- Educators skilled in use of ICT.
- Continuous professional development.
- Technical assistance to maintain the system.
- Standards and resources.
- Student-centred teaching approaches.
- Continuous assessment.
- Community support.
- System support to institutions and individuals.

Examples of teacher training projects

The Intel Teach to the Future website is a worldwide effort to help both experienced and pre-service teachers integrate technology into teaching. Participating teachers receive instruction and resource tips to promote effective technology use in the classroom. Another example is the District Wide Applications (DWA) Learning Systems, an interactive form of learning software which enables high school students to use cell phones and messaging systems to access information. a further example is the Nepal Teacher Education Project aims to develop a network of education training institutes to facilitate pre-service and in-service teacher training.

U. Public-Private Partnerships for Developing M-learning Programmes

Mr. Vincent Quah, Manager, Regional Academic Programme, Microsoft Corporation
Mr. Samir Patel, Principal Consultant, Optara

This paper outlines the benefits of public-private partnerships for implementing m-learning programmes.

From a discussion with the workshop participants, the education needs in most countries can be listed as follows:

- Providing education to excluded groups.
- Infrastructure.
- Learning guarantee.
- Utilization of the knowledge gained.
- Sustainability.
- Educational content, software and genuine operating systems.

Feedback from workshops participants generated the following list of ICT-related educational goals:

- Basic infrastructure.
- M-learning for the entire country.

- Applying e-learning to multi-disciplinary subjects.
- Efficient use of ICT in education.
- Technology that does not become obsolete.
- Optimal use of existing resources.
- Engaged learning.
- Capacity to make decisions.

Currently, 130 million children never attend school and 872 million adults do not have the basic skills to break their way out of poverty. Educators and government officials have told us that current teaching and learning methods will not bridge the educational and digital divide, therefore new approaches to education need to be devised. Initiatives are required which empower educators and learners and provide a holistic approach to learning. Educational policies must address technical support, standards, innovative software, digital content, training, and access.

From a discussion with participants about their perspectives of public private partnerships, the following list was generated:

- Mobilize resources.
- Coordination.
- Involving the community.
- Social mobilization.
- Cost structuring.
- Integrated participation in technologies.
- Sharing of experiences and results.
- Supportive.
- Partnership between government and private enterprises.

Public-private partnerships involve the private sector, government, end users, NGOs, public organizations, and most importantly the community. Public-private partnerships are pursued for the following reasons[1]:

- Failure of public authorities to meet expectations.
- In order to secure higher levels of funding.
- A "third way" of delivering services to the public.
- The building of social capital.
- Transformation of public sector services in a knowledge society.

1. Caldwell, Brian, and Keating Jack. 2004. *Adding Value to Public Education: An examination of the possibilities of PPP.* Discussion Paper for Australian Council of Deans Education. Victoria, Australia.

Requirements for successful public-private partnerships

Win-win partnerships are those which account for differing expectations and conflicting objectives.

Successful public-private partnership entails:

- A stable transparent framework that guarantees equality.
- Political will.
- Economic viability .
- Social legitimacy.
- Clear roles and responsibilities.
- Communication.
- Clear expectations.
- Ownership.
- Leadership.
- Trust.
- Change optimization.

The following factors are important for successful public-private partnerships:

- Strong support from government to promote private sector.
- Strong private sector.
- Flexibility.
- Capacity building.
- NGO participation.
- Cultural relevance.
- Equity.
- Transparency.

Example of a successful partnership

An example of a successful public-private partnership in m-learning is the "School of the Future" (SOF) project in Taiwan. This project came about through efforts by the Government of Taipei to pursue m-learning and ICT-enabled education. The Governnment's holistic and integrated vision involved incorporating the following factors in order to enhance student achievement:

- Public policy support and integration.
- Education policy.
- Curriculum and pedagogy.
- Learning space design.
- Teacher training.
- Innovative technology.
- Research.

The partners involved in the School of the Future project included: the Taipei City Government (in charge of public policy and planning); Taipei Bureau of Education; the Teacher Training Institute; Tamkang University; Zhong-Lun High School; and companies from the private sector including Microsoft and Infovision; as well as NGOs.

The key driver of the project was a policy imperative initiated by the mayor of Taipei to modernize infrastructure and stimulate economic growth. The city has recently embarked on an aggressive initiative to blanket the entire city with a wireless network involving 10,000 antennae across the city, with the goal of providing 100 per cent WiFi coverage by December 2005.

The new mobile teaching and learning programme involved the community and all educational institutions within the city. Each school formulated a proposal for an ICT-enabled curriculum and submitted it to the Taipei Bureau of Education. Zhong-Lun High School was chosen as the site for the pilot project.

An advisory committee consisting of private enterprises, and local academics developed a 20-week curriculum for teacher training. NGOs provided best-practice information, including information of past successes and failures. The university provided a research framework and pedagogy, and the Bureau of Education worked with the community to get feedback from parents and students. The private sector furnished the bulk of the financial resources for the rejuvenation of Zhong-Lun High School's existing infrastructure. The hardware and software costs for the three-year project was approximately SG$400,000.

In all, the project was deemed a success because the following components were continuously maintained and integrated: strong policy support; strong leadership; state-of-the-art technology and software; strong teacher and administrative training; ongoing consultation and collaboration with stakeholders; ongoing research that serves as feedback; and willingness to develop new ideas and models.

V. Global Development Learning Network (GDLN)

Mr. Ashok Daswani, Senior Information Officer, Tokyo Development Learning Centre

The Global Development Learning Network (GDLN) consists of the World Bank Global Communications network which encompasses distance-learning centres (DLCs) across 119 countries. The communication network is comprised of three satellites (the World Bank buys transformer space on the satellites) and involves a mix of technologies including voice, data, video, fax and internet.

The network was originally based on permanently assigned multiple access (PAMA) providing independent links into each office, then moved to virtual demand assigned multiple channel (DAMA) link satellites, to achieve full IP convergence over asymmetrical single channel per carrier (SCPC).

The Quality of Service (QOS) differentiates the network from the normal internet because it provides bandwidth and jitter guarantees, and gives priority to video and audio, which are important for video conferencing.
Migration to IP has provided numerous benefits. These are:

- Improved quality of all services.
- Single communication pipe for voice, data and video.
- Low communications equipment complexity.
- Low operation and management costs.
- Easy integration with local area networks.
- Automated dynamic service interchange.
- Automated videoconference scheduling.
- Full compatibility with internet.
- Simple re-engineering for future growth.

The network currently covers 82 distance-learning centres worldwide. Africa has 11 distance-learning centres; East Asia has 14; Europe has 9; Eastern Europe and Central Asia have 14; Latin America has 19; Middle East and Northern Africa have 7; North America has 4; and South Asia has 4. There are various types of distance-learning centres, including:

- Separate Centres connected to the World Bank Network via VSAT, IPL, ISDN, or internet.
- Centres within World Bank Country Offices.
- Institutions which have joined the GDLN as affiliates.
- Partner-organizations such as the British Council.

The learning interactions that define the functionality of the Global Distance Learning Centre are:

- Interaction between student and teacher including two-way videoconferencing; two-way communications; two-way collaboration tools.
- Interaction between students through discussion forums, chat rooms, and bulletin boards.
- Interaction between student and study materials, including web-based access to course material and information resources, as well as internet access.

Future initiatives for the GDLN include the development of Internet Two (Ipv6). Internet Two was designed for multimedia applications including voice, video and data. Internet Two has 128bit IP address while Internet One has 32bit IP addresses. Internet Two has built in security solution and built-in quality of service network. The Internet Two is gradually emerging with implementation in private corporate networks, some universities in Europe, some limited commercial offerings on dedicated routes in the US, and on the Global Network of the World Bank. The consortium Internet2, the foremost U.S. advanced networking consortium, led by 200 universities working in partnership with industry and government, set out two objectives: develop and deploy advanced network applications and technologies; and recreate the partnership among academia, industry and government.

The consortium led to the creation of the Abilene network. Currently, the Abilene network has 10Gbps network; uses both internet protocol version 4 and native Ipv6, is based on OC-192c circuits; and equipment is collocated with Qwest points of presence. The World Bank will connect its headquarters in Washington D.C. to Internet2's high performance Abilene network. The World Bank's connection to Abilene will permit the existing GDLN video-conference network to interconnect with the Internet2 community in the U.S. and to institutions connected to its 50 partner national research and education networks (NRENs) around the world. Successful utilization of the Abilene network requires full usage of multi-priority QoS scheme on the run, but as QoS is currently not supported VC performance over the Abilene backbone is "enabled" on the best-effort-basis and uses the network's excess capacity. In addition, the leased line providing connectivity between GDLN centre and Abilene network has to provide enough capacity to prevent an overload. Once QoS is implemented the leased line capacity can be reduced.

Common activities provided through the network include: lectures, meetings, conferences and seminars on development issues, or consultations such as between the Japanese Government and Thailand during the tsunami.

Part Two

Summary of Country Reports and Action Plans

SUMMARY OF COUNTRY REPORTS AND ACTION PLANS

The section presents a summary of the country reports followed by the action plans of each participant for their respective countries.

Summary of Action Plans

Country	Project Title	Proposer	Budget (US $ million)
Bangladesh	Establishment of the ICT capacity of the Bangladesh Computer Council (BCC) for M-learning.	Mr. Saiful Hassan Badal	24.44
Cambodia	Improving Quality of Education through ICT.	Dr. Nath Bunroeun	1.29
Cambodia	Strengthening ICT Education Delivery Services.	Mr. Om Sethy	0.394
India	M-learning for Teaching English at the Elementary Level.	Ms. Namrata Kumar	100.00
India	Pilot Project for E-learning in Educational Institutions and Provision of M-learning Devices for the Health Sector in India.	Mr. Ashok Kumar Singh	160.45
Indonesia	Technical Assistance for Developing an E-learning Model in a Selected Community Access Point.	Ms. Mira Tayyiba	24.00
Lao People's Democratic Republic	The Establishment and Sustainability of E-learning for Vocational and Technical Education.	Mr. Oudone Maniboun	16.32
Lao People's Democratic Republic	Establishment and Sustainability of E-learning for Basic Education.	Ms. Paivanh Thengkham	16.50
Micronesia	E-learning Support Project in Micronesia.	Mr. Gordon R. Segal	13.85
Mongolia	M-learning for Nomads Children.	Mr. Baatarkhuyag Narantsogt	55.60

Country	Project Title	Proposer	Budget (US $ million)
Nepal	Development of ICT Centres in Nepal.	Mr. Maheshwor Sharma Paudel	4.8
Pakistan	M-learning for Female Technical Education in Rural Areas of Pakistan.	Ms. Sadia Shakil	14.4
Pakistan	Providing and Improving Elementary Education through Mobile Technologies.	Dr. Tayyaba Siddiqui	44.0
Philippines	Development and Delivery of E-learning Modules for Out-of-School Youth and Adults in the Philippines.	Ms. Abigail Cuales Lanceta	45.58
Philippines	Expanding Educational Opportunities for the Filipino College Faculty through Alternative Delivery Mode.	Ms. Elsa G. Florendo	20.38
Sri Lanka	Use of M-learning to Empower Students with Special Needs.	Dr. Buddhini Gayathri Jayatilleke	25.25
Thailand	A Pilot Project "One Day Weekly Schooling".	Mr. Suwat Suktrisul	18.0
Thailand	M-learning as a Tool to Upgrade Knowledge.	Ms. Wattana Artidieng	20.0
Colombo Plan Staff College	Developing Mobile Learning Systems for Rural Youth and Women in the Colombo Plan Region.	Professor Myong Hee Kim	191.4

A. BANGLADESH

Mobile learning has the potential to have far-reaching implications in a country like Bangladesh. The population of Bangladesh is 140 million people, 40 per cent of which is not formally educated. Inadequate number of institutions, a shortage of teachers, financial constraints and some social issues severely limit access to education. Moreover, opportunities to achieve and broaden the knowledge and skills base beyond basic education are limited. Acquiring reliable and timely information on various services such as shopping, tourism, and medical services is difficult.

Technology-driven learning opportunities can address the challenges faced by Bangladesh. For example, e-learning and m-learning offer cost-effective access to quality learning materials on a wide spectrum of topics. In addition, the dynamic upgrade facility ensures that relevant content is available at all times.

ICT has been declared a key sector by the Government of Bangladesh (GOB). The Honourable Prime Minister of Bangladesh chairs a National ICT Task Force, a blue-ribbon committee of trusted and highly regarded subject-matter specialists representing the professions, civil society and the private sector. The Government of Bangladesh is focusing its efforts on the implementation of the National ICT policy for achieving the Millennium Development Goals. The vision outlined in the National ICT Policy is of building a knowledge-based society, where equalized access to information enables citizen empowerment, enhanced democracy and sustainable development.

Issues and challenges exist. Bangladesh does not own technologies or the infrastructure required to offer and produce such technology. The cost of access is too high for the majority of the population. Content must be adapted to the language and culture of Bangladesh. The use of the internet is limited to the capital city and other district headquarters. In 2003, the number of Internet users was 243,000, or 18 users per 10,000 people. Use of mobile phones for providing learning opportunities through various value-added services is still minimal. Information dissemination is also minimal. A digital divide between urban and rural areas, men and women, and educated and uneducated exists.

However, steps are being taken to overcome these challenges. The Telecom Authority of Bangladesh (BTRC) has liberalized the telecom sector, education has expanded, and more private learning institutions have been founded. Attempts have been made to encourage e-learning and the use of the internet. For example, Grameen Bank, a Bangladeshi NGO, provided internet instruction in Modhur so that the pineapple growers could acquire up to date and relevant information on the market prices for pineapples. A similar initiative has been taken by the Learn Foundation in rural areas. Weather and the results of interesting sporting events are occasionally provided by the mobile operators.

Title of Action Plan:	Establishment of the ICT Capacity of the BCC for M-learning
Proposer:	Mr. Md. Saiful Hassan Badal, Senior Assistant Secretary, Ministry of Science and Information and Communication Technology
Country:	Bangladesh
Date:	May 2005

I. Introduction

Knowledge and information are drivers of economic competition and productivity, and serve to stimulate social and political development. ICT-enabled services could disseminate information on agriculture, commerce, disaster management, education, health and sanitation awareness enhancing the quality of life of the people in Bangladesh.

The Bangladesh National ICT policy envisions building a knowledge-based society and the Government of Bangladesh declared ICT as a key sector. The Ministry of Science and Information Technology (MOSICT) is implementing the mandate of the Government in the ICT sector through the Bangladesh Computer Council (BCC), a Government organization.

Approximately 80 per cent of the total population in Bangladesh lives in villages. Agriculture, specifically livestock, and fisheries, are the main sources of income. Telephone service is available in 6 divisions, 64 districts and 464 sub-districts, a telephone density of 2.9 per cent.

The proposed project will target the rural communities, e-centres, and trained personnel. It aims to strengthen the ICT infrastructure and human resource development in the BCC.

II. Issues

- Lack of ICT knowledge and efficient manpower
- Low literacy rate
- Lack of financial funding
- Lack of infrastructure
- Large sector of the population lacking access to communications technology
- Limited number of women in workforce

III. Proposed Project

A. Purpose and Output

The purpose of the project is to create an ICT-oriented society where teachers, students and the poor have access to, and benefit from, this technology.

Objectives:

- To build capacity though training programmes and regional workshops
- To provide ICT-applications to be utilized for socio-economic activities
- To develop community-based ICT applications that could create employment and business opportunities
- To develop local internet content by translating internet content into local languages

Expected outputs:

- Community needs identified
- National initiatives, resources and services identified
- ICT applications and local content for local communities developed
- Lessons and experience learned from study tour documented
- Skills training for community arranged
- Training modules developed

B. Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors	Total cost
1. Consultants			
a. International consultants	0.00	1.92	1.92
b. Domestic consultants	0.00	0.78	0.78
2. Equipment and software			
a. Imported equipment	0.00	10.00	10.00
b. Software	0.00	1.50	1.50
3. Buildings and furniture			
a. Building	0.40	3.60	4.00
b. Furniture	0.10	0.90	1.00
4. Training, workshops, and study tours			
a. International training	0.08	0.92	1.00
b. Local training	0.16	0.48	0.64
5. CD/VAT	1.50	0.00	1.50
6. Research, development and surveys	0.25	0.75	1.00
7. Miscellaneous administration and support costs	0.10	0.50	0.60
8. Contingencies	0.10	0.40	0.50
Total	3.19	21.25	24.44

C. Implementation Arrangements

The Bangladesh Computer Council (BCC) will implement the project. A project director will be appointed. The expertise of the BCC will be utilized and a project technical committee will be formed to supervise the projects, training and study tour.

D. Benefits of the Project

- Increased literacy rate, especially ICT-literacy
- Increased awareness of m-learning
- More opportunity in the fields of ICT through e-commerce
- Enhanced global relationships and interaction leading to more effective research and development
- Support for students unable to attend the classroom physically
- Information communication network strengthened

Project Framework

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Goals			
• Build-up of ICT capacity for m-learning.	• Visible and measurable ICT infrastructure. • Increase in ICT literacy. • Increase in trained manpower of BCC.	• Yearly report published by Bureau of statistics. • Survey and statistical data analysis. • Performance analysis of trained/educated people. • Impact assessment Report done by Donor Agency.	• All activities should be done properly. • Integrated effort should be maintained. • Government policy will not be changed.
Purposes			
• Strengthening ICT infrastructure. • Human resource development through m-learning. • Capacity building of BCC personnel .	• Measurable new hardware and software that fulfills purpose. • Increase in access to ICT for learning. • Increased in skills of BCC personnel.	• Midterm review report. • Inspection, ICT related survey. • Report of student regarding performance of the trainer.	• Government and donors confirm provision of funds. • Work conducted as planned. • Mass awareness of m-learning created so that people come forward to read/learn using ICT facilities.

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Outputs			
In divisional centre: • Trained personnel. • Skilled human resources. • ICT infrastructure.	Centres and equipment with ICT facilities: • Training is conducted smoothly and properly.	• Students/trainers use the full facility of ICT. • No complaints about centre and trainers. • Survey report relating to ICT. • Quarterly review meeting.	• Government commitment for m-learning continues. • Law and order does not deteriorate.
Inputs			
• Acquisition of land. • Physical resources to construct infrastructure. • Provide sufficient manpower to execute the project. • Import ICT related equipment and software. • Integrated effort of GOB and development fund partner.	• Land is available to construct facilities. • All equipment related to ICT is installed and functioning properly. • Efficient and skilled manpower to be recruited.	• Recorded in the D.C office as well as office of the A.C land Inspection report of IMED. • Donor review report. • Various review reports of GOB.	• Timely procurement process. • Timely release of funds • Unavoidable circumstances. • Coordination among project, GOB and donor maintained.

B. CAMBODIA

Cambodia is in the initial stages of using information and communication technologies (ICT) to broaden access to education and improve education quality. The major educational policies are: to universalize nine years of basic education and develop opportunities for functional literacy; to modernize and improve the quality of education through effective reform; to link education and training with the labour market and society; and to rehabilitate and develop the youth and sport sub-sector.

The policy and strategies on ICT in education were developed in consultation with national and international partners through a series of workshops and meetings in Cambodia. The Ministry of Education, Youth and Sport (MoEYS) ICT in education policy has been articulated in the Education Strategic Plan (ESP) 2004-2008 and focuses on four main areas: access to ICT for all teachers and students; the role of ICT in education as a teaching and learning tool (radio and television) in different subjects and as a subject by itself; ICT to promote education for all regardless of age, gender, ethnicity, disability or location through distance education and self-learning, especially for deprived children, youth and adult who lack access to basic education; and using ICT to increase productivity, efficiency and effectiveness of education management.

The long-term-vision of Education for All in Cambodia is to ensure equal access to quality basic education for all citizens and to prepare its citizens to play an active role in constructing the country as well as integrating Cambodia into the knowledge-based global community. The Ministry is introducing various initiatives to facilitate greater integration of ICT to improve the effectiveness of education at all levels and to produce a technologically-literate, productive and critically thinking workforce for the country.

The Royal Government of Cambodia has set up the National Information Communication Technology Development Authority (NiDA) to develop and promote a national approach to e-Learning standards. The Royal Government National Education for All (EFA) plan of 2003 includes specific policies and strategies for the use of ICT in education.

While there are many potential benefits, the Government of Cambodia recognizes that there are also many challenges associated with the development of e-learning and ICT infrastructure. The Ministry faces a number of constraints in expanding ICT in education. Firstly, although one ISP (Internet Service Provider) offers preferential rates to MoEYS, the ongoing costs remain significant. Another difficulty is that not all offices or schools have electricity and the Ministry is investigating innovative ways of dealing with this problem. In particular, we are exploring opportunities to establish links with private ICT providers as part of a growing public/private partnership in ICT. In addition to this, future plans include: development of standards; multilingual content development; expansion of ICT in the corporate sector and higher education by promoting open source systems and software; content quality assurance; and regional networking through workshops.

Title of Action Plan:	Improving the Quality of Education through ICT
Proposer:	Dr. Nath Bunroeun, Under Secretary of State and EFA Secretary General, Ministry of Education, Youth and Sports
Country:	Cambodia
Date:	May 2005

I. Introduction

The Government of Cambodia and international community are working together to achieve the EFA goals by 2015 and the Government recognizes that the effective use of ICT is crucial not only for achieving these goals, but also in enabling freedom of expression and communication. It is expected that use of ICT will also encourage a culture of self-learning and lifelong learning.

The term "information and communication technologies" (ICT) as used in Cambodia encompasses: computer technology, computer networks, e-mail, internet and also radio and television.

II. Issues

With the many obstacles Cambodia needs to overcome in order to provide quality education for all, it may seem that ICT should be low on its list of priorities. However, unless ICT-in-education issues are addressed, the country will fall further behind its neighbours and younger generations will lack the skills they need for life in the digital age. It is believed that ICT offers a number of benefits. For example, ICT can help teachers adopt student-centred teaching approaches. In addition, through the use of information management systems, ICT can be used to automate and mechanize work such as the processing of student and teacher records, communication between government and schools, assessment and testing, financial management and the maintenance of inventories.

III. Proposed Project

A. Purpose and Output

This project supports Education Strategic Plan 2004-2008, which addresses the challenges in achieving the target of "Education for All" in Cambodia through its focus on improving quality of education. The project takes into account gender issues in ICT.

Objectives:

- Reducing disparities within the country by improving both the professional development of teachers and teaching-learning process.
- Expanding learning opportunities through the utilization of ICT.
- Increasing productivity, efficiency and effectiveness of education management by using ICT in provincial and district education offices.

Outputs:

- Human resources developed to meet the needs of ICT in education.
- Innovative thinking, communication, problem solving skills, research and processing skills promoted by using ICT as a tool in teaching and learning.
- Increased efficiency in administration by using ICT for educational management through the use of tools such as information management systems.

B. Methodology and Key Activities

The methodology of the programme will focus on how the use of ICT will support education reforms, including upgrades in education quality, poverty reduction strategies and medium-term strategic planning. Another focus will be to examine how policy/strategy development, monitoring and evaluation, and administrative processes can be complemented through the increased utilization of ICT within education institutions. The methodology will follow seven principles.

The first principle is building on previous initiatives. A central theme of the programme will be to draw on initiatives previously implemented in the field of ICT. This will enable previous or ongoing activities to be brought under a broader ICT policy and strategy umbrella whilst identifying lessons learned.

The second is to maintain properly coordinated team-work. It is anticipated that the programme will require a multi-disciplinary team consisting of MoEYS staff, international, regional and local technical assistance, development partners and target groups. It will be vital to ensure that overall programme management initiates and maintains synchronized outputs and effective dialogue and interaction.

Third, is a focus on the real world situation. In order for the programme to have optimum impact and sustainability, it will be important to tailor the application of technologies and expertise specifically to the Cambodia context. A key principle of the methodology will be to appreciate the opportunities and constraints of the context through significant stakeholder consultation. This early situation analysis will provide a guiding framework throughout the programme.

Fourth, is integration of stakeholders. An overarching principle of the methodology will be that solutions and resources developed under the programme be driven by the target group and stakeholder needs. The programme will facilitate a high degree of stakeholder participation that will drive analysis, design, specification, planning, development, capacity-building and recommendations.

Fifth, is a focus on skills transfer and facilitation. A key aspect of the methodology will be for the programme team to perceive themselves as catalysts and facilitators of ICT adoption to meet stakeholder needs. The emphasis of activities will be to work closely with target groups and stakeholders to ensure that skills and experience can be transferred through mentoring and on-the-job training to ensure enhanced sustainability.

The sixth principle is to facilitate learning about the field of ICT. The content and process design of the programme will provide a unique opportunity to increase mutual understanding and development of a currently little-understood area. This process of learning will be carried out throughout the programme, with specific activities explicitly addressing only this. This will in turn lead to the creation, sharing and dissemination of better practice and knowledge in the area.

Monitoring and evaluation will be a vital aspect of the methodology and activities associated with the programme. Specific areas of evaluation that will run through the programme will include:

a) Bi-annual reviews by the EFA secretariat as part of EFA Monitoring and evaluation.

b) Annual performance audit undertaken by the National ICT Development Authority and Cambodia Development Council.

c) Programme reviews through the annual joint MoEYS/donor/NGO ESSP review.

C. Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors	Total cost
1. Consultants a. International consultants b. Domestic consultants	0.02	0.2	0.22
2. Equipment and software a. Equipment b. Software	0.04	0.92	0.96
3. Buildings and furniture a. Building b. Furniture			0.00
4. Training, seminars, and conferences	0.063		0.063
5. Research, development and surveys			0.00
6. Miscellaneous administration and support costs	0.045		0.045
7. Contingencies	0.005	0.006	0.011
Total	0.173	1.126	1.299

D. Implementation Arrangements

The managing departments for this programme will be the Teacher Training Department (TTD) and the Information and ASEAN Affairs Department. These two departments are responsible for the development of ICT policy within education. The Information and ASEAN Affairs Department is particularly qualified through its responsibilities of disseminating MoEYS information internally;

communicating to and sensitising communities on education reforms; experience in use of multimedia and administering the MoEYS website. The Teacher Training Department (TTD) is responsible for all aspects of policy development and national management for pre-service and in-service teacher training. The project will be monitored as follows:

- Bi-Annual Project Review: The EFA secretariat will be responsible for conducting an independent review of progress.
- Bi-Annual Report: Prior to the annual review the managing departments will be responsible for preparing a bi-annual report on progress and impact.
- Annual Performance Audit: The long-term goal of the project is to help increase the ICT awareness and capability of the Cambodian workforce as part of enhanced global and regional economic competitiveness.

E. Benefits of the Project

The programme has been designed to support the MoEYS medium-term policy objectives within the ESP 2004/08 and longer-term EFA goals. The target groups identified in the proposal range across all levels of the education sector. The programme will provide benefits for MoEYS management development, teacher trainers, trainee teachers. The estimated impact on each target group is outlined below:

- Management Target Groups. This group consists of the Teacher Training and Information and ASEAN Affairs Departments. The main benefits to this group will include enhanced:
  a) Capacity to further develop ICT policy within education.
  b) Levels of communication and coordination between the departments to ensure effective technical ICT skills transfer to training institutions.
  c) Management capacity for the delivery of ICT education services to teacher trainees and upper secondary school students.
  d) Technical capacity amongst identified staff for the continued maintenance and development of proposed information systems and maintenance and development of proposed information systems and multimedia resources.
- Delivery Target Groups: This group consists of teacher trainers and new graduates in the NIE and Regional Teacher Training Centres (RTTC). The main benefits to this group will include: a) professional capacity and core skills of teacher trainers enhanced through use of ICTs, b) teacher trainers will have the capacity to facilitate the use of ICT information system by trainees and c) graduates able to draw on ICT resources via proposed information system to enhance the delivery of school curriculum and facilitate ICT skills development in students.

National Benefits: The programme will contribute to implementing ESP 2004-2008 policy and strategy and EFA 2003-2015 goals and objectives. In addition, the programme will enable the profile of ICT in education to be raised, stimulating increased demand and expectations.

Project Framework

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Goal			
Empower teachers and administrators through ICT.	Well trained teachers and administrators.	Bi-annual reviews by the EFA Secretariat. Programme review by MoEYS/donors.	Government, NGOs and donor agencies support ICT project.
Purpose			
• Reduce disparities within the country through improving both the professional development of teachers and the teaching-learning process. • Expand learning opportunities through the utilization of ICT. • Increase productivity, efficiency and effectiveness of education management by using ICT in provincial and district education offices.	• Increase connectivity for excluded groups. • Increase access to ICT for learning and teaching. • Good governance.	• Yearly report of the Ministry of Education, Youth and Sport. • EFA Secretariat monitoring and evaluation.	• Government, NGOs and donor agencies support ICT project.
Outputs			
• Develop human resources to meet the needs of ICT in education. • Promote innovative thinking, communication problem solving skills, research and processing skills by using ICT as tool in teaching and learning. • Increase efficiency in administration.	• Reduce gap between urban, rural and remote areas. • Well-trained teachers. • Effectiveness of management.	• Donor project implementation report. • Workshop report proceedings. • Follow-up report.	

	Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks	
	Activities				
	• Series of Stakeholder Consultations/Workshops. • Provision of Computer labs in training institutions. • Capacity-building for administrators.	• Key staff of the Ministry, school, stakeholders. • Computer labs equipped. • Effectiveness in management.	• Donor's project implementation reports. • Workshop/seminar reports.	• Government, NGOs and donor agencies support ICT project.	
	Activities				
	• Technical assistants. • Materials. • Financial support.	International TA. References: ESP,ESSP, EFA, National Plan, ICT Policy. Donor agencies and government.	MoEYS, donor agencies, ESWG, NEP, Joint Technical Working Group.	Some government agencies, donor agencies may not give full cooperation.	

Title of Action Plan:	Strengthening ICT Education Delivery Services
Proposer:	Mr. Om Sethy, Director, Department of Information and ASEAN Affairs, Ministry of Education, Youth and Sports.
Country:	Cambodia
Date:	May 2005

I. Introduction

The Ministry of Education, Youth and Sports (MoEYS) is engaged in fundamental education reform through the application of a Sector Wide Approach (SWAp). This reform process is being implemented through the Ministry's rolling five-year Education Sector Support Programme (ESSP), developed as a result of the Education Strategic Plan (ESP) which establishes in detail the Ministriy's key policy positions. The ESSP combines recurrent and capital funded programmes with the basic principle being that programmes are planned and implemented through Government and Ministry systems rather than parallel modalities. The Ministry's capital investment programmes focus on strengthening the infrastructure of the sector through facility and capacity-building programmes.

The Ministry understands the growing importance of utilizing information and communication technologies (ICT) within Cambodia. The current policy and strategies regarding ICT in the education system represent a challenge to the Cambodian Ministry of Education, Youth and Sport to reform its delivery services effectively within a new context of universalization.

II. Issues

While recognizing that there are many potential benefits, the Government of Cambodia is aware that there are many challenges associated with the development of e-learning and ICT infrastructure. It may not be possible to offer a full range of specialized programmes. The Ministry knows that closer engagement with global partners requires immediate strengthening of information and communication technology at all levels. The Ministry is determined not only to strengthen the ICT infrastructure in Cambodia, but also to ensure Cambodia's young people develop the skills to use ICT for the maximum benefits.

A related opportunity is to use ICT to enrich existing education and training programmes. For example, there may be special areas in management, economics and finance where particular countries or institutions do not have the specialist staff to teach these areas. The Ministry sees real opportunities to use internet-based programmes to overcome these constraints and allow our learners to have greater flexibility in their range of studies.

III. Proposed Project

A. Purpose and Output

This proposal details the required support that MoEYS has identified for increasing the use of ICT in the delivery of education. The proposal is consistent with broad sector strategies as detailed in the ESSP 2004-2008 and complementary to a number of current Ministry initiatives being undertaken in partnership with donors. For the education sector to maximize the use of planned, equipped, computer labs in upper-secondary schools there must be sufficient capacity amongst educators to facilitate their use. The required capacity falls into two broad categories: capacity to use, maintain and troubleshoot computer equipment and software; and capacity to understand and teach an ICT curriculum. This proposal aims to develop the education infrastructure to enable the learning and use of ICT to support the wider curriculum, set out guidelines on using ICT in education, and better prepare upper-secondary students for graduation by providing ICT learning opportunities.

B. Methodology and Key Activities

The project will be based at the central level of the Ministry of Education, Youth and Sport. An ICT education expert from IEC/ICT Unit of the Ministry will be assigned as a project coordinator to facilitate and coordinate the project related to the activities such as: ICT curriculum development for use in upper-secondary schools and associated curriculum for training teachers in Regional Teacher Training Centre (RTTC); guidelines developed on the use of ICT facilities within upper-secondary schools to support the wider curriculum; guidelines developed on the use of ICT facilities within RTTCs to support teacher training and broader RTTC needs; and Development of multi media tools. The current National ICT Education Working Group could play the role as a project steering committee to be chaired by the leader of the Ministry of Education, Youth and Sport.

C. Implementation Arrangements

The key focal point of this programme will be the National Institute of Education. The Institute will be responsible for planning activities required to produce an ICT curriculum, guidelines to support the wider use of ICT, development of multi-media tools and staff training. For this purpose, it will consult with heads of RTTCs, Pedagogical Research Department, Teacher Training Department and other stakeholders, who meet as an advisory group, to ensure that proposed outcomes are coordinated with broader teacher and learning development strategies. The IEC/ICT Unit, Department of Information and ASEAN Affairs, will ensure that installed networks are being used effectively and that sufficient time allocations are given to activities identified in this proposal. They will monitor the impact networks make on trainee teachers, including assessing the extent to which ICT literacy is being achieved.

D. Cost Estimates and Financing Plan

COST ESTIMATES (US$ million)

Item	Government	Donors	Total cost
1. Consultants a. International consultants b. Domestic consultants	0.04	0.06	0.10
2. Equipment and software a. Equipment b. Software		0.117	0.117
3. Buildings and furniture a. Building b. Furniture			0.00
4. Training, seminars, and conferences	0.036	0.114	0.15
5. Research, development and surveys			0.00
6. Miscellaneous administration and support costs	0.005	0.02	0.025
7. Contingencies	0.002		0.002
Total	0.083	0.311	0.394

E. Benefits of the Project

The major beneficiaries of the project will be teacher trainees that will have increased self-study opportunities and enhanced core skills through access to the proposed ICT information system. The use of ICT resources will enable trainees to gain a broader and deeper understanding of teaching methods and the curriculum. Students graduating from upper-secondary schools in Cambodia will also benefit, by having ICT skill-sets, better preparing them for an increasingly ICT dependent employment or further study environment. Students with ICT skills will be increasingly competitive nationally and internationally. The programme will contribute to implementing ESP 2004-2008 policy and strategy and EFA 2003-2015 goals and objectives. In addition, the programme will enable the profile of ICT in education to be raised, stimulating increased demand and expectations; large scale human resource development in ICT skills, increasing access to ICT for learning, teaching, searching and sharing information; enabling key staff of teacher education institutions and curriculum development units to become master trainers in ICT curriculum in their respective areas and reducing digital gap among ASEAN countries.

Project Framework

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Goal			
Enhance human resource capacity to respond to the knowledge-based global community.	Raise ICT literacy and skills.	Project research, case study and impact assessment report by IEC/ICT Unit, Department of Information and ASEAN Affairs, MoEYS.	Government, NGOs, and donor agencies support ICT project.
Purpose			
• Improve Cambodia's international competitiveness through increased student exposure to ICT alongside curriculum development and teacher training. • Enhance learning opportunities within schools and other institutions through the utilization of ICT and multimedia to complement conventional learning materials and techniques.	• Increase access to ICT for learning, teaching, searching and sharing information.	• EFA secretariat monitoring and evaluation.	
Outputs			
• Participants in these workshops will be able to develop ICT curricula. • Participants in these workshops will be able to develop the guidelines on using ICT curriculum in education.	• All participants become master-trainers in ICT curriculua in their respective areas. • All master-trainers can conduct orientation programmes on ICT curriculum in education.	• Donor project implementation report. • Workshop report proceedings. • Follow-up report.	• Government, NGOs and donor agencies support ICT project.

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Activities			
• Workshops/seminars for developing ICT curriculum for upper secondary schools. • Workshops/seminars for developing guidelines on the use of ICT to support the broader curriculum in upper secondary schools and RTTCs.	• Key staff from National Institute of Education, Pedagogical Research Department, RTTCs and other stakeholders.	• Donor's project implementation reports. • Workshop/ seminar reports.	• Government, NGOs and donor agencies support ICT project.
Inputs			
• Technical assistants (TA) • Materials.	• One TA for 6 months. • ToR. • ESP, ESSP, EFA National Plan. • Donor Agencies and Government.	• MoEYS, donor agencies, ESWG, NEP, Joint Technical Working Group.	• Government agencies, donor agencies may not give full cooperation.

C. INDIA

India is successfully adapting to the digital age and evolution of ICT. Electronics and information technology is the fastest growing segment of industry in India, both in terms of production and exports. Today, the electronics industry is completely de-regulated with the exception of aerospace and defence electronics. Foreign investment and export-import policies have been liberalized. The electronics and information technology sector is attracting considerable interest not only as a vast market, but also as potential production base for international companies. In recent times, software development and IT-enabled services have emerged as a niche opportunity for India in the global context. The Government of India is taking all necessary steps to make India into a global information technology superpower and a front-runner in the age of information revolution. The Government has announced the promotion of information technology as one of the five top priorities of the country and constituted a National Task Force on Information Technology and Software. In addition the Government has approved the National E-Governance Action Plan for implementation during the year 2003-2007.

Within the education sector there have been outstanding initiatives to incorporate ICT into education at the state and national level. Projects such as "Headstart", a computer assisted education programme in Madhya Pradesh; "Rural Relations", a programme to prepare children from rural areas for life and work; "Goa computers in Schools Project" (GCSP); nationwide project "Shiksha", a computer literacy programme with Microsoft; Community Learning centres in Karnataka; mobile classrooms and IT buses in rural Maharashtra; and many others. These projects have been implemented by government, the private sector, and NGOs.

In September 2004, India launched the first nationwide exclusive educational satellite. Edusat is an interactive satellite-based distance education system for the country that provides a total of 74 channels and includes national and regional beams. Edusat will have enormous capacity for providing a variety of options for interactive/broadcast/telecast modes and online communication networks at the national, regional and state level. AC Band network, Ku Band network and two-way computer connectivity can be used for virtual classrooms to have access to database and audio networks. In January 2000, a 24-hour satellite-based national educational channel was established in addition to several educational radio programmes.

A key challenge is the limited access to ICT by rural and underprivileged communities. The limitations of the existing telecom infrastructure are such that reaching all communities is difficult in the Indian context. The technology mainly caters to voice communication, and does not meet the broadband requirements. The present approach, which aims at expanding the use of ICTs in developing countries, neglects production of ICTs, so is likely to perpetuate the technological dependence of the South. The population of India resides largely in villages where the digital divide is real. Nevertheless, ICT can provide effective tools and techniques for a variety of applications in rural scenarios.

Title of Action Plan:	M-learning for Teaching English at the Elementary level
Proposer:	Ms. Namrata Satdeve Kumar, Additional Secretary (Elementary Education) Government of Uttaranchal, India
Country:	India
Date:	May 2005

I. Introduction

The new State of Uttaranchal came into existence on November 9, 2000. It is important to understand the demographic, natural and geographic features which characterize the State since they have implications for daily life, the economy, culture and tradition of the people, and provide a clue to the reality of the wide range and variety of settlement patterns, and greatly influence the nature of, and prospects for, social and economic development. The Census of 2001 places its population at 8,479562, spread over an area of 53,483 square kilometres, with an average density of 159 persons per square kilometre. Population density in the 13 districts of the State varies from a high of 612 per square kilometre in Hardwar to a low of 37 in Uttarkashi. Infrastructure is inadequate. Most of the roads are usable but not all areas have roads. The state has received massive funds for development of the power and road sectors, however, since these tasks are time consuming, infrastructure is underdeveloped in the remote and hilly regions.

The Indian Constitution has made elementary education one of the fundamental rights of every individual. The State Of Uttaranchal recognizes that no tool is better than education for development of the state and its people. Thus the vision of the state is: achieving 100% access and enrolment by 2003. It is hoped that all enrolled children will complete five years of primary levels by 2007 and upper primary levels by 2010. The focus is on quality education and on bridging all gender and social gaps at primary and upper primary level by 2007, and universal retention by 2010.

II. Issues

- Literacy levels have risen by 20%, but there is a 20% gender gap.
- We have achieved 99.5% enrolment in primary and upper primary, but we still have to improve upon the achievement levels, that is: quality of education.
- We have achieved social equity in case of primary and upper primary, but we have to still address the retention issue in case of socially and physically disadvantaged children.
- Interventions have helped create structures for resource and management support, but education management and classroom management needs to be institutionalized.
- Education has been provided to children in the farthest areas but the issue of distance management still needs to be addressed.
- Dependence on government programmes for development needs to decrease, therefore means of sustaining these programmes need to be developed.

- On the achievement level, in terms of language, children have not shown satisfactory progress. Specifically with regard to the English language, which for many is a third language.

III. Proposed Project

At the state level there are a total of 38170 teachers deployed at the primary level. At the primary level a teacher is engaged in teaching all the subjects including language (Hindi, English and Sanskrit), science, social science, EVS and mathematics. There are approximately 100,000 children enrolled in the government schools.

Until 2003, the English language was introduced to children at the primary level in grade 3. Perceiving the benefits of learning English, the State Government piloted a programme of introducing English at grade 1. This was implemented in the primary schools of a development block of each district. From 2005, the course will now be run in all the primary schools of all the districts. Books for English learning were prepared by the State Council of Research Education and Training (SCERT). Master-trainers were trained at district-level teacher training institutes. There is great scope of improvement in teaching techniques, wherein the element of e-learning will be very useful. Students that will require training in learning English will include both the primary school teachers and the students. Thus the project aims to train 38170 primary school teachers and 10 lakh (100,000) children.

A. Purpose and Output

The end goal is to establish a fear-free atmosphere towards use of technology in day-to-day learning. The short-term objective is teaching and learning English at primary level through e-learning and m-learning. The purpose of the proposed project is to initiate m-learning for teaching English language. The question is: how can we combine new technologies (devices that offer mobility, flexibility and greater canvas of choices) with pedagogy to teach a language that is foreign to the native learner?

B. Methodology and Key Activities

The project will be implemented in three phases: pilot phase, test phase, and expansion phase. The pilot phase will be the most crucial and will include the following activities:

1. Formation of core team to implement the programme – this will initially include personnel from government, the state project office, student community, teachers. The team will be headed by a project manager, the State Project Director (SSA).
2. Identification of the partners to implement the programme as a public-private partnership. Potential partners are firms offering readymade content, or offering expertise for content development, funding agencies, agencies offering appropriate hardware, NGOs, state and district-level teacher training institutes, the State Education Board, architects.
3. Discussions with the government on policy formulation.
4. A baseline survey will be conducted before the commencement of the pilot to test the proficiency (speaking, reading and comprehension skills) of both teachers and students in English.

5. A strategy will be devised on how to make use of the available technology, such as use of PCs at the teacher training institutes, cell phones, video conference, tele-conferencing facilities, radio, email. New devices will be purchased if required.
6. Sub-teams will be formed, content will be developed or the existing content will be adapted to make it suitable for the local context, the master trainers will be trained, monitoring and evaluation will be undertaken.
7. Training of teachers for technology know-how.
8. Master trainers selected: the first part of pilot will focus on teaching English to teachers. About 100 teachers will be trained. The second part of pilot will focus on teaching English to students. Three sets of master trainers will be created for content development, managing technology and teaching English with the use of m-devices. While the team of content developers will remain constant throughout, the team of technology experts and language experts will disseminate the know-how in a decentralized manner, at the centres.
9. Two of the district level teacher training institutes will be converted into centres of excellence for English language training (and m-learning). Since the pilot phase will include various important and interrelated activities it will be for minimum of three years.

The testing phase does not have to follow the pilot phase. Testing of technology, content, knowledge dissemination process, monitoring and evaluation systems will occur during and after the testing phase. The testing phase will include the following activities: devising strategies for sustaining the initiatives taken during the pilot phase; and preparing strategies to mobilize resources, experts, and to keep pace with the technology. A package of incentives for the best-performing teachers will be offered. Incentives will include provision of mobile-devices; permission to tutor children after school for extra income (on condition that results in English language are 60 per cent); higher-level training; case-by-case capacity-building; and exchange programmes with teachers in other states and countries.

The expansion phase will occur after the successful pilot phase. The programme will be expanded throughout the state. The vision is that the pilot will be replicable not only within the state, but also in the north, west, central and East Indian states.

C. Cost Estimates and Financing Plan

The partners involved will contribute funds, expertise or provide free services. The partners will determine the funding the existing infrastructure, manpower or equipment available with the organization; initial operational and maintenance costs; and types of contingencies foreseen.

The pilot project will involve a number of activities including: purchase of m-devices suitable to local needs; training of 100 master trainers with the help of m-devices and m-learning; development of content; developing teams of technical experts; continuous monitoring and testing of the content, functionality of devices, and monitoring tools. The total cost of the pilot project will be US$100 million.

D. Implementation Arrangements

The State Project Office for Sarva Shiksha Abhiyaan (EFA) will be the implementation agency, and the registered society responsible for an overall implementation of the EFA project at the primary level in the state. A committee will monitor the functioning of the society. The Education Secretary of the State Government will be the chairperson of the programme committee. The Chief Secretary of the State Government will be the chairperson of the executive committee. The Chief Minister of the State will be the chairperson of the general body.

A core team will implement the programme. The core team will initially include personnel from government, the state project office, student community, and teachers. The team will be headed by a project manager, the State Project Director (SSA). The function of the team will be to formulate policy, and guide the coordination between various partners. In addition, two sub-teams will be formed and will focus separately on academic and technical aspects. Identification of the partners to implement the programme in the PPP mode will be held. Potential partners will be firms offering readymade content, or offering expertise for content development, funding agencies, agencies offering appropriate hardware, NGOs, state and district level teacher training institutes, the State Education Board, and architects. The implementation arrangement will be further supported by discussions with the government on policy formulation.

E. Benefits of the Project

- Centres of excellence created as English Language teaching (learning) institutes at primary level and centres for m-learning.
- High academic achievements in English.
- Schools considered outstanding as public/private schools in English.
- Students in secondary and higher education making use of m-learning, not only for learning English but also in other subjects.
- Teachers trained in the use of m-learning devices and using them for the day-to-day self learning.
- Schools and classes not limited by conventional teaching methods.
- Pool of expert content-developers created.
- Community gains confidence in the government school teaching systems.
- Acceptance of the use of technology for personal advancement and development.
- Confident teachers and students who have no fear of foreign languages or technology, and who can make use of m-learning.

Project Framework

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Goal			
• Establish a fear-free atmosphere towards use of technology in day-to-day learning. • Focus on teachers because teachers are vehicle of education at present, and students because they are drivers of the future.	• Number of students getting good grades in English each year. • Number of students from government schools compared with students from non-gorvernment schools. • Number of teachers able to go on exchange programmes. • Results of students from government schools are as good as those from non-government schools.	• School tests. • Teacher evaluation. • Frequency of use of internet. • Use of mobile devices for monitoring and evaluation. • Annual review of the programme by the community.	• Delay in programme because delay in accepting the new ways of teaching through m-learning. • Coordination problems with multiple partners.
Purpose			
• Create confident teachers and students who have no fear of foreign languages or technology, and who can make use of m-learning not just in learning English but for other subjects. • Community gains confidence in the government school teaching systems.	• Number of students in secondary and higher education making use of m-learning not just in learning English but also in other subjects. • All the teachers get trained in use of m-learning and use it for the day-to-day self learning. • Schools and classes are not limited by conventional teaching methods.	• Tools of child tracking. • Use of m-learning by the teachers for monitoring the student performance. • Use of mobile devices for monitoring and evaluation by the management staff. • Annual review of the programme by the community.	• Delay in accepting new ideas and new technologies.

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Outcome			
• Confident teachers and students who have no fear of foreign language or technology, and who can make use of m-learning not just in learning English but in daily life.	• Number of students in secondary and higher education making use of m-learning not just in learning English but also in other subjects. • All the teachers get trained in use of m-learning and use it for the day-to-day self learning. • Schools and classes are not limited by traditional methods. • Master trainers created as content–developers, creating content for not only higher level of English but also developing content for other subjects.	• Tools of child tracking. • Use of internet by the teachers. • Evaluation by teachers of their students and themselves. • Mechanisms of external evaluation. • Conducting impact studies. • Online monitoring of the programme.	• Policy issues. • Delay in accepting new ideas and new technologies. • General delay in acquiring hardware and establishing/ renovating the existing infrastructure to suit new arrangements.
Outputs			
• Master trainers for teaching English. • Content developers. • Technical team (systems engineer, programmer, instructional designer, illustrator, content developer, tutor) to keep track of latest technologies. • Centres of excellence for English learning with language lab and one of m-learning.	• 100 Master trainers for teaching English by way of m-learning. • Content developers. • Technicians to keep track of latest technologies. • Centres of excellence for English learning with language lab and one of m-learning.	• Use of internet by the teachers. • Evaluation by teachers of their students and themselves. • Online monitoring of the programme. • Mid-term assessment study.	• Policy issues. • Delay in accepting new ideas and new technologies. • General delay in acquiring hardware and establishing/ renovating the existing infrastructure to suit new arrangements.

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Outputs			
• Content developed for teaching English (for ToT) content for learning English at primary level. • Necessary devices and infrastructure creation at training institutes and schools. • Monitoring tools.	• Content developed for teaching English (for ToT) content for learning English at primary level. • Necessary devices and infrastructure creation at training institutes and schools.	• Video conference to monitor state-wide progress. • Annual reports. • Monthly progress reports.	
Inputs			
• Funds for establishing the entire structure, manpower and system. • Will include purchase of equipments, project management costs, pre-project activities.	• Number of hardware, devices purchased and used in the programme. • Number of district-level teacher training institutes converted into English language institutes or m-learning institutes.	• Regular monitoring by the core team so formed for monitoring. • Inputs inventory that will be filled on monthly basis. • Stock registers. • Online monitoring tools.	• Policy issues. • General delay in acquiring hardware and coordination between the multiple partners in the project.
Activities			
• Planning, designing infrastructure, designing content, identification of master trainers, research and development, developing linkages, coordination between partners, establishing training institutes as centres of excellence in m-learning.	• Core teams formed for over all management. • Sub teams formed for focused attention on developing content and technical expertise.	• Action plan drafted with time lines and deadlines to meet the objective.	• An efficient leader or project manager required to achieve the desired objectives.

Title of Action Plan:	Pilot Project for E-learning in Educational Institutions and Provision of M-learning Devices for the Health Sector in India
Proposer:	Mr. Ashok Kumar Singh, Principal Secretary to Government Human Resouces Development Department, Government of Jharkhand, Dhurwa
Country:	India
Date:	May 2005

I. Introduction

India is a large country with considerable inter-regional variations. On the one hand there are relatively developed states like Karnataka, Maharashtra and Andhra Pradesh and on the other there are less-developed states such as Bihar and Jharkhand, with varying degrees of economic development and e-learning standards. For example, Jharkhand has only 67 per cent literacy rate and over 5 per cent of the population lives below the poverty line. The female literacy rate is less than 32 per cent. A large number of female students drop out after the primary level. The state Government has provided bicycles to young women as an incentive to remain in school and continue on to secondary school. However, the drop out rate has not decreased. A high infant mortality rate, a burgeoning population, and death due to endemic tuberculosis and cerebral malaria are related to widespread illiteracy and lack of medical information in remote rural areas.

Any strategy to introduce and sustain e-learning or m-learning in India has to take into account the kind of financial resources and inherent infrastructural difficulties of different states. A strategy must also take into account the cost of hardware, software, equipment and maintenance required to introduce and sustain e-learning or m-learning on a long-term basis. Any scheme has to take into account the lack of electricity in rural areas of less developed states like Bihar and Jharkhand. In these areas sharp voltage fluctuations require the installation of voltage stabilizers with computer hardware. An e-learning programme would call for the installation of generators or solar panels as a source of electric power for the equipment and computers.

Absenteeism of teachers and doctors is an issue that must be tackled. Patients in rural areas are unable to receive adequate medical services and students unable to receive an education. Medical training and education is urgently needed. India is faced with an internal digital divide that must be bridged in order to take advantage of technological changes.

II. Issues

- Resistance to conventional systems of teaching and medical treatment.
- Safety and security of the hardware to be installed in medical and educational institutions.
- Technological obsolescence in an age of ever-changing technology, necessitating adoption of latest technology.

- Convince health care workers, teachers, students, parents and the legislators of benefits of e-learning.
- Mental conditioning.
- Training of manpower.
- Motivate Government functionaries especially the education and health administrators to take advantage of the Edusat satellite to promote distance learning through the use of ICT.

III. Proposed Project

A. Purpose and Output

The purpose of the project is to provide infrastructural facilities in at least 10,000 upper primary schools, high schools, constituent colleges, selected primary health care centres, referral hospitals, district level hospitals, medical colleges and hospitals in Jharkhand on a pilot-project basis. Mobile devices shall be provided to health workers and teachers in difficult-to-reach areas. After impact evaluation the project can be extended to other states in India.

The project aims to institute the following infrastructural facilities:

1) One independent classroom in primary schools and in high schools, colleges and university departments.
2) Ten desktop computers in each of those rooms, with uninterrupted power supply, voltage stabilizers, generators and provision of mobile devices to primary health care workers.
3) Furniture.
4) At least three trainers in each location.
5) Link up with Edusat to receive and transmit messages.
6) Literacy, vocational and skills-training for disadvantaged groups and dispersed populations, especially Birhor and Paharia groups.
7) Computer hardware and software in primary health centres, referral hospitals, district hospitals and medical college hospitals.
8) Mobile devices for teachers, doctors and selected health workers in rural areas.
9) Digitization of libraries in universities, colleges, schools and state public libraries.

B. Methodology and key activities

The project will be launched by the State Department of Information Technology in collaboration with the Department of Human Resource Development, and the Department of Health and Family Welfare. Service providers will be invited to participate in competitive bidding for the supply and maintenance of hardware, software and mobile devices for a minimum period of five years. The service providers would also be responsible for the initial training of healthcare workers, in-service teachers, and trainees in the teacher training institutions throughout the state. Service providers will also be responsible for safety and security of the hardware and virus protection. E-learning and m-

learning will be part of the training for doctors, health workers and teachers at the primary, secondary and senior secondary stage. Students from class 6 to 12 would be given lessons in e-learning at least twice a week.

The project also focuses on students that have dropped out, or children who are not attending school, especially female students. These children would be encouraged to take part in several e-learning knowledge testing examinations being conducted by the Department of Electronics of the Government of India. The success percentage of the students in these examinations would reflect the utility and effectiveness of the training being conducted by the service providers. The feedback will determine if the service provider is successfully implementing the project and shall continue.

In addition to the schools, the constituent colleges, university departments and some selected affiliated colleges would also be provided with hardware and software. The scheme envisages digitization of libraries in schools, colleges and universities as well as for state public libraries located at state, division, district and sub-divisional headquarters.

In order to support e-learning for doctors, both in the public and private sectors, and patients with disabilities, the scheme envisages installation of computer hardware and software in major government hospitals, which could be extended later to other regional hospitals.

C. Risks and assumptions

Assumptions:

- State Government will provide 10 per cent of the funds for the project (this is not guaranteed).
- Teachers, health workers and doctors will not be averse to change.
- Hardware will be rugged enough to run in relatively dusty rural conditions.
- Cost of preparing and purchasing educational capsules especially in science, mathematics and English.
- Cost of creating and changing course curriculum and content.
- People accept medical services from health worker and indirect advice from doctors.
- Continuing medical education for the health care worker through mobile devices.
- Provision of soft loans from the development bank with a sufficiently long period of repayment on concessional rate of interest.
- Acceptance by other states of this pattern of financing (10 per cent by the state and 90 per cent by the donor agencies to be ultimately repaid by the Government of India).
- Government of India provides long-term financial support.

D. Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors	Total cost
1. Consultants			
a. International consultants			
b. Domestic consultants	0.25	2.25	2.50
2. Equipment and software			
a. Equipment	8.00	72.00	80.00
b. Software	0.50	4.50	5.00
3. Buildings and furniture			
a. Building	5.80	52.20	58.00
b. Furniture	0.50	4.50	5.00
4. Training, seminars, and conferences	0.60	5.40	6.00
			1.00
5. Research, development and surveys	0.25	2.25	2.50
6. Miscellaneous administration and support costs	0.25	1.75	2.00
7. Contingencies	0.05	4.45	0.50
Total	16.15	144.30	160.45

E. Benefits of the Project

- Substantially enhanced level of e-learning and computer awareness paving the way for m-learning.
- Ensuring literacy and latest educational inputs to students especially dropouts and female students.
- Ensuring literacy and educational inputs to disadvantaged groups and dispersed populations.
- Tackling hard spots in science, mathematics and English to ensure higher retention rate in schools.
- Constant upgrade of knowledge and information both for students as well as teachers, making them internationally competitive.
- A device to bring down the high infant mortality rate and control population growth.
- A device to tackle endemic diseases like cerebral malaria and tuberculosis and safeguarding the very existence of endangered communities such as the Birhor and Paharia groups.
- Assistance to students with disabilities.
- Ensure vocational training and skills-upgrading for dispersed populations and disadvantaged groups.

D. INDONESIA

On the Growth Competitiveness Index (2002), Indonesia was ranked at 64 out of 75 countries. On the Human Development Index (2003) Indonesia ranked at 112 out of 175 countries. In the last decade, Indonesia's literacy index has improved, from 79.50% in 1990 to 87.30% in 2001. However, accessibility to education is still limited. In 2003, the school participation ratios were 96.40% for 7-12 year olds, 81% for 13-15 year olds, and 51% for 16-18 year olds. These figures indicate that higher education is not accessible to all Indonesians. A large youth population, lack of educational infrastructure, shortage of highly trained teachers, severe budget constraints and large distances to cover make it difficult for the Indonesian government to provide education to all. Given such conditions, e-learning is an attractive option.

Conventional methods classroom learning remains the dominant approach in the Indonesian school system. However, numerous schools and universities are utilizing ICT facilities to support their teaching-learning activities, though mainly in administrative areas, such as registration, scheduling, payment, and grade checking. The use of ICT facilities has recently received more attention because the Ministry of National Education issued a decree in urging universities to offer a dual-mode system, including both conventional teaching and distance learning. As a result, a number of projects on e-learning have been prepared by the Government and private institutions, such as the Open University and educational websites. However, the projects are still opreated on a stand-alone basis and not fully integrated.

The development of e-learning in Indonesia faces many challenges. The first issue relates to limited ICT infrastructure. The fixed line penetration rate is 3.65 per cent, mobile rate is 5.53 per cent, and the Internet user penetration rate is 3.77 per cent. A large proportion of the infrastructure, 86 per cent, is located in Java and Sumatra. Limited infrastructure makes Internet access and tariffs expensive. The educational budget is not enough to support extension of e-learning. In addition to insufficient infrastructure support, ICT literacy and knowledge is low, and there are no appropriate mechanisms to support the sustainability of the programmes.

The Government needs to map a clear direction; establish standardized curricula; develop ICT infrastructure, including frequency and bandwidth allocations; favorable tariffs mechanism; content development; and strong collaboration among educational institutions. In the case of Aceh and North Sumatra, 16.1 per cent of the total education infrastructure (1,168 schools) was ruined in recent natural disasters, highlighting the need for emergency schooling facilities and use of WiMax.

Title of Action Plan:	Technical Assistance for Developing a Model of e-Learning Programme in a Selected Community Access Point
Proposer:	Ms. Mira Tayyiba, Section Head for Post and Telecommunications, Director of Energy, Telecommunications and Informations National Development Planning Agency
Country:	Indonesia
Date:	May 2005

I. Introduction

Learning from recent financial instabilities in ASEAN countries, the national development goals of Indonesia need to be achieved by focusing on human productivity rather than foreign investment. Therefore, access to education, an enabler of human productivity, must be guaranteed. However, due to the large youth population, a shortage of highly trained teachers, severe budget constraints and vast distances between land masses, it is difficult for the government to provide adequate educational infrastructure. E-learning is a desirable alternative because it overcomes geographical boundaries and other constraints.

II. Issues

Major obstacles to presenting an e-learning programme are the lack of ICT infrastructure, high tariffs, lack of skills to operate computers, an old-fashioned mind-set, and low awareness of the potential of ICT.

The rate of Internet subscribers to fixed line capacity in 2003 was approximately 10 per cent, but the percentage of internet users was 95 per cent. Limited funding has induced a need for a systematic strategy towards ICT development. Expanding public facilities has been a strategy to improve public access to ICT services. By the end of 2003, public facilities for accessing telecommunications services and the internet produced about 30 per cent of total pulses generated by fixed-communication customers. In Indonesia, approximately 3,500 ICT facilities are in place. Therefore, public facilities that provide access to ICT need to be expanded into Community Access Points (CAP), or tele-centres. CAPs are expected to be a more efficient means of providing public access to ICT. Funding constraints need to be strictly accounted for, especially in rural areas where income is low in comparison to urban areas.

III. Proposed Project

A. Purpose and Output

The objective of the project is to provide technical assistance to the Government of Indonesia in developing a model for e-learning implementation in a selected CAP. The project will be carried out in three stages: (1) the evaluation and selection of the appropriate CAPs; (2) the development of a model; and (3) the implementation of the model into a pilot project. The expected output is an establishment of a pilot project for e-learning in a selected CAP.

B. Methodology and Key Activities

Project Framework

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Goal			
• Improvement of school participation rates through e-learning programmes. • Efficient use of public facilities for accessing ICT.	• Improved school participation rates. • Improved literacy and e-literacy rates.	• Yearly report by Bureau of Statistics • Monitoring and evaluation reports published by Bappenas.	• Political will from the government to allocate more funds for education sector.
Purpose			
• To expand e-learning.	• Adopted as one of the regular schooling programmes.	• Ministry of National Education evaluation reports.	
Outputs			
• Establishment of a pilot project for e-learning in a selected CAP.	• Established model for e-learning. • Number of CAPs that copies the model.	• Monitoring and evaluation reports of the Executing Agency.	
Activities			
• Selecting CAP areas suitable for the programme. • Establishing a model including: identifying appropriate technology, hardware, software, and other equipment requirements, and target group of people. • Developing a funding mechanism for a sustainable e-learning programme, including: identifying co-sharing obligations among central and local government, as well as incentives required to encourage the programme. • Building collaboration with the private sector and other educational institutions. • Developing plans to generate revenues.	• Criteria for CAP and areas suitable for the programme. • A priority list to select certain CAP areas. • An established model. • The number of students in the programme. • The number of CAPs that copy the model.	• Project reports.	• The programme is fully supported by: (1) the local government of the selected CAPs; (2) the vendor partners; (3) the telecom operator.

C. Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors	Total cost
1. Consultants			
a. International consultants		1.00	1.00
b. Domestic consultants	0.50	0.00	0.50
2. Equipment and software			
a. Equipment		7.00	7.00
b. Software		3.00	3.00
3. Buildings and furniture			
a. Building		3.00	3.00
b. Furniture	2.00		2.00
4. Training, seminars, and conferences	0.50		0.50
5. Research, development and surveys		3.00	3.00
6. Miscellaneous administration and support costs		2.00	2.00
7. Contingencies	1.00	1.00	2.00
Total	4.00	20.00	24.00

International consultants will be required at the start of the project to oversee the overall plan (implementation and review) and provide quality assurance input, while non-governmental organizations will be the local partner. Equipment, software, buildings, and furniture will be used for the e-learning pilot model.

D. Implementation Arrangements

The Implementing Agency of the project will be the Ministry of National Education, while the Executing Agency will be the Ministry of National Education and the Ministry of Communications and Informatics. In order to assure the achievement of the goal, Bappenas will monitor and evaluate the project quarterly through survey and discussion with the executing and implementing agencies.

E. Benefits of the Project

- Increased access to education especially in rural areas.
- Increased literacy, e-literacy, and school attendance rates.
- Expose the schools to technology for long-term benefits.
- Increase e-readiness.
- Prepare the community to take part in the knowledge society.

E. LAO PEOPLE'S DEMOCRATIC REPUBLIC

The Lao People's Democratic Republic (Lao PDR), a landlocked nation in Southeast Asia, is one of the least developed countries in the world. The quality of education is low in comparison to other ASEAN member countries. Overall, the use of ICT in Lao PDR is limited. Government agencies have little experience in using ICT, and the few officials who use the Internet do so primarily for exchanging e-mail. Likewise, the business sector has not been active in developing Internet-related applications. Few Laotians have access to computers or the Internet, and less then 2 per cent of Laotians households have a telephone. Although there are approximately 60 Internet cafes in Lao PDR, most of them are in Vientiane. Thus, the 80 per cent of the population living in rural areas have even less access to ICT than Laotians in the capital or tourist areas. According to an e-ASEAN Readiness Assessment conducted in 2001, Lao PDR ranked last out of the 10 ASEAN countries in terms of e-infrastructure, e-society, e-commerce and e-government.

As of 2002, the Ministry of Education (MOE) and 11 provincial offices shared roughly 150 computers, 40 of which were Internet-compatible and had a basic intranet system. This reflects the MOE `s "top-to-bottom" approach toward IT development. Under this approach, the MOE will focus first on ICT development within itself, then within the National University Of Laos (NUOL) and then on the integration of ICT into secondary schools. At present, almost no public primary or secondary schools in Lao PDR have access to the Internet, and formal education in ICT or computer science is not available below the tertiary level.

One reason for the limited use of ICT in Lao PDR is the relatively late introduction and development of mass media and Internet technologies within the country. Specific constraints are: lack of a co-ordinated ICT master plan; lack of ICT infrastructure; lack of knowledge base for ICT; and lack of financial resources. Radio and television broadcasting in Laos did not begin until 1960 and 1993, respectively. In addition, Lao PDR did not have sustained Internet connectivity until 1996, making it one of the last Southeast Asian countries to be online.

One promising trend is the rise in demand for the Internet among young educated and urban Laotians. This trend stems from a unique paradox in the higher education system in Lao PDR. Prior to the opening of the National University of Laos (NUOL), most students received college degrees studies outside of Lao PDR and were exposed to the Internet during that time. Upon their return to Lao PDR, they sought to remain electronically connected to the outside world. In this way, the absence of a national university seems to have contributed to an increase in ICT awareness among this population. Radio and television usage in Lao PDR is also on the rise. Radio, in particular, is a critical media outlet, with more than 50 per cent of Laotian households owning a radio.

The Ministry of Education (MOE) has developed a three-phase master plan for IT development in education. The focus of each phase is as follows: the establishment of a ministerial intranet system with links to provincial offices and the NUOL; the incorporation of ICT content into the secondary and tertiary curriculum; and the promotion of distance learning and e-learning through ICT.

Title of Action Plan:	The Establishment and Sustainability of e-learning for Vocational and Technical education
Proposer:	Mr. Oudone Maniboun, Human Resource Development Coordinator, Department of Personnel
Country:	Lao People's Democratic Republic
Date:	May 2005

I. Issues

- Limited resources for ICT education.
- Secondary school graduates are not able to continue their formal education.
- Technical and vocational graduates unable to find employment.

II. Proposed Project

The project will establish IT training facilities in technical and vocational training institutes and in skills development institutions, at the central and local levels. ICT in general, will be introduced with particular focus in the education sector. The project is geared at reducing unemployment by upgrading the quality of ICT use in education. The project is expected to benefit young Laotians with ICT experience. The project will additionally coordinate ICT activities with related organizations in order to improve ICT planning, and will introduce an ICT integrated teacher training system within public and private institutions.

A. Purpose and Output

The goal of the project is to establish e-learning lessons in technical and vocational education.

Purposes:

- To introduce computer literacy and e-learning in technical, vocational and skill development institutions.
- To assist government agencies in ICT policy making, planning and sustainable management.

Assumptions and risks:

- Government policy allows non-government organizations and private sectors to promote ICT.
- Government attracts foreign investment in ICT.
- Generally, ICT is not well understood in Lao society.
- Some government agencies may not give full cooperation.

B. Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors	Total cost
1. Consultants			
a. International consultants		2.00	2.00
b. Domestic consultants	0.50	1.00	1.50
2. Equipment and software			
a. Equipment		1.00	1.00
b. Software		2.00	2.00
3. Buildings and furniture			
a. Building	0.50	4.00	4.50
b. Furniture	0.50	1.00	1.50
4. Training, seminars, and conferences	0.50	1.50	2.00 1.00
5. Research, development and surveys	0.50	0.50	2.00
6. Miscellaneous administration and support costs		0.50	0.50
7. Contingencies	0.00	0.00	0.77
Total	2.05	18.5	16.32

C. Benefits of the Project

- Raise Lao PDR education in ICT to international standards.
- Influence changes in teaching methods.
- Improve the ability of teachers to utilize ICT.
- Introduce technology into the daily life of young Laotians, including studying and working.
- Increase employment and generate income.
- Reduce poverty.

Title of Action Plan:	Establishment and Sustainability of e-learning for Basic Education
Proposer:	Ms. Paivanh Thengkham, Academic Staff, Department of Organization and Personnel
Country:	Lao People's Democratic Republic
Date:	May 2005

I. Introduction

The use of ICT in Lao PDR is limited, especially within education. The infrastructure is underdeveloped and unable to support expansion of ICT.

II. Issues

The leading issues are the lack of a knowledge base for ICT in the country, and the lack of access to computers in schools.

III. Proposed Project

A. Purpose and Output

The project has three purposes: set up e-learning in basic education; train teachers in usage of ICT; and develop basic education curriculums.

B. Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors	Total cost
1. Consultants			
a. International consultants	0.00	2.00	2.00
b. Domestic consultants	0.00	1.00	1.00
2. Equipment and software	0.50	3.50	4.00
3. Buildings and furniture			
a. Building	1.00	3.00	4.00
b. Furniture	0.50	1.50	2.00
4. Training, seminars, and conferences	0.50	1.00	1.50
5. Research, development and surveys	0.30	0.70	1.00
6. Miscellaneous administration and support costs	0.00	1.00	1.00
7. Contingencies	0.00	0.00	0.00
Total	2.80	13.70	17.32

Project Framework

	Design summary	Monitoring mechanisms	Assumptions and risks	
	Goal			
	• Establish e-learning in basic education.			
	Purpose			
	• Training teachers in computer teaching and maintenance. • Develop basic curricula. • Introduce e-learning in basic education.	• Department of Teacher Training. • Department of General Education (MOE).	• Computer language may not be well understood by local students and teachers. • Difficult access in some rural areas. • May lack trainers.	
	Outputs			
	• E-learning in basic education curricula. • Computer teachers.			

F. MICRONESIA

The Federated States of Micronesia (FSM) varies in topography from high mountainous islands to low, coral atolls. The total population is about 108,155. Economic activity consists primarily of subsistence farming and fishing. The islands have few mineral deposits. The nation is in a remote location, and lacks adequate modern facilities. Based on 2002 figures, FSM has 10,100 fixed telephone lines, 1,800 mobile phone subscribers, and 6000 Internet dial-up users.

The College of Micronesia (COM-FSM) currently offers 10 courses that are partially categorized as distance education courses. ICT facilities at the College Micronesia include one T1 line for access to Internet. Free e-mail services are available at all times to students at all campuses. At the national campus, student Internet access stations are available in three computer labs, the library and residence halls. A campus-wide area network links the national campus and state campus to the Internet. Computer equipment for labs are funded by the technology fee generated by individual campuses. Technology training is incorporated into the college curriculum for any major, including education. Macromedia products are taught for web creating purposes, and basic Internet usage courses are offered and encouraged. Multiple programmes for continuing education for in-service teachers are active.

The FSM has in place a National Committee on Communications and Information Policy Advisory Committee (CIPAC). The mission of CIPAC is to provide advice and assistance in matters of information and communication technologies (ICT) to the Government of FSM, through the Secretary of the Department of Transportation, Communications and Infrastructure. The primary purpose of the CIPAC is to develop a National IT Plan and to initiate programmes to promote the increased use of ICT, with the objective of furthering the economic development of the FSM and the delivery of government services to the people of the nation. In 2002 CIPAC set out the following agenda: (i) Effective, efficient and transparent governance, (ii) Appropriate allocation and development of financial and human resources, (iii) public awareness of ICT, (iv) Development of a co-ordinated FSM ICT policy, (v) Strengthening and improving health and education through ICT, (vi) Strengthening and improving commerce through ICT, (vii) FSM-wide access to quality ICT services, (viii) Low cost ICT for the FSM.

The COM-FSM has contingency plans in place to move forward with video-conferencing capabilities and greatly increase courses offered through distance education methods. Funds are being identified and plans have been drafted. Infrastructure developments to allow for an integrated student services system accessible through the Internet as well as VOIP are also in the works. Wireless options are currently employed in the form of 802.11 access points and bridges but advances in WiMax capabilities are being observed for potential usage in the near future.

Title of Action Plan:	E-learning Support Project in Micronesia
Proposer:	Mr. Gordon R. Segal, IT Director, Information Technology Department, College of Micronesia
Country:	Micronesia
Date:	May 2005

I. Introduction

The Federated States of Micronesia (FSM) has an approximate population of 108,000. There are 607 islands spread out over a surface area greater than the size of the continental United States. About 195 schools located on the islands and atolls serve approximately 35,000 children. Of these schools, 74 have fewer than 100 students and 43 have fewer than 50 students. Barriers to development include the inability to obtain needed information and knowledge in a timely and cost effective manner, and a lack of efficient coordinated efforts in e-learning.

II. Issues

- Most schools are located in remote outer islands with vast distances of ocean between them.
- Telecommunications and power are not available on all islands or to all schools.
- Phone and Internet services are not widely available.
- Bandwidth cost is very high.
- Individual state energy departments vary greatly in effectiveness.
- Little opportunity for ICT training.

III. Proposed Project

In order for the FSM to achieve sustainable development, telecommunications options must be greatly improved. In addition to general upgrading of infrastructure, the following components are needed: power supplies, accessibility, training, technical support, standards, innovative software, digital content, research, and effective policies.

A. Purpose and Output

The purpose of the proposed project is to support existing technologies and involved entities in the expansion of existing programmes and new technologies into unreachable and remote areas, as well as to improve the existing ICT in less remote areas. The output will be: improved literacy levels and improved learning opportunities nationwide.

B. Methodology and Key Activities

Before the project can be planned or implemented, an ICT or e-learning government office should be put in place to coordinate efforts with the COM-FSM.

The first phase of the project is to pilot technologies and incorporate them at all COM-FSM campuses and classrooms. Tablet PC's will be used to incorporate learning into content servers and classrooms. In addition, WiFi/WiMax capabilities will be set up at all campus sites.

The second phase will be led by the COM-FSM education teacher training division. The plan is to employ recently piloted methods of disseminating information to in-service teachers and students by integrating Tablet PC's and Pocket PC's and accepted content into pilot classes in primary schools on islands that have basic infrastructure.

The project will also establish an e-learning resource room at each COM-FSM campus to showcase and provide technical support for e-learning initiatives to in-service teachers and the general public. In the populated outer island schools, reliable V-SAT stations will connect local caching servers to content servers in COM-FSM campuses. Each site will have at least one pre-trained in-service instructor and appropriate necessary equipment. In remote areas of low population density without access to electricity, sections of existing field ships or marine patrol vessels can be converted to mobile classrooms. The mobile classrooms will have full connectivity options including a V-SAT link, WiFi enabled content servers, WiFi Pocket PCs and qualified teachers or tutors. The equipment would be recharged on the ship.

Project Framework

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
	Goal		
• Sustainable improvements in ICT or e-learning capabilities nationwide.	• Measurable improvements in ICT. • Measurable improvements in literacy rates. • Measurable economic performance.	• Government surveys. • Record keeping.	• ICT technology will be effective, be able to stand up to environment. • Technical support. • Bandwidth cost decreases. • Government financial support. • COM-FSM administrative backing.

Purpose			
• Sustainable effective ICT for expanded opportunities.	• Changes in teacher classroom techniques. • Adoption of effective ICT classroom tools. • Increased economic opportunities. • Improved literacy rates.	• Government surveys. • Record keeping. • Teacher feedback. • Student feedback. • Community feedback.	• ICT technology effective. • Technical support. • Bandwidth cost decreases. • Government financial support. • COM-FSM support.
Outputs			
• Effective ICT capabilities that improve lives. • Develop a plan for the selective integration of audio, video, and data communications. • Provide high-speed, on-campus networking to COM-FSM classrooms, pilot primary classrooms, public libraries. • Provide access for in-service teachers through possible means. • Provide coordination for all networking media including data, satellite, microwave, radio, and cable.	• Measurable improvements in ICT. • Measurable improvements in literacy rates. • Measurable economic performance.	• Government surveys. • Record keeping. • Teacher feedback. • Student feedback. • Community feedback.	• ICT technology will be effective, be able to stand up to environment. • Technical support. • Bandwidth cost decreases. • Government financial support. • COM-FSM administrative backing.
Inputs			
• Dedicated telecommunication infrastructure and government policy conducive to e-learning capabilities. • Develop a systematic approach for identifying and preparing a cadre of skilled students to serve as a technology support resource. • Increase high speed link between COM-FSM network and national high-speed backbone, add relevant services as bandwidth capabilities increase.	• Measurable improvements in ICT. • Measurable improvements in literacy rates. • Measurable economic performance.	• Government surveys. • Record keeping. • Teacher feedback. • Student feedback. • Community feedback.	• ICT technology will be effective, be able to stand up to environment. • Technical support. • Bandwidth cost decreases. • Government financial support. • COM-FSM administrative backing.

C. Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors	Total cost
1. Consultants			
a. International consultants	0.40	0.60	1.00
b. Domestic consultants	0.20	0.30	0.50
2. Equipment and software			
a. Equipment	4.00	6.00	10.00
b. Software	0.40	0.60	1.00
3. Buildings and furniture			
a. Building	3.20	4.80	8.00
b. Furniture	0.80	1.20	2.00
4. Training, seminars, and conferences	0.40	0.60	1.00
5. Research, development and surveys	0.28	0.42	0.70
6. Miscellaneous administration and support costs	0.20	0.30	0.50
7. Contingencies	0.26	0.39	0.65
Total	5.54	8.31	13.85

D. Implementation Arrangements

The project requires extensive consultant input as well as coordinated government efforts in the following components of the project: hardware and technical support, customized software, telecommunications, software procurement, area and content expertise, and research.

E. Benefits of the Project

- Increased literacy rates.
- Infrastructure developed.
- Human resources development.
- Enhanced decision-making.
- Higher standards of dissemination.
- Enhanced communications.
- Higher teacher and student retention rate.
- Improved teaching methods incorporating e-learning.
- Nation building.

G. MONGOLIA

Mongolia, the seventh-largest country in Asia, covers an area of 1,564,100 square kilometres, larger than the overall combined territory of Great Britain, France, Germany, and Italy. The country is sparsely populated with a density of 1.5 persons per one square kilometre. Mongolia is well suited to distance learning. Herders and settlers live a large distance from urban areas, thus it is essential that Mongolia address their education needs in form of distance education. Technology-based education is in its initial stages, but is evolving according to the National Programme on Distance Education Programme which extends until 2010. Mongolia has a high literacy rate of 98.8 per cent, excluding children under the age of 8. Approximately 700,000 students attend 683 primary and secondary schools and 172 universities. Educational expenditures account for 22.6 per cent of the national budget.

The Government of Mongolia has initiated and supported the development of e-learning. Between 1994 and 1998 a small teacher training project was launched in which publishing facilities were furnished to all regional, educational, and cultural centres; and television studio equipment was provided to three regional centres. Between 1994 and 2012, UNICEF supported a distance education project for junior high school teachers. Radio and television based courses with supplementary print materials were offered. In June 1997, the Non-formal Training Centre was established under the Ministry of Science Education and Culture. From 1997 to 2001, UNESCO implemented the Learning through Life project which trained 40,000 herders, families, and children. From 2000 to 2003, the International Development Research Centre (IDRC) supported an Internet-based distance education experimental project. From 2001 to 2004 a joint project of UNESCO and MOSEC promoted child rights for girls and boys in Mongolia by the provision of out-of-school learning opportunities.

In January 2004, the first distance-learning system was established at the University of Communication and Information Technology. Under the framework of this project, 15 province centres and two points in Ulaanbaatar are connected through the network. The short-term goals in the next two years are to transfer 2500 course files into electronic form, and conduct 500 courses through e-learning. In order to implement these goals it is critical to increase the bandwidth of Internet and intranet, improve the capacity of servers, increase the number of PCs, and develop educational content.

The challenges faced in expanding e-learning and m-learning include: lack of ICT infrastructure and human resource development especially skilled professionals. The biggest challenge is the traditional attitude towards learning and teaching, which must change to accept e-learning and adapt to it.

The National Programme on Distance Learning, approved in January of 2002, set out the following goals: to originate a distance-education strategy coordination and management; to create a mechanism for distance-education service and activity; to develop the ability of human resources to train distance-education specialists; to create a beneficial, sufficient distance-education environment; to process and implement its content and methodology.

Title of Action Plan:	M-learning for Nomadic Children
Proposer:	Mr. Baatarkhuyag Narantsogt, ICT Officer, Information and Communications Technology, Authority of Mongolia
Country:	Mongolia
Date:	May 2005

I. Introduction

The capital city of Mongolia, Ulaanbaatar, is home to 40 per cent of the population. Approximately 504,000 inhabitants reside in provincial centres. The remaining one million people live in remote and rural areas. The majority of these rural inhabitants are nomadic herders who move every season in order to take their cattle to favourable feeding locations. Distance learning is the only suitable means of providing education to these rural nomadic communities. The majority of the rural herders have very limited exposure or experience with the most basic telecommunications services. In the estimated 340 village centres, a small number of local government workers, teachers, doctors, and law enforcement officers are responsible for delivering government services to herder communities. Currently, 250,000 students are enrolled at the secondary schools in the village centres. The village centres lack basic electricity and ICT such as television and radio. The population in the rural areas is young: 34.5 per cent are children under 15; 30.6 per cent are aged between 15 and 30 years old; those aged between 35 and 59 comprise 21.1 per cent of the population, and 5.6 per cent are over 69 years old. Although the national literacy rate is 98.8%, school enrollment nationwide is decreasing. There are approximately 700,000 students enrolled in 683 high schools and 172 universities.

II. Issues

Universal services such as electricity and ICT service are characterized by a very low level of penetration, limited capability to meet growing demand, low level of investment, and outdated systems and technology. Mongolia faces the need to expand ICT service coverage to the remote areas. As a result of efforts by the Government and the private sector, about 40 village centres have been connected to fiber optic or satellite networks. However, the remaining more remote villages do not have access.

Most herdsmen use wind or solar battery generators for television, light and charging their mobile phones. Therefore, power resources to charge their mobile device is not a big problem for them. The leading issue is that children of herder communities need to be provided with flexible learning conditions that are suitable for their nomadic lifestyle. While looking after sheep or cattle, children could use mobile devices to study while maintaining their traditional way of life.

A newly-formed nationwide ICT sector policy, called e-Mongolia has set the following strategies in regard to e-learning:

- Develop equitable information infrastructure for education.
- Localize widely known e-learning software and develop local software.

- Extend utilization of existing distance-learning centres to ICT literacy.
- Establish information infrastructure.
- Support and attract international and private sector investment in the development of e-education.
- Promote media activities devoted to public ICT literacy.

III. Proposed Project

The purpose of the project is to develop an e-learning system for children of herder families living in remote areas

Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors	Total cost
1. Consultants			
a. International consultants		1.00	1.00
b. Domestic consultants		0.20	0.20
2. Equipment and software			
a. Equipment	10.00	30.00	40.00
b. Software	0.50	4.50	5.00
3. Buildings and furniture			
a. Building	0.10	1.00	1.10
b. Furniture		0.50	0.50
4. Training, seminars, and conferences	0.20	1.80	2.00
5. Research, development and surveys	0.20	2.10	2.30
6. Miscellaneous administration and support costs		0.80	0.80
7. Contingencies		2.70	2.70
Total	11.00	45.80	55.60

Project Framework

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Goal			
• Development of effective learning method (m-learning) for herders.	• Measurable improvements in herders life with up to date knowledge and real time information. • Herders engagement in global market increased. • Significant increase in literacy and ICT literacy rate.	• Steering Committee at the Government level. • ICTA.	• Stable and continuous political support. • Strong commitment at the local (village) level. • Good feasibility study that considers obstacles and resistance.
Purpose			
• Establishment of information infrastructure. • Development of m-learning system for children who live in remote areas.	• Nationwide information infrastructure. • Reduced digital divide. • Enhancement of quality of teaching and learning and the sharing of knowledge and information. • IT capacity-building of the teachers training institutions particularly in rural areas. • ICT awareness and skills of young population is improved. • ICT awareness of parents is improved through their children.	• Evaluation report of the ICTA and Ministry of Education, Culture and Science. • Yearly Report from the National Statistical Committee.	• Synchronization and alliance among implementing agencies and companies. • Active participation by the community. • Demographic changes can occur. • Citizens' massive movement to the centre will decrease.
Inputs			
• Hardware and Software: $ 70 m • Consultants: $ 1.2 Building and Furniture: $ 1.6 m • Survey: $ 0.2 m Training: $ 0.4 m • Civil work: $ 1 m Others: $2.5 m			

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Outputs			
• Knowledgeable inhabitants (herders). • Community satisfaction. • Enhanced nationwide information infrastructure. • Trained teachers. • New educational policies harmonizing with ICT.	• 250, 000 rural households (through children) are provided mobile devices for m-learning. • 400 secondary schools are provided with computer labs (15 PC each). • Favorable ICT related laws approved. • High speed internet service provided to every village, every household.	• Evaluation report of the ICTA and Ministry of Education, Culture and Science. • Donors' project evaluation and implementation report.	
Activities			
• Approve favorable laws and regulations to accelerate ICT in education (withdrawal of VAT on computer and computer related items, deregulating some radio frequencies, etc.) • Establish FO network to villages. • Establish Satellite network to those villages where FO cable establishment is meaningless. • Establish WiMax network in every village (340). • Conduct in-service teacher training. • Establish mobile learning units. • Installation of new equipments (FOC, mobile device, PCs). • Fielding of consultants.			

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Outcomes			
• Encouraged fair competition in ICT sector. • M-learning content and services (telephone, internet) are provided to people who live in remote areas. • 3400 teacher trainers trained. • Improved proficiency of teachers. • Explored collaborative learning among herders.			

B. Implementation Arrangements

The implementation agency will be the Ministry of Education, Culture, Science and ICTA. The agency will create a favourable environment by formulating policy and regulations on ICT and the education sector. A project implementation committee will be established with 15 to 21 members from MOECS, ICTA, educational institutes, NGOs, public schools and private sector. Their duty is to monitor, evaluate and implement the project. Close partnership and extensive support from the village community and schools are necessary for successful implementation. The project requires both domestic and foreign consultant input. The following table shows the duration, areas of expertise and expected result of consultant input.

	Foreign	Domestic	Expected result
Policy Regulation	1 consultant for 3 months	2 consultants for 12 months	Favourable legal environment based on studies of foreign experience (Mix and Match).
ICT infrastructure	2 consultants for 12 months	3 consultants for 36 months	Network planning, site survey, designing and dimensioning all infrastructure technologies (Mix and Match).
Educational content development	1 consultant for 6 months	3 consultants for 24 months	Widely acceptable educational content developed.
Software developer	1 consultant for 10 months	2 consultants for 24 months	Easy to use, understandable for children educational software.
System designer	1 consultant for 3 months	1 consultant for 6 months	Information System design developed.

C. Benefits of the Project

Today, most herders and their children do not recognize the benefits of technology. However, after implementation of the project they may acknowledge the educational benefits derived from the use of technology and its potential to improve the quality of education. Expected benefits of the project include:

- Improved quality of life (satisfaction).
- Expanded educational opportunities.
- Increased literacy rate.
- Increased learning efficiency.
- Improved quality of education.
- Sustained lifelong learning.
- Advanced community development.
- Improved quality of teaching.
- Effective usage of downtime.
- Extended knowledge about global market.

H. NEPAL

Nepal is a landlocked country. Approximately 68 per cent of the country is mountainous terrain, parts of which can be situated as high as 8848 metres above sea level. These terrestrial characteristics create difficult conditions for the building of adequate transportation networks. Rural areas especially lack adequate transportation networks. Mobile-learning could serve as a means of delivering information and learning to people living in remote and rural areas. E-learning and m-learning, therefore, are relevant to the needs of poor regions and underdeveloped countries because these forms of learning reduce costs and save time.

A National Education System Plan was introduced in Nepal in 1976. According to the plan, one year of training is compulsory to become a teacher. However, college facilities could not serve and provide training for the large numbers of untrained teachers. In 1980, a Distance Education Training System was established with support from USAID. The programme was delivered by radio to primary school teachers. About 84 per cent of enrolled teachers completed training via the distance education system. Recently, Nepal established an umbrella organization, the National Centre for Educational Development (NCED), to provide teacher training, management training and educational support at the local level. Curriculum-related audio cassettes and videos are provided along with audio equipment to 1300 resource centres. Currently there are 113,000 teachers and 20 per cent of these teachers are trained. The target is to train 60,000 teachers by 2009 and 100 per cent by 2015. It is difficult to accomplish this target through traditional classroom training methods. Therefore e-learning is a useful option and the Government has initiated e-learning programmes for teacher training.

The development of ICT in Nepal is encouraging. A telecom system and electricity supply are available in urban areas and district headquarters. However such facilities are not available in the rural areas. IT colleges have been established and enrollment is beyond maximum capacity. The Government of Nepal adopted an IT policy in 2001 that sets out the following goals: (i) Nepal shall be placed on the global map of IT, (ii) E-governance, e-commerce, e-learning and e-health shall be promoted and regulated, (iii) rural areas shall be given access to IT.

Various challenges impede the development of e-learning in Nepal: capable human resources are limited; rural areas lack access to IT facilities and electricity; there are no concrete programmes for the development of ICT; there is no policy about open learning and e-learning; terrorism and insurgency is a problem; and there is a shortage of funds.

Title of Action Plan:	Development of ICT Centres in Nepal
Proposer:	Mr. Maheshwor Sharma Paudel, Joint Secretary, Ministry of Eduction and Sports
Country:	Nepal
Date:	May 2005

I. Introduction

The development e-learning and ICT centres can help to overcome some of the barriers to education and development posed by the terrestrial diversity and difficult economic conditions of Nepal. Currently, there are more than 1020 IT training institutes and 26 ICT based colleges in Nepal. Private schools have introduced computer education into the curriculum.

The National Centre for Educational Development (NCED) is an umbrella organization for the training of educational manpower. Within the NCED, there are 34 Educational Training Centres (ETCs) that conduct teacher training, and 1331 Resource Centres (RCs) provide support for the ETCs.

II. Issues

In Nepal, infrastructural development is difficult and expensive because of the mountainous terrain. Electricity is unavailable in many parts of the country. Private schools offer IT courses but most poor people cannot educate their children in private schools, thus the gap between the "haves" and the "have-nots" is increasing. The cycle of poverty and illiteracy persists.

III. Proposed Project

A. Purpose and Output

The purpose of the project is to improve education quality and access to education in Nepal, and promote a system of e-learning. The existing Educational Training Centres will serve as the main training centres. The regional Resource Centres will conduct training under the leadership of ETC's. Approximately 20,000 teachers will be trained in the training centres. Internet facilities, Fax and phone services will be provided to the users on cost basis.

Project Framework

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Goal			
• Quality-improvement in school education.	• More trained teachers. • Educational standard of students will be raised.	• Annual result sheet will be evaluated by school supervisor.	• Government should allocate budget. • Lack of qualified trainers.
Purpose			
• Promote the system of e-learning in area-wide basis. • Increase access of modern tools and techniques of education. • Introduce computer education in all schools.	• Number of trained teachers. • Number of internet users. • Use of teaching and learning software.	• Progress Report. • Monitoring visits.	• Release of teachers can be difficult.
Oututs			
• ICT based teacher-training centres will be established. • E-learning will be an important part of teaching and learning. • Resource persons for teacher training will be produced. • Trained teachers will be produced through ICT based ETCs & RCs. • Internet, CD-Rom service will be provided for the local users. • Quality of school-level education will be improved.	• Numbers of well equipped ECTs and RCs. • Resource person will be working in RCs. • Number of trained teachers. • Record of service. • Good result of students.	• Tri-monthly progress report. • Bi-monthly field supervision by NCED. • Supervision by Regional Directorate of Education and District Education Office	• Budget constraints. • Commitment of Government. • Electricity and telephone line unavailable. • It can take time to accept new system of teaching and learning.

B. Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors	Total cost
1. Consultants a. International consultants b. Domestic consultants	0.05	0.05	0.10
2. Equipment and software a. Equipment b. Software	 0.50 0.25	 1.50 0.75	 2.0 1.0
3. Training, seminars, and conferences	0.25	0.75	1.0
4. Research, development and surveys	0.025	0.075	0.10
5. Contingencies	0.15	0.55	0.70
Total	1.225	3.675	4.8

C. Implementation Arrangements

A steering committee will be formed in the Ministry of Education and Sports. The Executive Director of NCED will be the member secretary of this committee. The implementing agency will be the NCED. Regional directorates and district education offices will support the implementation of the project. Educational Training Centres and Resource Centres will work according to the action plan of the project. The Ministry of Education and Sports will support all agencies.

D. Benefits of the Project

- Trained teachers.
- Quality of education raised.
- ICT and modern technology become part of teaching-learning process.
- Students can compete in the world market.
- Benefits from Internet access and usage.
- People will accept ICT, e-learning and life-long learning.

H. PAKISTAN

Pakistan is a large country with a relatively low per capita GDP, between $US400 and $US450. Approximately 32.5% of the population resides in urban areas while 67.5% lives in rural areas, facing critical problems of high illiteracy rates and low quality education. The low literacy rate can be attributed to vast geographic areas with large population sizes and low-density inhabitation. While the majority of the population is located in the rural areas, communication and transportation networks are inadequate and the number of formal schools in these areas is either extremely low or non-existent. The demands of the 21st century and a rapidly changing world have made the educational challenge formidable. Three interrelated challenges being faced are low enrollment, low completion and low achievement.

In 2000, Pakistan formulated the Education Sector Reform (ESR) Action Plan 2001-2004. In addition, a national action plan on education for all (EFA) 2001-2015 was developed in March 2003. The ESR was revised in 2004 as ESR Action Plan 2001-2006. In all the action plans ICT have been recognized as vital tools. Currently as a part of the ESR action plan, a national strategy of incorporating ICT in education is being formulated. The aim is to effectively integrate ICT in education in order to achieve the basic objectives of the national education policy 1998-2010, i.e achieve universal basic education, diversify secondary education and provide high quality tertiary education. The targets of e-learning, according to the National Education Policy 1998-2010, are to: modernize education in Pakistan; provide access for all to knowledge and information; promote teacher training and educational activities; and prepare children of all ages for the modern world.

IT education has been introduced as a discipline in most of the public sector universities and ICT infrastructure and connectivity has been provided to them. However, there has been little progress in expanding e-learning programmes in education at the primary and secondary level. The few programmes undertaken have been initiated by the private sector.

Pakistan has progressed rapidly in the field of information technology since 2000 when, for the first time, IT policy was officially announced by the Government of Pakistan. Over 2100 dialing stations are in place nation-wide. The backbone has recently been upgraded to DWDM with the capacity of 10 gigabytes per second. Bandwidth has been increased from 215.2 Mbps to 610 Mbps and the number of ISPs is 127. Pakistan owns a communication satellite now in orbit, and has extensive international connectivity. Computer education has been introduced in every walk of life. There are more than 300 software houses producing and utilizing various forms of ICT such as Internet, e-mail, CDs, websites and other programmes. About 600 cities have been connected through optical fibre, and 1707 cities have been linked to the Internet.

However, one of the main challenges is that the physical and human infrastructure necessary for the implementation of various e-learning programmes is not uniformly distributed throughout the country. There are still areas which do not have access to electricity and telecommunication links. Additional issues are: the non-availability of software in local and regional languages; lack of e-learning content for schools; lack of know-how in developing digital content for children. In addition there are cost implications involved. Implementing such a policy on the wide scale requires vast financial resources.

Title of Action Plan:	M-learning for Female Technical Education in Rural Areas of Pakistan
Proposer:	Ms. Sadia Shakil, Instructor, Computer Instructor, Project Coordinator, Polytechnic Institute for Women,Islamabad
Country:	Pakistan
Date:	May 2005

I. Introduction

Pakistan is a big country with a large population facing many challenges in efforts to improve the literacy rate. The Government is taking measures to improve the literacy rate, especially in the area of ICT. Emphasis is on primary education, especially for women as the female literacy rate in Pakistan is approximately half the men's literacy rate (Japan International Cooperation Agency, Planning Department, 1999).

Educational opportunities for girls are considerably limited in rural areas due to constraints imposed by society. The enrollment rate for girls in secondary education in rural areas is one seventh of that for girls in urban areas. The Government is doing a lot in the field of general education, such as giving incentives of free books at primary level. The Government is also trying to improve the status of technical and vocational education, yet it is a big challenge as the trend is towards general education and most people are not aware of the importance of technical and vocational education.

The Government is taking measures to improve technical education and a big step towards this goal is the plan to form a Technical Educational and Vocational Training Authority at the national level, which will impart technical training to thousands of youths in Pakistan.

II. Issues

Many families do not send their daughters to school because they need their daughters' help with housework when their finances are tight. They also do not let their daughters attend distant girls' schools or schools with male teachers. Furthermore it is difficult to persuade urban female teachers to live in rural areas. Another major issue is acceptance of the idea of mobile teaching methodology by the rural population as the people show resistance to big changes.

The feasibility of this project also depends upon the success of Wireless loop (WLL) launched in 2004 and future launching and success of PakSat-2 satellite.

III. Proposed Project

A. Purpose and Output

The objective is to train technical teachers to produce a skilled workforce among the rural female population. It is envisioned that teachers trained in the use of mobile devices will teach technical skills to women in rural areas using m-learning.

B. Methodology and Key Activities

The project is divided into two phases.

Phase 1: The m-learning centres will be set up in cities and towns that have telecom facilities and electricity, near villages where the mobile technical education is to be imparted. Initially, ten such cities and towns will be selected. Each teacher in these centres will be provided with mobile devices such as Pocket PCs and other necessary equipment. The teachers will be chosen from the villages where the training is to be imparted so that they will be willing to serve in their villages after completion of the training. Two teachers will be selected from each village and a total of 20 teachers will be trained in one centre. A total of 200 teachers will be trained within an estimated time period of one year. During this year the activities will include consultation, surveys, set-up of centres and training of teachers.

Phase 2: The trained teachers will be assigned to their respective villages (two teachers per village), so that 200 teachers can train students from 100 villages. Student training will be conducted in mobile buses. The buses will be equipped with mobile devices which will be used in imparting training. The students can be given an incentive in the form of a scholarship based on good performance. This phase will take one year.

C. Implementation Arrangements

The Federal and Provincial Ministries of Education, the Ministry of IT and Telecom or the Technical Education Boards can be approached for implementation of the project. The ministries or technical boards share the financial burden with donor agencies such as ADB, and the private sector. The curriculum used in the existing polytechnics can be modified into a one-year training curriculum. The National Institute of Science and Technical Education (NISTE) can be involved in modification or even creation of new curricula if needed. The Virtual University and Allama Iqbal Open University can also work with NISTE in the implementation of the project. NISTE will also be responsible for devising methods to train teachers. The project will be completed in two years time.

D. Benefits of the Project

The project will be useful in producing a skilled workforce among females in rural areas. A skilled work force will be able to initiate small businesses and promote development of rural areas.

Project Framework

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Goal			
• Establish and maintain m-learning training centres for female technical teachers' training. • Utilize trained teachers to impart technical training to the female population in rural areas using m-learning.	• Increase in the skilled workforce and enable the female population of rural areas to participate in the formal workforce.	• Federal and Provincial Ministries of Education, Ministry of IT and Telecom, and Boards of technical education.	• WLL and PakSat-2 satellite will be fully functional for educational purposes.
Purpose			
• To produce technically trained female workforce in rural areas. • To decrease the gap between the technicians and engineers.	• Response of rural areas inhabitants. • To provide middle level personnel in the industry.	• Survey by the project implementing agency.	• Awareness about the importance of technical education for women among villagers. • Acceptance of m-learning techniques by people in rural areas.
Outputs			
• Mobile technical learning centres for teachers and students.	• Availability and willingness of women in the villages to be trained as teachers.	• Survey by project implementation agency.	• Rural areas have women who can be trained a technical teachers.
Activities			
• Teacher-training in mobile training centres using modern mobile devices. • Students trained in the villages using mobile buses.	• Technically trained staff.	• Project implementation agency.	• Active participation by the community. • Understanding about the importance of technical education by stakeholders.

E. Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors	Total cost
1. Consultants	0.5	1.5	2.0
2. Equipment, software, buses	2.70	5.3	8.0
3. Buildings and furniture	0.70	1.3	2.0
4. Training, salaries of personnel	0.30	0.50	0.80
5. Seminars, surveys, travels, and scholarships	0.05	0.15	0.2
6. Resource material and stationery	0.03	0.07	0.1
7. Contingencies (10%)	0.43	0.88	1.31
Total	4.71	9.7	14.41

Title of Action Plan:	Providing and Improving Elementary Education through Mobile Technologies
Proposer:	Dr. Tayyaba Siddiqui, Principal/ Professor, Federal Government College for Women
Country:	Pakistan
Date:	May 2005

I. Introduction

Education for All (EFA) is the most significant part of the education sector reform agenda of the Government of Pakistan. EFA makes up one of the main components of the National Education policy 1998-2010 and the Education Sector Reform (ESR) Action Plan . It focuses on access and quality issues in education at the elementary level, and on diversification and provision of high quality education at the secondary and tertiary level. The policy aims to minimize the dropout rate by 20 per cent by 2010, and completely eliminate the drop out phenomenon by 2015.

Recently, numerous initiatives have been undertaken regarding integration of technology to improve access to education and the quality of education at the tertiary level. Primary education is the core building block of our education system, and has been deemed a priority by the ESR. Hence, it is important that ICT intervention at this level is also given due emphasis.

II. Issues

Presently, the net participation rate at the elementary level is 66 per cent, out of which almost 50 per cent drop out before completing their primary education. The reasons for low enrollment and high drop out rates are complex and range from economic, physical, geographical, social, cultural and administrative factors. An additional reason is the lack of educational infrastructure. An effective m-learning system has the potential to overcome these constraints successfully, as well as improve the quality of education at various levels. Issues that impede the expansion of ICT in education are:

- High costs involved in initial set-up, connectivity, upgrading and maintenance.
- Lack of minimum supporting infrastructure, such as electricity and telecommunications.
- Discontinuity of government plans and programmes.
- Lack of coordination among implementing agencies, such as the Ministry of Education and the Ministry of Telecommunications.
- High costs of licensing software.
- Weak educational infrastructure.
- Lack of high-quality ICT instructional material in local languages.

III. Proposed Project

A. Purpose and Output

The objectives of the project are to:

- Improve the access to education through the use of ICT.
- Enhance the quality of elementary education and teacher training and support programmes.
- Provide engaging educational content through a variety of mediums and technologies.
- Decrease the digital divide and disparity between the rural and urban areas and the disadvantaged groups.
- Provide life-long learning opportunities to teachers and communities.

B. Methodology and Key Activities

The proposal envisages the establishment of a network of e-learning and m-learning Central Resource Centres and 15 Area Resource Centres including three in each of the five educational sub--sectors of Islamabad district. Each centre will be provided with at least two mobile devices and with multi-media projection equipment. The centres in the rural areas would be provided with hot spots in order to overcome the problem of connectivity and would be integrated with the wireless local loop. Infrastructure will need to be upgraded and developed. Operation of the centres will be controlled and supervised by the respective area education officers under the administrative control of the Federal Directorate of Education of Islamabad. However, other stakeholders and national and nternational experts will be consulted when designing the course content.

Recurring expenditure for maintenance and operation will be reflected in the annual recurring budget of the Federal Directorate of Education. The centres will be run by qualified and technical staff. The central resource centre will act as the resource repository, consisting of an e-library and content for different levels and different subjects according to the needs of the students, teachers and the community. Maximum effort will be made to make use of available software preferably through open source. Content will be developed only where an alternative is not already available.

The majority of professionals will be engaged at the Central Resource Centres while the area Resource Centres will be manned by only a couple of personnel. The m-learning resource centres will provide support to the teachers and the students in the morning, and remain open to the public in the evening. These centres will provide a wide-range of services to maximize the utilization of resources. The project might be extended to other districts or provinces upon successful completion and cost-benefit analysis.

Project Framework

Design summary	Performance indicators/	Monitoring	Assumptions and
Goal			
• To provide quality education at the primary level through m-learning applications.	• One million students approached through m-learning and other interactive technology. • 15 Area Resource Centres and one Central Resource Centre (CRC) established and functional.	• Project monitoring data and reports. • National statistics.	• Lack of political will. • Shift of focus and priorities in education.
Purpose			
• Enhancing learning opportunities within and outside of schools. • Decrease drop-out rate. • Increase literacy level. • Improving quality of teaching and development of content in local languages.	• Retention rate increases in the schools. • All school-aged children have access to education. • Number of students accessing the school.	• Data gathering and analysis using different tools.	• Supporting policies implemented. • PAKSAT-II will be launched by the year 2008.
Output			
• 100% teachers trained in adopting and using m-learning applications. • Enhanced e-learning and m-learning awareness and use in the community. • Skilled manpower.	• Number of training hours imparted. • Number of teachers trained. • Number of community members trained in using ICT.	• Monitoring against intermediate results set in the M&E Plan. • National statistics. • Increased Internet access.	• Participation and ownership from community boards and Community Based Organizations.

Design summary	Performance indicators/	Monitoring	Assumptions and
Activities			
• Set-up of suitable networked infrastructure in schools and Resource Centres at District and Tehsil level. • Expansion of existing technological infrastructure in schools for broader outreach. • Capacity building programmes for managers, implementers, and instructional designers for m-learning. • Interactive multimedia content and courseware development in local languages. • Setting up support system for sustainability. • Plan for producing and testing additional materials and expanding to new locations and districts.	• The projects or Resource Centres generate sufficient revenue to share the recurring and expansion costs. • Revenue generated per month. • Number of schools benefiting from technological and m-learning applications. • Number of capacity-building programmes implemented for the audience. • Attendance of students and drop in absenteeism. • Amount of interactive multimedia content and courseware developed in local languages. • Cost analysis report. • Plan for up-scaling. • Number of m-teaching and learning applications and courses developed. • Literacy increased.	• Development of a project planning matrix having qualitative and quantitative indicators. • Monitoring against intermediate results.	• Natural disasters
Inputs			
• Budget/Funding. • Trained managers and other professionals. • Supporting policies. • Motivation and commitment. • Delivery mechanisms. • Service providers and m-learning providers.			• Financial support from government and other donors. • Funding withdrawal. • ICT courses incorporated into pre-service capacity-building programmes for teachers.

C. Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors	Total cost
1. Consultants	0.5	2.5	3.0
2. Equipment, software, buses	5.0	15.0	20.0
3. Buildings and furniture	1.0	2.0	3.0
4. Training, salaries of personnel	2.5	5.0	7.5
5. Seminars, surveys, travels, and scholarships	0.5	1.5	2.0
6. Resource material and stationery	0.5	2.0	2.0
7. Contingencies (10%)	1.0	2.0	3.0
Total	11.00	30.0	44.0

I. PHILIPPINES

The Philippines recognizes the importance of achieving "Education for All" but there remains a considerable proportion of Philippines society that does not have access to formal education, especially those communities in rural and remote areas. It is estimated that approximately one fifth of the Philippine population does not have access to education.

In the Philippines, optimism is expressed about the potential of ICT to broaden access to education. The Philippines Department of Education is presently drafting a National Strategic Plan with the theme of "Broadening Access to Basic Education Using ICT". The theme can be viewed from two perspectives: 1) as a mode of providing educational opportunities, particularly to those who have no access to the traditional educational system; and 2) as a means of improving the quality of education in schools that lack educational resources. It is important to note that the Strategic Plan does not promote a technological solution to literacy problems, but rather, an educational solution that contains technological aspects. The Department of Education and the Commission on Higher Education have a number of existing partnerships with other government and non-government organizations that include initiatives to promote the use of computers in Philippine schools, integration of ICT in lesson plans, and other initiatives geared towards promoting the use of ICT to improve the educational outcomes in the country.

The Information Technology and E-Commerce Council (ITECC) is the government-tasked organization to coordinate e-learning initiatives in the Philippines. It is the Philippine's highest policy-making body on information and communications technology (ICT) that continues to spearhead efforts to promote e-learning in the country. Other private organizations and societies have been formed to assist in the coordination of ICT initiatives and e-learning in the Philippines such as Philippine e-Learning Society (PeLS) and the Information Technology Foundation of the Philippines (ITFP). E-learning and m-learning programmes such as the mobile learning programme by the University of the Philippines Open University (UPOU), Library on wheels conducted by the Museo Pambata, Manila, and others are taking the lead in expanding ICT enabled education.

The existing pre-service teacher education curriculum in the Philippines includes two courses in Educational Technology. On in-service training of teachers in the use of ICTs in education, a programme of Intel called "Teach to the Future Programme" has trained a third of the total population of public high school teachers in the Philippines. A number of courses for teachers that are ICT supported are also available through the UPOU.

Major challenges include: limited access to computers and the internet; indifferent attitude and response of students and parents to ICT; and lack of preparedness of schools and communities to adopt ICT-supported learning.

Title of Action Plan:	Development and Delivery of e-learning Modules for out-of-school Youth and Adults in the Philippines
Proposer:	Abigail C. Lanceta, Education Programme Specialist II, Literacy Division-Bureau of Alternative Learning System Department of Education
Country:	Philippines
Date:	May 2005

I. Introduction

Education is a fundamental right of all. It is essential to a country's development and to the country's participation in the global community and in the search for peace, security and sustainable development. The Government of the Philippines recognizes the right of every Filipino to basic education. The Department of Education, in its desire to bring about Education for All, has been exploring every possibility to improve access to education and to enhance the quality and efficiency of basic education in the country.

The Philippines Department of Education is presently drafting a National Strategic Plan for ICT in Basic Education with the theme of "Broadening Access to Basic Education Using ICT". While hardware is the most visible aspect of computerization programmes, the policy direction of the Department of Education is to create an ICT-enabled school learning environment by addressing four critical elements: infrastructure, curriculum/content, teachers, and service support to schools. The diagram below illustrates how the Philippine Department of Education intends to utilize ICT in both traditional and alternative schools.

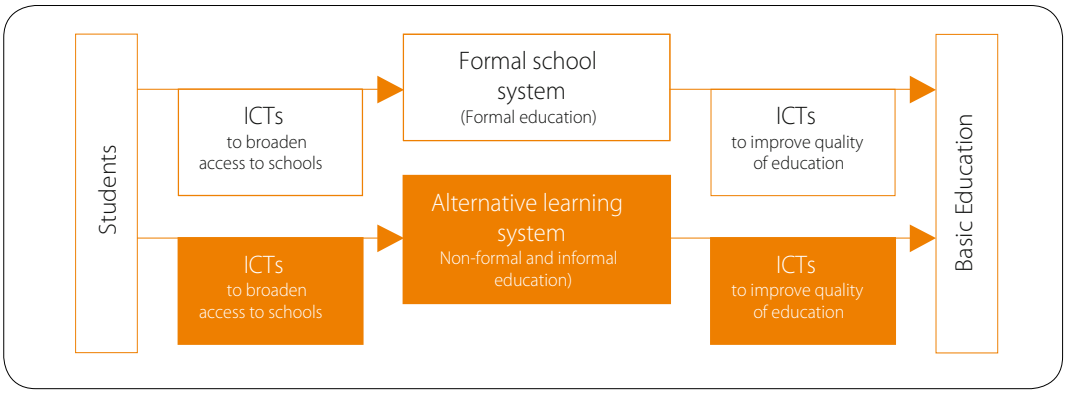


Figure 6. Philippine Action Plan: Entry points for ICT utilization in traditional and alternative schools

II. Issues

Despite efforts by the Government and by non-government organizations to improve access to education and the quality and efficiency of basic education, a fifth of the Philippine school-aged population is not enrolled in school. The World Conference on Education for All (EFA) in 1990 and other studies on the situation of world education indicate an increase in the number of school dropouts and a decrease in funding for education in developing countries such as the Philippines.

The current curriculum for formal education in the Philippines is inadequate and does not respond to the varying needs of sectors of society such as adults and other special groups. A second channel of learning that will provide an alternative learning system (ALS) to meet the basic learning needs of the educationally disadvantaged population is therefore imperative.

I. Proposed Project

A. Purpose and Output

The proposed project "Development and Delivery of E-learning Modules for Out-of-School Youth and Adults in the Philippines" aims to improve the delivery of an alternative learning system (ALS) and broaden access to basic education using e-learning and ICT.

Specifically, the project attempts to accomplish the following:

- Production of interactive e-learning modules for the delivery of ALS programmes.
- Development of trained and skilled teachers, facilitators and instructional managers in the delivery of ALS programmes in e-learning environment or using ICT.
- Establishment of operational centres for e-learning.
- Ensuring effective and efficient implementation of the project.

B. Methodology and Key Activities

1. Mobilize partner agencies to support the project. This shall be done through consultation meetings and advocacy campaigns to obtain financial support and other project commitments.
2. Materials development. Initiatives to convert existing ALS modules have begun. Content will no longer be developed because a curriculum for an alternative learning system that is parallel with that of the formal school system is available.
3. Setting-up of infrastructure and training of teachers can take place simultaneously.
4. Depending upon timing, availability of funds, location of learners and access to other needed resources, ALS programmes may be delivered through the following schemes:
    a. Computer based learning through the Internet (learners in cities and urban areas)
    b. Computer based learning using CD-ROM (learners in both urban and rural areas)

c. Combination of a and b (learners in both urban and rural areas)

d. Other existing delivery modes (mobile vans, radio, conventional mobile teacher programmes, mobile library, family literacy programmes)

5. Mobile phones and/or prepaid cards shall be provided to and used by the teachers/tutors to monitor progress and evaluate achievement of learners. Regular face-to-face meetings and home visits may be arranged between and among learners and teachers. E-mails and chats may also be used for feedback for those learners in the cities.

6. The platform that may take some time to develop and establish will interface along the e-mail and chats feedback options.

7. Sustainability plans will include design of other potential content based on needs of special groups such as women, adolescents, indigenous people, and shall be used for informal learning.

8. Monitoring and evaluation of field implementation will be conducted on regular basis by various groups and sectors.

There are important considerations to note in the actual implementation of the project to ensure that it will serve its true purpose. These include the following:

- Do not promote a technological solution to literacy problems, but rather, an educational solution that contains technological aspects.
- Judicious or sensible use of technology is more important than use of cutting edge technology.
- Respond to the need for a more systematic and flexible approach in reaching all types of learners outside the formal school system.

Project Framework

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Goal			
• To improve the delivery of an alternative learning system and broaden access to basic education for out-of-school youth and adults using E-learning and ICT.	• Percentage of increase in literacy rate. • Percentage of increase in enrollment to ALS programmes. • Percentage of increase in trained people on ICT in the Department of Education.	• Impact assessment and evaluation report. • Periodic reports from field programme implementers. • Training development and needs assessment reports.	• Priority of the government in basic education does not change in the next 3-5 years.
Component Purpose 1			
• Content and Materials Development: to produce interactive e-learning modules for the delivery of ALS programmes.	• Number of interactive learning modules produced.	• Copies of ALS modules in e-learning format on CD ROMs.	• Existing network and partners continue to support and provide free technical services in the material development.
Outputs			
• Workshops will have been conducted to convert 29 Basic Literacy Programme and 531 Continuing Education Programme modules into interactive e-learning format. • Consultants will have been hired to provide technical assistance. • Local content specialists, e-learning material design experts, etc. will have been involved.	• Number of workshops conducted. • Number of BLP and CEP modules converted into e-learning format. • Number of man-hours technical assistance provided.	• Workshop proceedings. • Copies of BLP and CEP modules in e-learning format. • Workshop proceedings. • Work contract.	• Programme field implementers and managers are willing to deliver ALS programmes in e-learning environment or using ICTs

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Component Purpose 2			
• Training of facilitators, mobile teachers and instructional managers. • To develop trained and skilled teachers, facilitators and instructional managers in the delivery of an ALS. • ALS programmes in e-learning environment or using ICT. • To deliver the ALS programmes in e-learning environment.	• Number of skilled mobile teachers or facilitators. trained in the delivery of ALS programmes using e-learning and ICT. • Number of training days and hours conducted by topic. • Number of out-of-school youth and adults who have accessed basic education through e-learning and ICT.	• Training proceedings. • Training completion reports. • Enrolment reports.	• Government fund allocation for the Department of Education remains stable. • Local government units commit.
Outputs			
• Training programmes for 600 mobile teachers, facilitators and instructional managers on e-learning and use of ICT will have been organized. • E-learning will have been implemented and ICT used in the delivery of ALS programmes.	• Number of man-training days and hours. • Number of enrollees in BLP and CEP programmes.	• Training completion reports. • Enrollment records, periodic reports.	
Component Purpose 3			
Infrastructure: • To establish operational centres for e-learning.	• Number of e-learning centres established and made operational.	• Building evaluation documents.	• Local government commit to provide an area for the centre.

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Outputs			
• 60 e-learning centres will have been established and set-up in 60 barangays in the country.	• Names of barangays by region.	• Building evaluation documents.	
Component Purpose 4			
• Support services: to ensure effective and efficient implementation of the project.	• Number of monitoring visits and project evaluation conducted.	• Monitoring and evaluation reports.	
Outputs			
• Local technical assistance will have been provided to the learning centres and the teachers. • Project meetings, advocacy campaigns, etc will have been organized.	• Number of technical assistance hours provided to learning centres. • Number of meetings and workshops conducted.	• Meeting and workshop proceedings. • Meeting and workshop records, attendance sheets.	

C. Key Inputs

- Capacity building and training of mobile teachers, facilitators and instructional managers.
- Technical assistance from consultants and experts.
- Hardware (computer desktops and other peripherals).
- E-learning platform and software portal.
- Building and furniture for e-learning centre.
- Support services (administrative, local technical assistance, monitoring, etc.).

D. Major Activities

- Converting existing ALS learning modules into interactive/e-learning format.
- Producing copies of converted e-learning modules in CD-ROMs.
- Constructing the centres to house e-learning facilities.
- Establishing e-learning centres at the barangay level and making them operational.
- Conducting in-service training for mobile teachers, facilitators and instructional managers.
- Delivering existing alternative learning programmes in e-learning environment or using ICT.
- Providing support services to e-learning centres.
- Mobilizing all sectors involved in the project (advocacy initiatives).
- Monitoring programme delivery.
- Evaluating efficiency and effectiveness of programme delivery (documenting success stories).

E. Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors	Total cost
1. Materials development, administration cost, meetings, workshops		8.154545	8.154545
2. Production, distribution, logistics	1.833545	1.833545	3.667090
3. Computers, servers, mobile phones		0.392727	0.392727
4. Platform, building, furniture, peripherals, consultancy		26.381818	26.381818
5. Personnel salary, maintenance	1.963636		1.963636
6. Training, consultancy, administration cost	2.781818		2.781818
7. Support services/local TA mobility, connectivity/prepaid cards, administration cost		2.238545	2.238545
Total	6.578999	39.001180	45.580179
Percentage	14.43 %	85.57 %	100.00 %

F. Implementation Arrangements

The project will be implemented through the consortium of the Department of Education, Local Government Units and other non-government partners in the alternative learning system. This will be forged by a Memorandum of Understanding (MOU) between and among the agencies involved. Specific roles and benefits of each partner agency shall be defined in this agreement.

The Department of Education Bureau of Alternative Learning Systems will serve as the overall project coordinator. Actual implementation will be carried out at the barangay level by the mobile teachers through the regional, division and district field offices. A central project management unit will be based at the main office in Manila. The Central Department of Education will direct the activities and will receive field reports for consolidation and database formulation and organization. A project coordinating committee will be created and will be composed of representatives from various sectors. This committee will serve as the highest policy formulating body for the project.

G. Benefits of the Project

The project is expected to benefit various sectors in society and will impact greatly on broadening access to basic education especially for out-of-school youth and for adults. In particular, the project will have the following benefits:

- Increased literacy rate.
- Greater access to basic education.
- Stronger and improved delivery system of ALS programmes.
- Increased number of skilled DepEd personnel on ICT.
- Stronger link between school and the community.
- Reduced cost of per capita learning.

Title of Action Plan:	Expanding Educational Opportunity for the Filipino College Faculty through Alternative delivery Mode
Proposer:	Ms. Elsa G. Florendo, Supervising Programme Specialist, Office of Programmes and Standards, Commission on Higher Education
Country:	Philippines
Date:	May 2005

I. Introduction

The Philippines is an archipelago of 7,107 islands and islets with a total land area of 298,170 square kilometres and a total water area of 1,830 square kilometres. It is made up of three island groups: Luzon (North), Visayas (Central) and Mindanao (South). It has an estimated population of more than 80 million. The leading barriers to educational development are the lack and inadequacy of classrooms; small number of qualified teachers; and insufficient library and laboratory facilities.

II. Issues

- Late release of faculty scholars' allowance.
- Lack of support from scholars' Higher Education Institutes (HEIs).
- Few faculty availing of the scholarship programme as allowance is insufficient, scholars are not deployed, and scholars unwilling to provide return service.

III. Proposed Project

A. Purpose and Output

The goal of the project is to improve the quality of tertiary and college education in the country. The project aims to increase the number of college faculty with Masters degrees in identified priority fields. The Commission on Higher Education (CHED) Faculty Development Programme (FDP) is part of a package of measures for higher education under the Higher Education Development Programme. Under this programme a project is to be funded by the Higher Education Development Fund (HEDF). It will conduct faculty upgrading and programme upgrading and curriculum review. The Non-Thesis Masters Programme will upgrade academic qualifications of 3,500 tertiary level faculty to the level of a Masters degree in the priority fields. Delivery will be via full or part-time basis and distance learning. Programme implementation will start AY 2004-2005 (Year 1) and 70 per cent of the scholarship slots are for non metro-Manila based faculty.

The project will be implemented in three phases, these are:

Phase 1: Programme implementation using the proposed mode.
Phase 1a: Identification of Distance Learning Higher Education Institutions (DE DHEI).
Phase 2: Pilot implementation for the identified DE DHEI.
Phase 3: Full implementation of the CHED FDP via distance learning.

Project Framework

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Goal			
• Improve the quality of tertiary and college education.	• Improvement of graduate in licensure examinations. • Increase percentage of faculty with Masters degree.	• Assess exam results of AB/BS graduates of SHEIs. • Assess reports of labour statistics office.	• All graduates will be prepared for jobs in field of expertise.
Purpose			
• Increase the number of college faculty with Masters degree in identified priority fields.	• Increase percentage of faculty with Masters degree.	• Assess faculty profile of SHEIs. • Assess teaching load of faculty members of SHEIs.	• FDP graduates will teach course of expertise as well other courses.
Outputs			
• Increased number of college faculty with Masters degree in identified priority fields.	• Approved scholars who completed the course or finished the degree.	• Evaluate quality of SHEI faculty. • Evaluate teaching load.	• Graduates of FDP will be handling courses where they were trained. • Assigned courses not within expertise.
Activities			
• Phase1: Programme implementation using the proposed mode. • **Phase 1a**: Identification of distance learning DHEIs. • **Phase 2:** Conduct of pilot implementation for the identified DE DHEI. • **Phase 3:** Full implementation of the CHED FDP via distance learning.	• Number of scholars under the proposed delivery mode. • Percentage of DHEIs identified as DE DHEI. • Come up with a journal of cases on the experiences derived from the pilot project. • Continue with journal of cases on the experiences derived from the pilot project.	• Conduct regular monitoring and close coordination with DHEI on status of project. • Hold regular meetings with DHEI coordinators to use experiences to improve each next cycle. • Conduct regular dialogue on how to further improve the full implementation of FDP.	• More faculty members will be allowed by their SHEIs to avail of the programme. • Events within the country will not interfere with the implementation of pilot cycles. • Implementing organization on schedule in order to maintain annual synchronization of project activities.

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Inputs			
• Support for graduate studies of faculty scholars. • Support for the home institution of the faculty scholar.	• Support provided helped the SHEIs produce: graduates passing licensure examinations and establish FDP within SHEI.	• Conduct monitoring and surveys of DHEI, SHEIs and scholars. • Assess employment placement of graduates of SHEIs.	• DHEIs continuously support its scholars and keep track of their graduates.

B. Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors	Total cost
1. Consultants			1.6
2. Equipment and software			6.4
3. Buildings and furniture			8.3
4. Training, seminars			0.3
5. Research, development and survey			0.6
6. Miscellaneous, administration and support costs			0.516
7. Contingencies			2.660
Total			20.380

K. SRI LANKA

The Ministry of Higher Education (MEHE) of Sri Lanka is of the view that Sri Lanka as a nation is far behind in the development of IT in relation to many countries of comparable economic growth and social environment. As a result, the National Policy on IT in school education was introduced and enforced in 2000. The aim of the policy is the commitment of the government towards providing up-to-date knowledge in IT to Sri Lanka's younger generation in order to achieve an information society with e-culture, and to develop youth into productive members of society.

The Open University of Sri Lanka (OUSL) was established in 1980 as a national single mode distance teaching university. It is the only recognized university in Sri Lanka that teaches using distance-teaching techniques. The delivery of the study programmes is primarily through printed text. The audio-visual materials are used as supplementary media to support students in their learning. The integration of electronic media into course materials is very limited. There are approximately 40 study programmes and 600 courses offered by the OUSL. E-learning is being used as a supplementary delivery medium by eight departments to deliver 41 courses. The Open University of Sri Lanka (OUSL) also realised the need in expanding its capacity in this area. The OUSL felt the necessity of incorporating multimedia and online teaching with the existing teaching methodologies and have conducted training programmes in development of multimedia courseware and e-learning.

The OUSL Local Area Network (LAN) consists of more than 300 nodes, providing facilities for Internet and e-mail, the Learning Management System (LMS) and the OUSL web. The modified version of the LMS was put into operation in March 2004 and is now being used successfully as the LMS of the OUSL. Once the central campus is fully networked with other regional study centres, the accessibility will be improved significantly. The main campus of the OUSL has 2 Mbps local leased line connectivity with 256 K Internet bandwidth. The OUSL has four regional centres and 26 study centres spread across the country. All the regional centres and some of the study centres have computer laboratories with approximately 10 to 25 computers. In addition, the main libraries have computers with Internet facilities.

Major constraints on improving e-learning programmes in Sri Lanka include: lack of access to the Internet and ICT, inadequate infrastructure and facilities, lack of human resources and trained teachers, high teacher workloads, and limited budgets.

Title of Action Plan:	Use of m-learning to Empower Students with Special Needs
Proposer:	Dr. Buddhini Gayathri Jayatilleke, Acting Director, Educational Technology Division, Development and Training Centre, Open University of Sri Lanka (OUSL)
Country:	Sri Lanka
Date:	May 2005

I. Introduction

Although the Government of Sri Lanka has made tremendous efforts to provide equal educational opportunities to all students, students with disabilities remain underserved. The need to provide equal educational opportunities as a right to all children gained credence with the adoption of the United Nations Convention on the Rights of the Child in 1989. This was further consolidated through the UNESCO Salamanca Statement and Framework of Action on Special Needs of 1994.

Children with special needs are defined as children with situational disadvantages due to malnutrition; child labour; and other factors associated with poverty; physical, mental, or emotional impairments ; and learning difficulties. It is estimated that as many as 50 per cent of school-age children in the least developed countries of Asia may need specialized educational responses.

The Ministry of Education is currently engaged in formulating a scheme to provide equal educational opportunities to students with disabilities and to integrate them into the mainstream of education. This is referred to as Inclusive Education. Inclusive Education is particularly pertinent at the moment because many students are victims of the recent Tsunami disaster and they may suffer from emotional disorders. Instead of placing them apart from the rest of the school children, it would be more appropriate for them to be in the same school and assist in their learning. The use of mobile technologies could cater to the needs of students with disabilities. M-learning tools can help teachers to give special attention and foster individualised teaching among students with special needs.

II. Issues

The main issues in the development of education in Sri Lanka are: lack of equal opportunities to all students in the country; lack of opportunities at the tertiary education level; and limited trained personnel in the field of ICT.

Little attention has been paid so far to students with special needs. There are few colleges completely dedicated to disabled students. The enactment of Inclusive Education is a challenge and needs various inputs such as expertise in the field of special needs. The mobile learning technologies seem to a viable means of overcoming this challenge. Four main issues can be identified relating to this project. The first issue is the identification of appropriate m-learning devices for different impairments, such as visual devices for deaf and audio devices for blind. The second issue is establishing m-learning centres at schools where inclusive education is taking place. In order to establish m-learning centres, facilities need to be built at selected ICT centres in secondary schools. The students with special

needs would be able to use these centres along with other students. The third issue is capacity-building of curriculum developers, in-service teacher educators, in-service teachers and technical staff. Since Inclusive Education is a new field, there is a severe shortage of trained personnel specialized in this field. Therefore, it is crucial to train personnel in this field in new techniques and teaching methodologies. The fourth issue to be addressed is the maintenance and sustainability of the m-learning centre. Many projects are unsustainable after the cessation of funds. It is very difficult to find adequate financial resources to maintain the equipment. Therefore, it is necessary to develop a viable mechanism to sustain the project.

III. Proposed Project

A. Purpose and Output

The overall purpose of the proposed project is to assist the Ministry of Education and Higher Education (MEHE) to extend the concept of "Inclusive Education" to the mainstream and provide financial and technical assistance. The project aims to train in-service as well as new teachers in this concept and to build up their capacity to work in this area. The project also aims to support the MEHE to strengthen the policy on students with special needs and to draw up mechanisms to sustain the project so that the students with special needs are treated equally and provide opportunities to empower them in society. The following are the specific objectives of the proposed project:

Component 1

- Assist the MEHE to strengthen the policy to empower students with special needs using mobile learning technologies.
- Provide financial and technical assistance to the government to materialise the concept of "Inclusive Education".
- Assist the MEHE to draw up mechanisms to sustain the project.

Component 2

- Coordinate activities among various organisations under the MEHE in planning and implementation.
- Provide necessary support to the National Institute of Education (NIE) to integrate "Inclusive Education" into the school curriculum with the guidance of the MEHE.
- Provide necessary support to the NIE and the Open University of Sri Lanka (OUSL) to strengthen the Special Needs units in their respective departments.
- Provide financial assistance to strengthen the already established Learning Resource Centres (LRC). These selected centres should be equipped with appropriate e-learning devices to teach students with special needs.
- Provide financial and technical assistance to train curriculum developers, teacher educators and technical staff attached to the LRC.

The following are the expected outputs of the project:

Component 1

- National policy on students with special needs.
- Legislation related to the sustainability of the programme.

Component 2

- Integrated school curriculum with Inclusive Education.
- Adequate trained educational developers, teacher educators, trained teachers and technical staff.
- Training course materials specially designed for Inclusive Education.
- Selected LRC with m-learning and e-learning devices in the secondary schools where the concept of "Inclusive Education" is integrated.
- Certificate/Postgraduate diploma in special needs education.

Project Framework

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Goal			
• Empowering children with special needs through mobile learning.	• Learning achievement level of students with special needs. • Establishment of hardware and software in the LRC at the secondary schools. • Increase in trained personnel in the field of students with special needs.	• Student assessment records and examination results. • Project monitoring data. • Project monitoring reports, review reports.	
Purpose			
• Assist the Government to effectively implement the concept of Inclusive Education in schools. • Build capacity for policy, planning management and delivery of training courses related to Inclusive Education using mobile technologies. • Promote a sustainable educational system to reach the children with special needs.	• Provide financial and technical assistance to the government to strengthen and support Inclusive Education. • Formulation of policies and legislature related to students with special needs. • Effective implementation of integrated curricula on Inclusive Education. • Effective Inclusive Education training programmes. • Enhanced capacity of personnel in the field of Inclusive Education in Sri Lanka.	• Project progress reports. • Project monitoring reports.	• Commitment and support from the MEHE to implement activities related to students with special needs • Strong Steering committee consist of experts in the field of students with special needs and ICT to monitor the progress. • Training of curriculum developers, teacher educators and teachers feasible. • Cadre positions available to recruit new teachers and the academics of NIE and OUSL. • Release of selected LRCs to use as m-learning centres for students with special needs.

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Outputs			
a. Policy and legislature related to students with special needs. b. Integrated Inclusive Education in school curriculum. c. Effective and sustainable training centres with m-learning devices to train teachers in NIE and OUSL. d. Offering a certificate/PGD study programme in special needs. e. Training course materials for teachers. f. Enhanced skills of the teacher educators, teachers and technical staff. g. Intensive training programmes for teachers. h. Effective and sustainable m-learning centres around the country.	• Revised policy and legislation on children with special needs. • Revised education curricula integrating Inclusive Education concepts. • Revised teacher education curricula in line with the concept of Inclusive Education. • Teacher training centres at the NIE and the OUSL are equipped with appropriate m-learning devices. • 25 curriculum developers are trained. • 100 teacher trainers are trained. • 500 teachers are trained. • 250 technical assistants are trained.	• Project monitoring data. • Review reports. • Quarterly progress reports of the MEHE. • Evaluation reports.	• Commitment and support from the administrators and the coordinators of the MEHE. • Enthusiastic and motivated teaching staff to work with students with special needs and to receive training. • Support from the respective principals to release trained staff entirely dedicated for this purpose.

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Activities			
• Orientation programmes . • Training programmes. • Monthly meetings. • Study visits to training centres and LRCs.			
Inputs			
• Conduct orientation programmes for government officials, development partners institutional representatives and others who are directly involved in the project. • Conduct training programmes for curriculum developers, teacher educators and technical staff. • Conduct monthly meetings with the responsible bodies and the donor agency to review progress.	• Workshop schedules, handouts and evaluation sheets. • Minutes of the meetings.		

B. Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors	Total cost
1. Consultants			
a. International consultants		3.00	3.00
b. Domestic consultants		0.50	0.50
2. Equipment and software			
a. Equipment		15.00	15.00
b. Software		1.50	1.50
3. Buildings and furniture			
a. Building			
b. Furniture	0.50		0.50
4. Training and seminars		3.00	3.00
		0.50	0.50
5. Research, development and surveys		0.50	0.50
6. Miscellaneous administration and support costs		0.50	0.50
7. Contingencies		0.25	0.25
Total	0.50	24.25	25.25

C. Benefits of the Project

The main benefit of this project will be that students with special needs who were neglected and deprived of education will be empowered. The project will enable these students to learn via technologies and gain new skills. They will therefore regard themselves as "valued citizens" of the country, become more self-sufficient, and eventually contribute to the workforce, and become more active members of the community. The project will also generate more awareness of Inclusive Education in society, and develop human resources in the area of students with special needs.

L. THAILAND

The development of e-learning in Thailand has been initiated, but is still in its infancy. The Office of Basic Education Commission (OBEC) is responsible for 80 per cent of basic education. The OBEC has recognizes the benefits of e-learning and has undertaken strategies in the following areas: connectivity, content development, and teacher training.

Most schools in Thailand do not have adequate ICT facilities and lack computers. There are currently 32,741 schools in Thailand that provide education for 8,830,000 students. Approximately 451 schools do not have electricity and 16,000 schools do not have telephone lines. The total number of computers in schools is around 120,739. Some initiatives have been taken including creating digital content, courseware development, computer-aided instruction, e-books, and creation of digital centres. However, these initiatives have had limited success. A number of secondary schools have built up digital content for various subjects, such as mathematics, science, English, Thai, and social studies. Some schools provide online access to the LMS (Learning Management System).

A distance education satellite was established in 1995. The satellite sends live programmes of 12 lessons for 12 classes at the primary and elementary level. About 10,000 schools, one third of all schools, have installed receivers. Currently, lessons are stored in a server that is connected to the Internet. The Internet allows users anywhere in the world to view a live broadcast of all the educational programmes with live video streaming technology.

The Education Ministry has developed its own LMS and made it available to the public. The Bureau of Technology for Teaching and Learning (BTTL), under the Office of Basic Education Commission annexed all e-learning beginner schools in order to build up common courseware. The BTTL has a plan to select seven schools to join in the e-learning scheme. The teacher-training curriculum emphasizes computer literacy and basic Internet knowledge, software package use, and computer programming. Different sectors concerned with ICT have launched efforts to develop teacher training. These include: Intel Teach to the Future course, a teacher-training cooperation between Intel and the Thai Education Ministry; and ITed supported by Japan and providing three-year courses. Six teacher-training centres have been established and three training course curricula developed. More than 60 per cent of teachers have acquired basic computer and Internet knowledge.

Title of Action Plan:	A Pilot Project: "One Day Weekly Schooling"
Proposer:	Mr. Suwat Suktrisul, Director, Bureau of Technology for Teaching and Learning, Ministry of Education
Country:	Thailand
Date:	May 2005

I. Introduction

Learning and studying is a continuous process that is important in all stages of life. Children need to learn how to communicate and acquire knowledge. Working adults need to develop skills and knowledge in order to keep pace with rapid changes in technology and the workforce. Learning is constrained by factors such as time and the cost of education. In rural areas, many children do not have access to education due to geographical barriers and the need to work either at home or in the workforce to provide an income for their families.

In order to address some of the challenges associated with providing education, Thailand established distance education via satellite in 1995, and e-learning has been introduced. However, this distance learning system is limited in its effectiveness because it permits only one way communication and it is not always expandable into remote and rural areas due to lack of facilities. Today's WiMax technology and Pocket PCs offer a distance learning solution.

II. Issues

Network connectivity is limited in many parts of Thailand and is sometimes unavailable. WiMax technology offers an alternative as it can be combined with existing resources such as the satellite for education and ICT education training.

III. Proposed Project

A. Purpose and Output

- Set up two content servers in each of five selected Education Service Area (ESA) for students to access via Pocket PC.
- Distribute Pocket PCs for use in each school.
- Develop educational content which can be used on a Pocket PC at a student's home.
- Develop teaching and learning pedagogy applicable for the technology to ensure maximum efficiency.
- Develop a process of monitoring and evaluation.

B. Methodology and Key Activities

Select five Education Service Areas (ESAs) which have a high percentage of dropouts. These ESAs are usually located in rural areas, where children have little opportunity to attend school and often drop out. Two computer servers will be installed at selected places in each ESA. Contents can be updated via satellite which can be accessed by students at their homes. In addition to allocation of Pocket PCs, teacher training both in ICT usage and content development will need to be conducted. In addition, it will be necessary to develop courseware that is compliant with the curriculum and to prepare for monitoring and evaluation.

C. Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors	Total cost
1. Consultants			
a. International consultants		1.00	1.00
b. Domestic consultants			
2. Equipment and software			
a. Equipment		15.00	15.00
b. Software	0.50	0.50	1.00
3. Buildings and furniture			
a. Building	0.20		0.20
b. Furniture	0.50		0.20
4. Training, seminars, and conferences			
5. Research, development and surveys	0.1		0.1
6. Miscellaneous administration and support costs	0.2		0.2
7. Contingencies		0.3	0.3
Total	1.2	16.8	18.0

D. Implementation Arrangements

The Office of Basic Education will be responsible for implementing the project.

E. Benefits of the Project

The pilot project will contribute to reducing the number of dropouts and developing better methods of student assessment. The result of the pilot project can be used to implement nation wide programmes.

Project Framework

	Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks	
	Goal	1,000,000 students.	Report from school.		
	Purpose	• Drop out rate decreases. • Assessment standard • developed.	• Follow up high risk students • Student tracking report.		
	Outputs	Students use PPC to learn at home.	Assignment from teachers.		
	Activities	Number and quality of relevant course ware available for students' use.	Teachers' reports.		
	Inputs	Existing resources and m-learning technology.	• Number of servers. • Number of PPC.		

Title of Action Plan:	M-learning as a Tool to Upgrade Knowledge
Proposer:	Ms. Wattana Artidtieng, Director, Office of the Chief Information Officer, Office of Education Council
Country:	Thailand
Date:	May 2005

I. Introduction

E-learning in Thailand began over 10 years ago, but is still in its early stages. Most teachers still have no experience with e-learning. The Office of Basic Education Commission (OBEC), which is responsible for 80 per cent of basic education, has recognized the benefits of e-learning and subsequently undertaken the following activities: connectivity, contents development, and teacher training.

Most schools in Thailand do not have adequate ICT facilities and lack computers. Only some large schools are connected to the Internet. Locally-relevant content and courseware, in local languages, are lacking, and few teachers or personnel have expertise in ICT. Teacher training seems to be the best way to solve the problem, but those with computer knowledge are in high demand. The leading problem is the lack of organization and direction of an e-learning programme.

II. Issues

1. National Education Act of 1999 states that "The State shall establish a central unit responsible for proposing policies, plans, promotion and co-ordination of research, development and utilization of technologies for education, including matters relating to evaluation of the quality and efficiency of the production and application of the technologies for education."
2. E-learning has not yet been implemented throughout the country. There are a large number of schools for basic education in Thailand. E-learning is one means by which the Government aims to increase the quality of education, but the financial cost of ICT is very high. Most of the teachers lack adequate ICT skills, especially the older generation.
3. Many people want to continue their education, but they lack the time, opportunity and funds. The labour force therefore does not have the opportunity to develop their knowledge and work skills.
4. Between 2005 and 2008 the Thai Government policy is to use ICT to develop education, including teaching and learning processes. The Ministry of Education is working on an action plan and one of the strategic plans is using non-formal education as an alternative to increase the educational level of people aged between 15 and 59.

III. Proposed Project

A. Purpose and Output

The purpose of the project is to upgrade the knowledge of people aged between 15 and 59 years through m-learning.

Outputs:

1. Research reports on status and requirements for m-learning.
2. Models for expanding education opportunities through use of m-learning.
3. Teachers have adequate skills for teaching m-learning.
4. M-learning content created.

B. Methodology and Key Activities

1. Research into current m-learning requirements.
2. Analysis of research results and applicable models of m-learning programmes.
3. Selection of experts to develop content.
4. Selection of sample for pilot study.
5. Conduct pilot study to demonstrate feasibility of overall model.
6. Setup of necessary infrastructure and facilities.
7. Teacher training.
8. Teachers create content for m-learning.
9. Testing of model in selected areas.
10. Improve model.
11. Implement project throughout the country.

C. Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors	Total cost
1. Consultants			
a. International consultants		1.5	1.5
b. Domestic consultants	0.5		0.5
2. Equipment and software			
a. Equipment	4.0	6.0	10.0
b. Software		1.0	1.0
3. Training, seminars, and conferences	1.0	4.0	5.0
4. Research, development and surveys	0.5	0.5	1.0
5. Miscellaneous administration and support costs	0.1	0.9	1.0
Total	6.1	13.9	20.0

D. Implementation Arrangements

The Ministry of Education must be involved in all activities of the project. Organizations responsible for each of the activities are: the Office of Education Council, Department of Non-formal Education, Office of Basic Education Commission. Government enterprises, the private sector, and resource experts.

E. Benefits of the Project

The project will provide e-learning for those aged between 15 and 59 years old. People will be able to learn anytime, anywhere, and anyplace. The Government will meet the target to upgrade the education of those aged between 15 and 59 years old.

Project Framework

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Goal			
• People aged between 15 and 59 finish education in higher level.	• Average schooling of 15-59 year olds.	• Data from National Statistics Organization. • Indicator created by Office of the Education Council.	• Data is not collected at the same period of time each year.
Purpose			
• To upgrade the knowledge of the people in age group 15-59 years using m-learning.	• Number of people aged 15-59 that register to learn via m-learning. • Number of the m-learning students who finish the level.	• Ministry of Education. • Office of the Education Council. • Non-formal Education Department.	• M-learning is not adopted by the population.
Outputs			
• Research report on status and requirement of m-learning. • Models for expanding educational opportunities with m-learning. • Teachers have ICT skills. • M-learning content created.	• Research report. • Models of using m-learning for non-formal education. • Teacher can use m-learning as a tool for student's learning. • Sufficient contents to meet the requirements of students and teachers.	• Ministry of Education. • Office of the Education Council. • Non-formal Education Department.	• Research output is not clear enough to plan or create the model. • Teachers do not change attitude and do not use m-learning. • Content is not applicable to m-learning. • Lack of software contining relevant content.

Design summary	Performance indicators/targets	Monitoring mechanisms	Assumptions and risks
Activities			
• Research on current status of m-learning. • Pilot study to find a good model for each area. • Brainstorming seminar for feasibility study. • Prepare facilities. • Teachers create content. • Testing the model. • Improve the model. • Country wide implementation.	• Research activities. • Questionnaires. • Sampling units. • Models. • Seminars. • Training course. • Good content. • Trained teachers. • Students participating.	• Ministry of Education. • Office of the Education Council. • Non-formal Education Department.	• Inadequate input support. • Promotion of the administrator. • Policy change.
Inputs			
• Researchers. • Content developers. • Technology providers. • Infrastructure. • Delivery mechanism. • Teachers. • Students. • Experts and consultants.	• Number of researchers, teachers, students, experts and consultants.	• Ministry of Education. • Office of the Education Council. • Non-formal Education Department.	• Government provides financial support. • Quality expert and consultant. • Teacher with good basic background in computers. • Infrastructure support system adequate.

M. COLOMBO PLAN STAFF COLLEGE

Title of Action Plan:	Developing Mobile Learning System for Rural Youth and Women in the Colombo Plan region
Proposer:	Professor Myong Hee Kim, Inter-governmental Agency for HRD in Asia and the Pacific Region, Colombo Plan Staff College for Technician Education
Date:	May 2005

I. Introduction

Mobile learning is an innovative means for the delivery of educational services which enable individuals to learn anytime and anyplace. With the phenomenal growth of information and communication technologies, learning materials are increasingly accessible through the use of technologies such as mobile phones and satellite communication devices. In addition, the development of broadband communication services and recent advances in the field of communication protocols through the Internet have offered enhanced convenience, flexibility and connectivity.

While ICT brings down some barriers to education and builds new interconnections, the problem of access to information still persists. Recent technological developments have mainly been of benefit to the "haves" in developed regions and have usually not brought benefits to the "have-nots", most of whom live in the rural areas. If this imbalance continues, information and communication technology will remain in the hands of a minority, while the majority of the population will be increasingly deprived of access to information.

In order to reverse the imbalance between information "haves" and "have-nots", there is an urgent need to bring information and communication technologies to marginalized communities and find ways to use ICT for poverty reduction and livelihood generation. There have been a number of efforts on the part of the public and private sectors to bring the benefits of ICT to the poor by delivering basic services in areas such as: education and health care, and equipping the poor with the necessary information and skills to bring them into the mainstream of the emerging knowledge societies.

II. Issues

The Colombo Plan countries are generally those with large proportions of poor, rural-based people which have limited access to education and information. A number of factors limit access to education, particularly for women and youth, in rural regions. First, for social and cultural reasons, the rural youth and women in such countries are often deprived of basic education services when the family finances are tight. In these countries parents often send their sons to school but the daughters are required to remain home to assist the family by performing household chores. Second, daughters are often not permitted to attend school unless the teacher is female but female teachers are scarce in rural regions because it is difficult to persuade urban female teachers to live in rural areas. Third, it is difficult to introduce new technologies, which may improve access to education, because of resistance to change by the rural population.

A concerted effort is required by both the government and non-governmental organizations to narrow the digital divide. Mobile learning technologies may be a means of enabling the expansion of educational opportunities for rural youth and women and contribute to narrowing the digital gap in the Colombo Plan region.

III. Proposed Project

The main objective of the proposed project is to organize and maintain mobile-learning training sessions for female technical teachers and utilize these trained teachers to teach the rural female population. Training will be provided so that the women and youth can gain useful skills and will have more opportunities in terms of livelihoods.

A. Methodology and Key Activities

The project is divided into two phases. The first phase is the establishment of learning centres. The learning centres will be located in areas which have electricity and telecommunications facilities, but near the villages which are the venues of the mobile training. These centres will be provided with equipment and each teacher will receive a mobile device. This phase will involve establishing 20 learning centres, spread out in the member countries of the Colombo Plan Staff College for Technician Education (CPSC). Prospective teachers will come from the villages where the training is to be conducted so that they will be willing to serve in their villages after completion of the training. Two teachers will be selected from each village and a total of 20 teachers will be trained in one centre. A total of 400 teachers will be trained and the estimated time limit is one year, which includes consultation, surveys and training of teachers.

The second phase is the training, which will be conducted by the trained teachers. The trained teachers will be assigned to train in their respective villages, two teachers per village, so that 400 teachers can train students from 200 villages simultaneously. The training will involve using buses equipped with mobile devices. The participants will be given incentives in the form of scholarships, the granting of which will depend upon good performance.

B. Implementation Arrangements

Cooperation and collaboration between the departments of the Ministry of Education, specifically technical education and vocational training, is necessary for sharing responsibilities in planning and implementation. Suitable teaching-learning materials will be designed and developed. CPSC, as the proponent agency, will be responsible in the training of technical teachers.

C. Benefits of the Project

The project will provide rural youth and women with useful skills they can utilize locally, thereby expaning their employment opportunities. Other benefits will include: increased access to knowledge and information through the establishment of the learning centres; improved ICT skills on the part of the trained teachers and trainees; the gap between the urban and rural information "haves" and information "have-nots" is narrowed.

Project Framework

Design summary	Performance	Monitoring	Assumptions and risks
Goal			
• Establishing mobile learning centres for rural youth and women	• Improved quality of life of rural youth and women	• Ministries of Education	• Given the purpose
Purpose			
• To set up and manage learning centres. • To train technical teachers to use mobile devices in teaching. • To provide rural youth and women with technical and vocational skills.	• Functional learning centre. • Women and Youth have technical and vocational skills.	• Project survey. • Research.	• Awareness among villagers about the importance of technical education. • Acceptance of mobile learning techniques in the rural areas.
Outputs			
• Learning centres. • Trained technical teachers. • Mobile teaching-learning materials. • Trained rural youth and women.	• Set up 20 mobile learning centres. • Train 400 technical teachers. • Train 4000 rural youth and women.	• Project survey. • Observations.	• Rural areas have females who can be trained as technical teachers.
Design summary	**Performance**	**Monitoring**	**Assumptions and risks**
Activities			
• Consultants and experts. • Technical infrastructure (servers, internet, Mobile Terminals, etc). • Trained technical teachers. • Mobile learning materials.	• Consultant hired. • Acquired equipment. • Training conducted. • Mobile teaching-learning materials developed.	• Project implementation agency.	• Active participation by the community.

D. Cost Estimates and Financing Plan

COST ESTIMATES (US $ million)

Item	Government	Donors/ Private	Total cost
1. Consultants		10.0	10.0
2. Equipment, Servers, Internet, leased lines, terminals, communication equipments,	5.0	60.0	65.0
3. Buildings and furniture	5.0	60.0	65.0
4. Training, seminars, and conferences	1.0	9.0	10.0
5. Management expenses	3.0	15.0	18.0
6. Resources materials development	1.0	5.0	6.0
7. Contingencies (10%)	1.5	15.9	17.4
Total	16.15	174.9	191.4

Annexes

Workshop Schedule

Monday, 16 May 2005	09:00 – 09:30	Registration
	09:30 – 10:00	Opening Ceremony
		Welcome Remarks by Cédric Wachholz, UNESCO
		Opening Remarks by Peter McCawley, Dean, ADBI
		Election of Officers
		Group Photo Session
	10:00 – 10:30	Break
	10:30 – 11:20	Introduction to the Workshop and of Participants and Resource Speakers by Jeoung-Keun Lee, Senior Capacity Building Specialist, ADBI
	11:20 – 13:00	Opportunities and Issues of M-learning in Developing Asia and the Pacific by George Darby, President, Paradise Patent Services
	13:00 – 14:00	Lunch Break
	14:00 – 15:30	Country Reports of Bangladesh, Cambodia, Indonesia, Lao People's Democratic Republic, Micronesia, Mongolia, Nepal, and Pakistan (8)
	15:30 – 16:00	Break
	16:00 – 16:40	Country Reports of India, Philippines, Sri Lanka, and Thailand (4)
	16:40 – 17:50	How to Draft Action Plans by Jeoung-Keun Lee, ADBI
	18:00 – 19:00	Welcome Reception
Tuesday, 17 May 2005	09:30 – 11:00	Key Questions on M-learning, by Cédric Wachholz, Chief, ICT in Education Unit, UNESCO
	11:00 – 11:30	Break
	11:30 – 12:15	Mobile Campus Solutions, by Yasunori Akenaga, Wireless Broadband and Sensing Solutions, IBM Japan
	12:15 – 13:00	Why We Need to Cultivate E-learning Professionals, by Kaz Shinkai, Mizuho Information and Research Institute, Japan
	13:00 – 14:00	Lunch Break
	14:00 – 14:45	Exploring M-learning Academic Initiatives in North America and Europe, by Judy Brown, Director Academic ADL Co-Lab, University of Wisconsin System
	14:45 – 15:30	Use of Satellites for Expanding Educational Opportunities, by Eui Kon Koh, President, Asia-Pacific Satellite Communications Council (APSCC)
	15:30 – 16:00	Break
	16:00 – 16:45	Introduction to Mobile Learning Tools, by William Horton, President, William Horton Consulting
	16:45 – 17:30	Demonstration of M-learning, by Vinay Deshpande, Managing Director of the Simputer Trust, India

Wednesday, 18 May 2005

09:30 – 10:15	Designing Courseware for Mobile Devices, by William Horton
10:15 – 11:00	M-learning in a University Setting, by Alan Smith, Associate Professor, University of Southern Queensland, Australia
11:00 – 11:30	Break
11:30 – 13:00	Demonstration: NEARStar English as a Second Language, by David Brauer, Information Technology Director, PREL (Coordinated by George Darby)
13:00 – 14:00	Lunch Break
14:00 – 14:30	Case Study: NEARStar English as a Second Language, by Tony Tung, NEARStar Programme Director, PREL
14:30 – 15:00	Teaching Tomorrow's Leaders using M-learning Techniques and Experience, by Alvin Chan, Regional Marketing Manager, Hewlett-Packard Asia Pacific Pte Ltd
15:00 – 15:30	Break
15:30 – 16:30	Future Opportunities in M-learning, by Judy Brown
16:30 – 17:00	Internet-based E-learning System, Supercourse and a Proposal of Supercourse-Asia Network (SCAN), by Hiko Tamashiro, Hokkaido University, Japan
17:00 – 17:30	Use of Tablet PCs in Schools, by Lim Soon Jinn, Heuristix Lab, Singapore

Thursday, 19 May 2005

09:30 – 10:15	M-learning Issues and Strategies, by Cédric Wachholz, UNESCO
10:15 – 11:00	M-learning for Mobile Workers, by Christopher von Koschembahr, Worldwide Mobile Learning Executive, IBM Global Services
11:00 – 11:30	Break
11:30 – 12:15	1:1 Computing Paradigm, by Bruce Dixon, Chairman of the Partners in Learning International Advisory Council
12:15 – 13:00	Teacher Training for M-learning, by William Loxley, Principal Education Specialist, ADB (via Video Conference)
13:00 – 14:00	Lunch Break
14:00 – 15:30	Public and Private Partnership for Developing m-learning Programmes, by Vincent Quah, Regional Academic Programme Manager, Microsoft with Samir Patel, Optara Pte Ltd.
15:30 – 16:00	Break
16:00 – 17:30	Global Development Learning Network: How it Works, by Ashok Daswani, World Bank

Friday, 20 May 2005

09:30 – 11:00	Presentation of Action Plans (Chairperson)
11:00 – 11:30	Break
11:30 – 12:20	Presentation of Action Plans (Chairperson)
12: 20 – 13:00	Finalization of Action Plans and Workshop Evaluation by Jeoung- Keun Lee
13:00 – 13:30	Closing Ceremony
	Closing Remarks by Raymond Renfro, Director, CBT, ADBI
	Closing Remarks by Cédric Wachholz, UNESCO
	Handing Out of Certificates
	Vote of Thanks by Participants

ANNEX II

Group Activity

On the first day of the workshop, Mr. Lee, ADBI led the participants in a group activity. The workshop participants were asked to make a list of at least 30 titles and ideas for m-learning projects. The participants were divided into two groups and each group designated a rapporteur to report the list back to the workshop. On the second day of the workshop, Group two was rewarded with a free Pocket PC from Hewlett-Packard Asia Pacific Pte Ltd for their list of m-learning projects.

Group One

Rapporteur: Mr. George Darby

1. E-Partnership among the ASEAN countries for m-Learning
2. Template designs for ICT centres in rural areas
3. Multilingual templates for m-Learning in aquaculture
4. Using ICT to overcome teacher resistance to ICT
5. Infrastructure recommendations for m-Learning in geographically isolated areas (electricity)
6. Research into culturally appropriate graphics for m-learning
7. Research into the limits of delivering m-learning through mobile phones
8. Research into cost effective technologies for m-learning
9. Capacity building for governments to support m-learning
10. How m-learning differs from e-learning
11. Pedagogical frameworks for m-learning, with emphasis on language learning
12. Development of multilingual templates for m-learning
13. Reference architectures for infrastructure deployment
14. Courseware development tools for teachers
15. Reference policies and tools for inventory management (anti-theft)
16. Sustaining learning initiatives
17. Establishing minimum cost of entry for m-learning
18. Mobile m-learning classrooms
19. Mobile maintenance centres for m-learning
20. Catalog of best practices in m-learning
21. M-learning for workforce development

22. Recommendations for multiservice m-learning
23. Core curriculum for m-learning
24. Recommended telecom and ISP policies for shared use of m-learning
25. M-learning to support the Education For All Programme and poverty reduction
26. Cultural implications of m-learning
27. E-Communities and m-learning
28. E-Government and m-learning
29. Infrastructure building blocks
30. Empowering teachers through ICT
31. Best practices for educational administration using m-learning backbone
32. M-learning for disadvantaged groups of the community
33. Explaining m-learning for donor agencies
34. Explaining m-learning to government agencies

Group Two

Rapporteur: Mr. Eui-Kon Koh

1. Building capacity for elementary school teachers in teaching science, maths and language with ICT
2. Developing Science, Maths and Language curriculum for elementary grades with ICT
3. Develop a programme to allow effective resource sharing/networking between school/areas education officers/districts
4. Research into effective ways of delivering mobile learning to remote areas/inner urban areas
5. Build a knowledge network around m-learning between ADB ASEAN countries to leverage reesarch in each country
6. Building capacity for technology support in ICT/m-learning initiatives
7. Local government ICT/e-learning capacity-building to improve leadership and governance
8. Developing policy for sustainable m-learning projects
9. Using m-tools/learning to assist in building better management information systems and make better data driven decisions
10. Develop mobile training programmes focused on technical vocational education and training
11. Research to investigate ways in which mobile ICTs might assist special and disabled students

12. Research to investigate ways in which mobile ICT might assist high achieving students
13. Develop a pilot programme in a pre-service teaching college to ensure all faculty are digitally literate
14. Developing startegies and courses to embed ICTs in all teacher-education undergraduate courses
15. Comparing the effectiveness of PPC to labtops for use by teaching staff in High Schools
16. Develop administration tools to allow teachers to use ICTs to more effectively complete administrative tasks
17. Building capacity for high school teachers in teaching science, maths, language with ICTs
18. Developing a community based IT centre that can be shared by school and community
19. Create m-learning in service programme to develop digitally literate teachers that can be taken to scale
20. Research on how ICT may assist indigenous communities in learning
21. Develop national showcase event to promote ICT skills amongst high school students
22. Build a future teacher's project to show case beat practice teaching around mobile ICTs
23. Build a scalable model to use refurbished PCs and laptops in school based Internet Cafes
24. Create an online repository of curriculum resources for K-12 teachers using mobile ICT in innovative ways
25. Build a mobile inservice workshop for teachers that can provide on-site capacity-building using ICT opportunities for teachers
26. Build a national ICT skills competition for high school students
27. Research policy and resourcing that will allow developments of a sustainable mobile learning strategy
28. Develop a pre-service teacher training course which embeds mobile ICT at all levels
29. Develop programmes to build strong home-school links and extend learning beyond the school walls and school today.

ANNEX III

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