

Information and Communication Technology for Social Development

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Jakarta, 22-24/May 2006

Edited by Jon Baggaley

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Foreword



**THE MINISTRY OF RESEARCH AND TECHNOLOGY
REPUBLIC OF INDONESIA**

Opening speech by **HE Kusmayanto Kadiman**
Minister of Research and Technology
at the International Symposium on
ICT for Social Development
Jakarta, 23rd May 2006

Distinguished Ladies and Gentlemen,

First of all, let me express my highest appreciation to the ASEAN Foundation (AF) and the International Development Research Center (IDRC) of Canada for their initiative and efforts in implementing the ICT4D collaboration project that is currently resuming its 3rd year program. I believe that all of the outcomes will help the region in understanding better and finding more new ways to solve issues related to the development of information and communication technology (ICT) in the Southeast Asia region. Therefore I would like to ask that all of the materials, experience and “lessons learned” can be shared widely among the institutions of the participating countries and also other regions that need our help in solving their ICT issues.

As we are all aware, the digital divide is not only a world-wide issue, but is also an issue that cannot be solved in one day and needs a long-term, consistent and systematic effort through many stages. That is why the digital divide issue is addressed in many regions as a common world problem, to make sure that no-one is left behind in the transformation towards the digital culture.

This digital gap is not a simple gap, however. It can result from a lack of awareness or application, infrastructure or access, education and wealth, or simply from a different lifestyle or culture. It is our responsibility to really understand the nature of this gap in the region, and to find ways to narrow it. In this context, it is very important that we distinguish between two different type of promoting ICT, firstly the effort to increase our national competitiveness by using ICTs in, for example, e-government initiatives to increase efficiency; and secondly in the effort to help communities in rural areas (the other side of the gap) to make sure they will not be left behind.

As a rule of thumb, to narrow the digital gap, we need to find ways for the development of the second group to have faster acceleration than that of the first group. Communities in rural areas normally have a minimal knowledge of ICT and face different life problems. In developing countries, they commonly face very basic human problems such as lack of food, and education. It is therefore important for us to introduce ICTs in rural areas that fit to their common life priorities, so that they really can catch up and systematically build their region towards a future digital lifestyle.

Permit me to highlight some examples. In seeking to eradicate poverty and hunger, we can use ICT to increase access to market information and reduce transaction costs for poor farmers and traders. In improving universal primary education we can use ICT to increase the supply of materials and lectures through distance learning programs. These examples show us that the digital divide issue, especially in relation to social problems, needs to be formulated carefully so that it will really fit the need of the local community. I would like to suggest that this collaboration can be extended to a more long-term basis with an objective to understand in full the nature of social development in the region, and to assist the people from stage to stage, in narrowing the gap between them and the future digital lifestyle. I believe that long-term collaborations will enable us to find optimal approaches that can be shared with the rest of the world.

Another example is the national disaster issue. During the Tsunami disaster in Aceh, Indonesia experienced the loss of all public information in the region, as well as the telecommunication infrastructure. A new emergency wireless network has since been

implemented to rebuild Aceh's infrastructure, especially in support of public service activities. This expensive lesson has triggered us to give more attention to our geographical parameters, and to make use of ICT networks to support disaster early warning systems. Indonesia's current focus in the field of ICT is to develop the infrastructure, including telecommunications, internet and computers accessible to Indonesia's widespread communities. The use of ICT is expected to become the 'enabler' of economic growth and the trigger of 'Good Corporate Governance'" as well as an important tool to develop democracy in Indonesia.

One of our current programs is the *Indonesia, Go Open Source* (IGOS) initiative, initiated by five Ministries: Research and Technology, Communication and Information, Law and Human Rights, Empowerment of Human Resources, and National Education. This initiative is widely promoted by the government as a tool to minimise the "quite high" software piracy rate, by introducing an open software approach as an alternative for the community. This initiative is also being discussed in the ASEAN region, in order to create a wider regional support as well as to strengthen the local and regional software industries.

The convergence of ICT networks is also an important issue that needs to be addressed throughout the region. I believe that the convergence towards IP-based wireless networks will give us the opportunity to narrow the digital gap by building the ICT infrastructure in rural areas at a much cheaper and faster rate. The Ministry of Research and Technology is currently initiating a number of studies and research activities on ICT convergence, to identify all of the near-future options for narrowing the digital gap, especially for small and medium enterprises (SMEs) and communities in rural areas.

Again, let me express my highest appreciation to the ASEAN Foundation and the International Development Research Centre, and to all parties for their initiative and contribution, including the organising committee of this symposium. I hope that all of the knowledge, experience and lessons learned can be widely shared, and I hope that this collaboration can be strengthened in the future for the benefit of the communities in the region. Thank you.

Kusmayanto Kadiman, State Minister of Research and Technology,
Jakarta, May 23, 2006.

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Introduction



Introduction by **Apichai Sunchindah**
Executive Director of the ASEAN Foundation
at the International Symposium on
ICT for Social Development
Jakarta, 23rd May 2006

Dr. Ir. Richard Mengko, Minister's Advisor for Information Technology Affairs of the State Minister of Research and Technology of the Republic of Indonesia; Excellencies; Distinguished Guests; Ladies and Gentlemen,

A very good morning to everybody, and a warm welcome to Jakarta for those of you coming from abroad. On behalf of the ASEAN Foundation, it is my great pleasure to welcome the distinguished guests, speakers and participants to this Opening Ceremony of an International Symposium on *Information and Communication Technology (ICT) for Social Development*.

First of all, I would like to express my sincere gratitude to Minister's Advisor for taking the time to be with us this morning, reflecting his keen interest and firm support for research and development in science and technology activities in the region. I would also like to convey my grateful appreciation to the International Development Research Centre of Canada (IDRC) for its financial support to the Foundation through the ICT4D Collaboratory project over the past three years, and in the organisation of this symposium.

The Association of Southeast Asian Nations (ASEAN) was founded in 1967 to promote cooperation in economic, scientific, social and cultural fields, as well as other transnational issues of common concern. Among its main purposes is to hasten economic growth, social progress and cultural development in Southeast Asia, so that the region will be more developed, prosperous and peaceful. By

working together, ASEAN countries hope to improve the living standards of the peoples of the region, and to increase awareness of their common history, legacy and destiny. To all intents and purposes, ASEAN as a whole attaches great importance to human resources and social development. All sectors of ASEAN have recognised the significance of the development of the region's human resources for its future growth and success in an increasingly competitive world.

It is for this particular reason that the ASEAN Foundation was established by the ASEAN Heads of Governments on 15 December 1997, during the Association's 30th anniversary Commemorative Summit in Kuala Lumpur, Malaysia. The Foundation aims to help bring about shared prosperity and a sustainable future for the peoples of all ten ASEAN countries. These now include Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam. I am glad to see that the participants at this Symposium are from throughout the ASEAN region

The ASEAN Foundation has been mandated to promote greater awareness of ASEAN, and greater interaction among its peoples and their increased participation in ASEAN activities, as well as to undertake development cooperation activities that enhance mutual assistance, address equitable economic development, and reduce poverty. Over the years, the ASEAN Foundation has contributed to developing the ASEAN socio-cultural community through various human resources development projects, information dissemination campaigns, network building, and community resource mobilisation activities, cutting across four major sectoral areas:

1. Social development (with special focus on children and youth, women, rural development, agriculture, disaster management, education, health and nutrition);
2. Science and Technology;
3. Environment; and
4. Culture and information.

In the past seven years, the Foundation has funded nearly 100 projects in these areas, to the tune of approximately 15 million US dollars. It has been quite apparent that one of the growing concerns for the Southeast Asia region is to narrow the digital divide within and among ASEAN countries. One way of overcoming this problem is to increase digital opportunities for

ASEAN people. We are also aware that many of the developments in the application of ICT for social purposes are taking place in Asia. In this regard, one of the priority areas of the ASEAN Foundation is on promoting access to ICT resources for differently advantaged groups including youth, women, persons with disabilities, and rural communities.

Over the years there have been a number of ICT-related projects in ASEAN countries, funded by the Foundation with the support from various donors. In particular, the International Development Research Centre of Canada (IDRC) has funded a project known as the ICT for Development Collaboratory (ICT4D), which has provided a wide range of ICT services to the citizens of ASEAN since its establishment here in 2003. This symposium is intended to mark the culmination of the 3-year phase of the Collaboratory's service, and to showcase the activities undertaken and the achievements made. The Symposium is also intended to serve as a forum for reviewing the Collaboratory's existing projects and the development of future initiatives. The Foundation would not have been able to organise the Symposium without the generous support of the IDRC, for which I would like to once again express my sincere appreciation. I would like to particularly thank all the speakers, as well as the participants who have come and supported this event and who will surely provide significant contributions to the success of the Symposium in the next two days.

I trust that the results of the Symposium will serve as a valuable contribution to the development and progress of ICT in ASEAN countries and beyond, through the building of various networks and partnerships for future collaboration. It is a great pleasure for me to address you this morning as we embark on the Symposium, which will hopefully strengthen the capacity of peoples in this region and increase their awareness of each other. With this, I wish each and every one of you a productive two-day session, and I hope your stay here will be an enjoyable one.

Thank you for your kind attention.

Apichai Sunchindah,
Executive Director, ASEAN Foundation,
Jakarta, May 23, 2006.

Researching and Evaluating Information & Communication Technology for Social Development

Colin Latchem

Introduction

Projects applying information and communication technology (ICT) to social development are rarely researched, evaluated or reported, and even when they are, the conceptualisation, design, conduct and reporting of this work often lacks quality. There is a need for far more rigorous research into ICT projects at the national, organisational and practitioner levels, to achieve a body of research that can guide future planning and practice. Policy-makers, planners and practitioners alike need to be involved in undertaking formative and summative evaluation, and quantitative and/or qualitative research, not only to improve their own knowledge and skills in ICT for social development, but to provide robust and strategically significant findings that can influence and guide governments, donors, and other key stakeholders.

Research and evaluation of ICT for social development are needed at the:

- 1) National level:
 - to enable governments, national agencies and other key decision-makers to assess the quality, cost, relevance, effectiveness and potential of ICT projects; and
 - to inform policy-making, management and implementation in such projects.

2) Organisational level:

- to ensure that social development needs are understood and provided for;
- to satisfy the internal and external reporting requirements and assure quality in processes and outcomes; and
- to ensure that those engaged in the projects are granted the status, training and resources they need.

3) Practitioner level:

- to improve the understanding and practice of the managers, course and materials developers, teachers, trainers and technologists; and
- to persuade others to support such projects.

ICT for social development needs to be informed by:

- empirical inquiry, through which projects are analysed to guide future practice;
- theoretical inquiry, in which hypotheses and conceptual frameworks are developed to guide future thinking and action;
- formative research, which is conducted throughout projects to monitor what is occurring so that corrections and revisions can be made before it is too late;
- summative research, which is carried out at the conclusion of projects to measure the outcomes against the missions, goals and key performance indicators, and to report on what succeeded and what failed, and why;
- quantitative research, which involves collecting numerical data through surveys and questionnaires to inform the planning, implementation and review of projects; and
- qualitative research, which involves observing, questioning and documenting processes, actions, behaviours, opinions, and values, to inform the planning, implementation and review of projects.

Or by any combination of these.

Let us consider the kinds of research needed in ICT for social development. Let us suppose we are devising a project using ICT to help farmers in remote/rural areas improve their farming methods.

Before embarking on this project, we need to know who these farmers are, where they are, what their needs are, their levels of literacy, their circumstances and culture, the technologies they can access, afford and use, and the training methods that are most

likely to work well for them. This work is *formative*. As we develop and deliver the ICT applications, we need constantly monitoring of the processes and outcomes, to see whether they are working or need changing. This research is also formative. At the conclusion of this project, we need to know and report on the outcomes, the numbers of farmers who took part, the dropout rate and its causes, the costs, cost benefits and cost savings, the effectiveness of the technology, any problems that arose, and any further work that is needed. This is *summative* research.

Some of our research will be *quantitative*. We need to find out what percentage of the targeted group of farmers signed up for the project, what percentage stayed the course, what percentage could access the technology, what percentage could operate the technology, what percentage found the ICT information and training useful, and so on. Some of our research will be *qualitative*. For example, we need to know what the farmers thought of the project, what they liked and disliked about it, what they found most useful, whether they put the new ideas into practice and whether they worked well, and whether they would take part in further projects.

All of the above is *empirical inquiry*. If we engaged in *theoretical inquiry*, we would try to work out what theory or model could be applied to training farmers via ICT, or what cultural, psychological and other factors needed to be embedded in this framework. Some of this work could be in the form of independent or '*third-party research*', carried out by outside experts who have nothing to gain or lose from their studies. Such research is strictly objective, usually 'once-off', and primarily concerned with providing feedback to governments, donors and other providers on projects' quality, impact and value for money.

Some of this work may be in the form of 'practitioner research' undertaken by managers, teachers or trainers, instructional designers, ICT experts, and others involved in the project, in order to assess and improve their professional practice, test new ideas, methods and materials, share feedback with colleagues and decide which new approaches to carry forward. By its very nature, practitioner research is cyclical. As Woodley (2004) points out, the meaning of 'research' is "to search and search again". Situations are continually changing, there are always new depths and complexities to fathom, and new knowledge is forever throwing

new light on our assumptions and practices. So there is always need for further research to support, extend, challenge or disprove our thinking and practices.

A critical review of ODL and ICT research and evaluation

Much of the research into open and distance learning (ODL) and ICT comes in for criticism. The former Vice-Chancellor of the UK Open University and President of the Commonwealth of Learning, Sir John Daniel refers (2002) to the mass of trivial and badly conceived research that has spawned, as ODL has become fashionable in conventional institutions. Professor Dianna Laurillard, head of the UK government's e-learning strategy unit, observed (1994) that many evaluative studies of ICT are persistently and predictably inconclusive because they ignore the many complex factors that can support or undermine their use. Phipps & Merisotis (1999) referred to the paucity of original research dedicated to explaining or predicting phenomena related to ODL, and observed that little of this work allows for extraneous variables or evidences cause and effect. For example, many studies suggest that ODL courses compare favourably with classroom learning, but the quality of much of the research is questionable, so the findings are inconclusive. Naidu (2003), Passi & Mishra (2003) and Robinson & Creed (2004) have suggested that much ODL/ICT research is reiterative, uses invalid and unreliable instruments, and yields little in the way of new information.

Reviewing the 374 editorials, articles and colloquia published in the 31 issues of the *British Journal of Educational Technology (BJET)* between January 2000 and November 2005, Latchem (2006) found that over 50% of them addressed issues in the university sector, that very few examined ODL/ICT in open schooling or technical and vocational education and training (TVET), that *none examined ICT for social development* or non-formal adult and community education, and that the developing countries were barely represented. Galbraith (1967) defined technology as "the systematic application of scientific and other organised knowledge to practical tasks". This definition is probably the best organising concept for the development of educational technology and its evolution into a discipline.

Educational technology is defined by the US Association for Educational Communications & Technology (AECT) as "the theory and practice of the design, development, utilisation, management, and evaluation of processes and resources for learning".¹ Despite having 'educational technology' in its title, however, the majority of articles appearing in *BJET* were more narrowly focused than the definition suggests, dealing only with hardware, software, course design and teaching methods. Very few of the articles dealt with the all-important planning, managerial, organisational, resource, costing or student support issues.

The momentum of ODL/ICT research is certainly growing in the Asian region, in, for example, the Open University of Hong Kong's Centre for Research in Distance and Adult Learning (CRIDAL),² the Indira Gandhi National Open University's Staff Training and Research Institute (STRIDE),³ and at the Commonwealth Educational Media Co-operative/ Centre for Asia (CEMCA).⁴ Research carried out in the region is disseminated through national journals such as the *Indian Journal of Open Learning*,⁵ the *Turkish Online Journal of Distance Education*,⁶ and in international journals such as the Asia-Pacific Educational Research Association's *Educational Research for Policy and Practice*,⁷ and the Asian Society of Open and Distance Education's *Asian Journal of Distance Education*.⁸ Conferences organised by the Asian Association of Open Universities (AAOU) and other organisations also help to advance the research agenda, as do events organised by international agencies such as the ASEAN Foundation, the Asian Development Bank, UNESCO, the Commonwealth of Learning (COL), and the International Development Research Centre (IDRC) of Canada.

Asian research also comes in for a fair degree of criticism. Reviewing research at the national level, the UNESCO Forum on Higher Education, Research and Knowledge (UNESCO, 2003) concluded that it tends to be top-down, that government-funded research on national reforms often lack assessment, relevance

¹ <http://www.aect-members.org/standards/knowledgebase.html>

² <http://www.ouhk.edu.hk/cridal/>

³ see <http://www.ignou.ac.in/institute/index.htm>

⁴ www.cemca.org/

⁵ <http://www.ignou.ac.in/ijol/journal.html>

⁶ <http://tojde.anadolu.edu.tr/>

⁷ <http://springerlink.metapress.com/>

⁸ <http://www.asianjde.org/>

and quality, and that rather than being undertaken prior to policy-making, the research is often used to justify or amend policies that are already in place. Reviewing research and evaluation in India, Sahoo (2001) identified gaps between the research that was needed and that actually undertaken; Sesharatnam (1996) concluded that most of the research was piecemeal and lacking in a theoretical basis; and Powar (2001) judged that it lacked quantitative and qualitative rigour.

Reviewing the proceedings of the Asian Association of Open Universities (AAOU) Conferences held between 1995 and 1998, Latchem, Abdullah & Ding (1999) found that only 38% of the 178 papers were based upon empirical research. The majority of papers theorised about ODL/ICT, were descriptive, were re-workings of familiar ground, and relied heavily on western theories, models and findings. As with the *BJET* articles discussed above, the majority of the AAOU papers focused on instructional technology and design, and were from the university sector. Few of the writers reported on student needs, characteristics and performance. Fewer still investigated student support and quality assurance, and only a small number dealt with non-completion and failure rates, staff development, course evaluation, policy-making, management, admissions, credit, costs, cost-benefits, cultural and social factors, gender issues, library and information services, or plagiarism. There were *no papers on ODL/ICT for social development*.

The above findings clearly show that many significant aspects of ODL/ICT are not being researched or reported. From the performance improvement perspective, it is also noteworthy that many of the studies reported at the AAOU conferences were by managers or researchers rather than by those directly involved in developing and delivering the programmes or services. This may well lead to a failure to feed findings back into the workplace. If research is to inform practice, it is far better if those implementing the projects also do the research and evaluation. Daniel (1996) and Ramanujam (1997) noted the lack of reliable data on success and completion rates in Asian ODL. It is equally difficult to find any cost-efficiency, cost-utility, cost-effectiveness and cost-benefit studies that would convince politicians, donors, administrators and providers of the values of ODL/ICT, as advocated by Rumble (1999).

As in the international arena, most Asian research papers about ODL/ICT derive from the university sector. Very few deal with open-schooling, colleges and non-formal adult and community education, and *ICT for social development barely receives a mention*. This is extremely disappointing in a region where ODL/ICT are bringing education, training and information to millions of previously disadvantaged people, and are enabling women's groups, ethnic minorities and other previously unheard voices to build coalitions, share information, and find solutions to their problems in ways never possible previously.

It is also disappointing to find so little research into any differences that may exist between 'Asian' and 'Western' styles of learning and their implications for ODL/ICT. Most research of this kind is carried out by Western researchers. How much better it would be if Asian researchers were researching and reporting on these issues. International organisations such as the ASEAN⁹ Foundation, World Bank,¹⁰ Japan International Cooperation Agency,¹¹ the Commonwealth of Learning,¹² private sector providers such as Microsoft,¹³ non-profit organisations such as Grameen Bank,¹⁴ and national agencies, *are encouraging and supporting ICT projects for social development*. It is important to develop a strong base of evidence to justify and inform the establishment and operation of these initiatives and to generate evidence about the kinds of interventions that work best. However, when Baggaley (2004) and Kobayashi et. al (2005) carried out meta-surveys on behalf of international donor agencies interested in the quality and outcomes of their Asian ICT for social development projects, they discovered that many of the projects lacked key performance indicators by which they could be judged, that few of the team members had training in research and evaluation, and that there was a general reluctance to admit to what had been occurring or going wrong. This made it difficult for the researchers to provide useful feedback to the donors who had commissioned these meta-surveys.

⁹ <http://www.aseanfoundation.org>

¹⁰ <http://www.infodev.org>

¹¹ <http://www.jica.go.jp/english/>

¹² <http://www.col.org>

¹³ <http://www.microsoft.com/unlimitedpotential>

¹⁴ <http://www.grameenfoundation.org/>

Ramanujam (1997) suggests that ODL in Asia is most successful when systems are developed that are appropriate to local needs and circumstances. Whilst accepting that the current lack of indigenous theory and expertise will make the evolution of Asian models slow and difficult to achieve, he argues that as products of Asian conditions, they will have greater strength and relevance. Such an evolutionary process challenges managers and practitioners to move beyond their time-honoured thinking and practices. This may not be easy where organisations are hierarchical, roles and functions are bound by tradition, consensus and harmony are valued over individualism and candour, criticism is deemed unseemly, and self-criticism leads to 'loss of face'. However, if governments, donors and other important stakeholders are to be convinced of the value of ICT for social development, all of their processes and outcomes must be open to public scrutiny and their quality assured – and this can only be done through rigorous, honest and frank research and reporting.

Failure is a stepping stone, not a stumbling block.

In ICT for social development, it is sometimes the case that costs spin out of control, technologies fail, teaching methods turn out to be inappropriate, learners drop out, management systems falter, and territorial disputes arise between providers. These failures are rarely admitted in journal articles and conference presentations, however. They may only become apparent to those who have first-hand experience of the projects or who can talk with the participants. Only then may it emerge that the project management was poor, that the learners did not really 'buy in' to the project, that the technology was inappropriate, or that conflicts arose as soon as key personnel departed or the donors withdrew their funding. Such omissions and cover-ups are particularly worrisome because, as Koul (1998) observes, politicians, managers and practitioners new to ODL/ICT are easily misled by over-optimistic accounts of what occurs, and fail to appreciate the complexities involved.

Rerup (2003) and Denrell (2003) point to the dangers of focusing on success alone. They suggest that organisations can learn as much from their failures as from their successes, and that failure needs to be seen as a stepping stone to improvement, not as a stumbling block to be ignored or covered up. Researching and reporting on failure requires imagination, diligence, courage and a willingness

to ask awkward questions. This may be difficult to achieve in some contexts, but it is important to develop an organisational culture in which people are encouraged to admit what went wrong, and to do something about it.

A research and evaluation agenda for ICT for social development

ICT for social development calls for research into the needs and circumstances of the end-users, the services provided, the methods and technologies employed, the outcomes and the benefits. Research is also needed into the policies and procedures that are needed to achieve successful outcomes. The following research and evaluation agenda is proposed for those concerned with ICT for social development.

National level

Governments, donors and other national agencies need to be able to draw upon the following in order to develop well-informed plans, policies and procedures:

- a) Meta-surveys (surveys of a range of initiatives) and meta-analyses (findings derived from a number of research studies) that provide robust evidence of system-wide gains in access, economy, efficiency, effectiveness and impact, the factors that support or prevent the achievement of these outcomes, and ways to overcome any barriers to change that may arise in the process.
- b) Environmental scanning to establish:
 - The needs and opportunities for using ICT to achieve, for example, the UN's Millennium Development Goals of eradicating extreme poverty and hunger, achieving universal primary education, promoting gender equality and empowering women, reducing child mortality, improving maternal health, combating HIV/Aids, malaria and other diseases, ensuring environmental sustainability, and developing a global partnership for development; and
 - ways to bridge the digital divide.

c) Research findings on:

- the political actions, policies and systems needed to achieve project sustainability;
- the technology, infrastructure and logistics needed for such projects;
- the funding and resource requirements;
- the staff training requirements;
- the potential for collaboration and partnership;
- leadership and management issues; and
- key performance indicators needed to measure the short-term and longer-term benefits of projects.

d) Formative and summative evaluation to provide robust information on:

- the appropriateness of projects; and
- the impact, efficiency, cost and cost-effectiveness of projects.

Organisational level

ICT-based social development projects take many forms, from improving adult literacy and helping poor farmers to adopt new practices, to providing disadvantaged communities with ICT through community telecentres. Many of these initiatives are experimental and new to the providers as well as the end-users. A number of stakeholders - individuals or groups (including the end-users) - are interested in influencing the projects, achieving the outcomes, and ensuring the projects' viability. Organisations supporting such projects need to be accountable to these stakeholders and to undertake or commission research ensuring that:

- the end-users' needs and circumstances have been correctly defined;
- the projects have been appropriately resourced, managed, implemented, provided and evaluated and delivered;
- the goals, targets and performance indicators have been met;
- problems have been resolved; and that
- dissemination and diffusion methods have informed all stakeholders of the projects' outcomes and benefits.

Practitioner level

Managers and staff engaged in such projects need to undertake:

a) Personal inquiry to inform their understandings of:

- the theoretical basis of ODL/ICT, lifelong learning and non-formal adult and community education;
- global developments and trends in ODL/ICT;
- adult and distance learners and their learning;
- constructivist, independent, collaborative and problem- and work-based learning;
- cultural, gender and individual differences in learning;
- curriculum, course and instructional design;
- materials development;
- learner support;
- quality assurance; and
- leadership and management.

b) Action research (work-based research by individuals or groups that proceeds through a cycle of planning, action, observation and reflection and provides evidence that informs practice) regarding:

- equity and access;
- end-users' needs, circumstances, behaviours and achievements;
- curriculum, course and materials development and delivery;
- instructional design and technology;
- learner support; and
- assessment and evaluation.

c) Formative and summative research into:

- the effectiveness of the policies, planning and project management;
- the effectiveness and cost-effectiveness of the projects;
- the effectiveness and cost-effectiveness of the technology;
- the effectiveness of the teaching/training and learner support systems;
- the end-users' views on the methods and technologies employed;
- the benefits to the end-users; and
- the social development benefits for the wider community.

Performance indicators and research

Key performance indicators (KPIs), sometimes known as Performance Indicators or Key Success Indicators, are essential in defining and measuring progress toward a project's goals. KPIs are observable, quantifiable and agreed-to processes and outcomes that reflect the critical success factors in projects. They vary according to the projects' missions and goals.

Let us consider, for example, a project whose mission is “to improve health awareness in rural communities”, and whose goals are “to use ICT to motivate and educate village communities in health care”, and “to achieve more effective and cost effective ways of improving community health care”. To evaluate the progress and outcomes of this project, we need something more specific than its overall mission and goals. We need to specify the number of village communities to be targeted, who is to be involved (e.g., the village heads, the mothers, the younger generation, or the entire community), the methods and technologies to be used, the intended cost savings and cost benefits, the intended short-term outcomes and longer-term benefits, and how the project compares with other, more traditional approaches.

We then need to set targets for each performance indicator. For example “Involve all villages”, or “Involve all mothers in improving health care”, or “Reduce the costs of delivery by at least fifty percent” are clear targets that everyone will understand and be able to act on. Next we need to mandate a person or persons to be accountable for qualitatively and/or quantitatively evaluating and reporting on the steps taken to achieve these targets, and on what has been achieved. We also need to establish causal links. For example, if the village mothers fail to stay the course or do not adopt the recommended approaches, we need to find out why. Such an approach provides a sound basis and framework for research and evaluation of ICT for social development.

Disseminating research

Unfortunately, research findings do not always result in greater understanding or improved practice. The researchers may lack credibility, the dissemination methods may be inappropriate, the findings may be ignored, there may be disagreement on the problems or proposed solutions, the recommendations may be too costly, or they may have political ramifications that threaten the *status quo*. It is therefore important to consider who the research findings are intended for, and how to disseminate the research findings in ways that will attract the attention and support of the key-decision makers and will result in the necessary actions (Stuart & Latchem, 2004).

Training in research and evaluation

Until recently, knowledge and skills in research and evaluation have been limited to academics and key practitioners in other sectors. Relatively few people have been trained in researching ICT for social development, particularly in the developing world. Researchers and would-be researchers can now receive excellent online training through the Practitioner Research and Evaluation Skills Training Programme (PREST) developed by the Commonwealth of Learning (COL) and the International Foundation for Open Learning (IRFOL).¹⁵ Written for ODL practitioners by ODL practitioners, the PREST training resources provide convenient access to training in research and evaluation that can be of immediate relevance to those working in the field, and can also be a resource for formal study.

Conclusions

This paper has argued the need for:

- a stronger research and evaluation culture in ICT for social development;
- providers and practitioners in this field to engage in research and evaluation, to be self-critical, and to be committed to quality assurance;
- researchers to collaborate with policy-makers in educational, training and donor organisations, and to help create a body of research to guide future planning and practice;
- environmental scanning, meta-surveys, meta-analyses and overviews of current thinking, needs and developments; and
- formative and summative evaluation, with robust strategically significant findings to inform and influence decision-makers.

A prime reason for the current Symposium is the desire of the ASEAN Foundation and its Canadian donors for more and better research and evaluation in ICT for social development. It is hoped that the Symposium delegates will now seize the many opportunities that present themselves for research activities that can help to improve the quality and extent of ICT for social development in Asia.

¹⁵ <http://www.col.org/resources/startupguides/prest.htm>

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Chapter 2

Building collaborative ODL research: the PANDora projects

Jon Baggaley, Tian Belawati & Naveed Malik

Introduction

From 2005 to 2008, *the* International Development Research Centre (IDRC) is funding a series of open and distance learning (ODL) studies in its *Pan Asia Networking* (PAN) region. Nine collaborative projects are underway in 12 countries, in an initiative designed to generate shared access to Asian ODL methods and resources. The projects emphasise information and communication technologies (ICT) appropriate to Asian distance education, and cover a wide range of practical and policy topics, including the use of open-source software (OSS), mobile technologies, learning object materials (LOM), and online assessment methods. The PAN projects' networking approach is designed to build on the strengths of individual Asian research teams, and to avoid overlap and duplication between projects and nations.

An apt metaphor for online education is that of *Pandora's Box*. In Greek legend, the box was a mixed bag of problems accompanied by hope. Today's online education is a similar ragbag of methods and tools, some well conceived but others creating more problems than they solve. Throughout the world, for example, online ODL technologies are emerging with little or no apparent respect for the

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accessibility problems they create, and are leading to less efficient educational delivery than was possible with traditional media and with earlier Internet-based methods. Meanwhile, in specific regions, different technological emphases have emerged to the exclusion of others. North American ODL institutions, for example, tend not to exploit the Internet's vast potential for synchronous interaction, in view of the time-zone differences between online students and faculty; while other nations (e.g. Japan) have emphasised live, satellite-based broadcast methods of education to a greater extent than online methods. Meanwhile, nations with widespread Internet connectivity tend not to be using it for educational purposes at all. The South Pacific island of Niue is apparently the only nation in the world with completely free Internet service though little educational usage of it (Veramu, 2005, personal communication).

As Latchem has stressed (*Chapter 1*), comparative research and evaluation efforts are essential to adjust these disparities, and to identify the most effective policies and practices for ODL technology usage. Research into online methodology tends to be conceived within finite geographical boundaries, however, leading to widespread duplication of effort between institutions and nations. In an attempt to overcome these problems, the IDRC supports a series of complementary ODL projects involving close collaboration between R&D teams in 12 Asian countries: Bhutan, Cambodia, Hong Kong, India, Indonesia, Laos, Mongolia, Pakistan, the Philippines, Sri Lanka, Thailand, and Viet Nam. The initiative runs from 2005-2008, and has been named *PANdora*, representing 'PAN Asia Networking Distance and Open Resource Access'. The *PANdora* network is administered by the Virtual University of Pakistan and Universitas Terbuka, Indonesia, and is funded by the IDRC's PANAsia office in Singapore.

The IDRC has funded numerous DL technology projects in the past, each containing diverse elements. For example, a PAN Asia project nearing completion at the National Institute of Education, Bhutan, is developing a wide range of ODL provisions and skills, including traditional and online course materials, training and evaluation methods, and the development of key performance indicators. The *PANdora* initiative takes a different approach, whereby simultaneous projects examine specific issues, and minimal overlap occurs between the projects (Baggaley & Ng,

2005). The nine *PANdora* projects are thereby complementary in scope, and, it is hoped, will lead to the development of a ODL approach appropriate to South and SE Asia generally. The IDRC created its *PANdora* model following a 2004 overview tour of the countries involved by the first author of this *Chapter*. A comprehensive framework for the initiative has been presented by Malik, Belawati & Baggaley (2005).

The *PANdora* Projects (2005-08)

Project #1 (India, Pakistan Sri Lanka):

Accessibility, Acceptance, and Effects of DL Technologies in South Asia

This project investigates different ICT-based learning models (independent and blended), in terms of access, acceptability, impact on learning and cost effectiveness, and learning styles. It offers implications for future DL initiatives in Asia and in other countries where the benefits of DL have not yet become generally known. Expected outputs include research publications on access to learning technologies in the three countries; and recommendations for ICT-based learning models and best practices that are appropriate to the three countries and others in the region.

Project #2 (Mongolia, Philippines):

The Viability of Mobile SMS Technologies for Non-formal DL in Asia

The feasibility and acceptability of using short message system (SMS) technologies are being investigated for non-formal DL delivery to different socio-economic, cultural and gender groups. Expected outputs include courseware in SMS and other formats (booklets, cassettes, CD-ROMs, online); an SMS server in the two participant countries to handle student registration, storage, and deployment of the educational materials; trained personnel on SMS-enabled technologies; research tools/ methodologies for use by project partners; publications; and a set of suggestions for policy guidelines and standards for the use of SMS in DL. [A progress report on this project is given in *Chapter 7*.]

Project #3 (Indonesia, Mongolia, Sri Lanka, Viet Nam):*Evaluation and adaptation of Open Source Software for DL in Asia*

This project is evaluating existing DL software, both commercial and open-source, in order to identify packages that can be customised to the needs of specific educational institutions. The expected outputs include an OS DL software to be disseminated under the GNU/ GPL license through the PAN/ ASEAN Foundation's Collaboratory server in Jakarta; mirror sites across the PANdora network; and a set of technical and user manuals for future customisation of the OSS. The project aims to enable a consistent course management approach across the region. [A progress report on this project is given in *Chapter 5*.]

Project #4 (India, Mongolia, Philippines):*A Platform for Virtual Research and Research Training in Asia*

This project is complementary to the previous project, and is developing an online research platform for Asian DL researchers, containing training resources in selected areas of DL research, links to research repositories and information networks containing data on research experts, advice by active specialists, policy guidelines for institutional research, and benchmarks and standards for collaborative virtual research and research training. The project will have implications for the development and administration of effective online research methods, currently a significant issue in the evolution of online graduate research approaches.

Project #5 (India, Philippines):*Instructional Design Training for ICT-based DL in Asia*

This project is taking stock of the instructional design approaches used in DL internationally, and is examining the extent to which they are appropriate in Asian DL. It aims to develop appropriate design approaches, prototypes, training resources, and blended training strategies for instructional design across domain/discipline areas and levels, and various media. It will pay specific attention to gender, age, and cultural factors in instructional design, and will make culture-specific recommendations for PAN projects in other parts of the region. [A progress report on this project is given in *Chapter 9*.]

Project #6 (Cambodia, Hong Kong, Indonesia, Pakistan, Thailand):*A Repository of Reusable Learning Objects for DL in Asia*

The aims of this project are to enhance collaboration and course materials sharing between its partners, to evaluate the effectiveness of sharable learning object materials (LOM) in content development, and to avoid deviation from internationally recognised standards. Expected outputs include a list of LOM criteria and definitions, a sharable LOM repository, a working granularity scheme for using LOMs collaboratively, prototypes of reusable LOMs for flexible, extensible use in curriculum development among the partners, and an evaluation report of the usability of LOMs by the participating institutions.

Project #7 (Indonesia, Pakistan, Sri Lanka):*E-assessment Methods and Models for Student Evaluation in Asia*

The project is examining existing policies, practices, and methods of e-assessment in relation to institutional, technological, operational, and human issues (including gender differences). A generalised e-assessment model will be developed, and its applicability and acceptability tested in the partner institutions. The model, training materials, and instructional design prototypes will be gender- and culture-sensitive for Asian students and faculty. The project will place special emphasis on the increasing problems of security in online assessment.

Project #8 (Cambodia, Lao PDR, Viet Nam):*Best Practices in DL Technology for Capacity Building*

The objectives of this project are to: (1) survey and take stock of the existing educational scenarios and problems in the three countries; (2) initiate strategies for networking collaboration with other DL institutions in the region; (3) record the best practices of DL policy, research, and practices in other Asian countries; (4) discuss these documents with the core groups, policy- and decision-makers in those countries; (5) build further capacity through a training-of-trainers programs in those countries; and (6) formulate recommendations for further development of detailed DL initiatives.

Project #9 (Hong Kong, Mongolia, Viet Nam):

Evaluation of DL Practices for Policy Recommendations

National recognition of DL is currently low in Mongolia and Viet Nam, and the project partners from these two countries are developing detailed social programmes to address the problem. Advised by the Open University of Hong Kong, the project examines the factors affecting DL adoption via consultations with a wide range of social groups and policy-makers. The project will provide an important underpinning for the work of the PAN network as a whole, and aims to combine with the previous project in increasing social acceptance and implementation of DL, and cross-cultural variations of it.

Project Partner Institutions

The nine PANdora projects are conducted in teams combining three or more of the following institutions:

- Allama Iqbal Open University, Pakistan
- ASEAN Foundation, Jakarta, Indonesia
- ESP Foundation, Ulaanbaatar
- Fisheries College #4, Bac Ninh, Viet Nam
- Health Sciences University of Mongolia, Ulaanbaatar
- Ho Chi Minh City Open University, Viet Nam
- Indira Gandhi National Open University, India
- InfoCon Ltd., Ulaanbaatar, Mongolia
- Institute of Information Technology, Viet Nam
- Institute of Technology, Cambodia
- International Institute of Cambodia
- Ministry of Education, Youth and Sports, Cambodia
- Ministry of Post and Telecommunications, Cambodia
- Molave Development Foundation, Philippines
- National Business Institute, Cambodia
- National ICT for Development Authority, Cambodia
- National Institute of Education, Bhutan
- National Science Council, Laos
- Open Forum
- Open University of Hong Kong
- Royal Academy of Cambodia
- Science Technology and Environment Agency (STEA), Laos
- Sukothai Thammathirat Open University, Thailand
- University of Colombo School of Computing, Sri Lanka
- University of the Philippines Open University
- Universitas Terbuka, Indonesia
- Vigyan Prasar, Department of Science & Technology, India

The PANdora Web site

Collaboration between the institutions conducting each project, and between projects, is facilitated by the initiative's interactive web site at <http://www.pandora-asia.org/>, designed and developed by the ICT4D Collaboratory. The site includes audio-conferencing software for international seminars and discussions among the project teams, project-planning and file-sharing software, trial versions of course management software, and copies of project reports, publications, conference presentations and evaluation tools. Emphasis is placed on OSS and freeware approaches. A 'blog' facility allows rapid communication of project announcements.

Conclusions

It is hoped that the PANdora initiative will ultimately succeed in generating a useful common model for Asian online education. The obstacles to this goal are clear. Cultural and technical issues may prevent the benefits of individual projects from being successfully shared across the region, and specific projects may generate conclusions of value to isolated project teams only. The alternative approach, however, would be to assume that different Asian nations have different ODL needs and situations, and to assume that they cannot work together in the common interest. Neither of these assumptions is likely to be valid. The non-collaborative approach would lead us to allocate funding to overlapping and even identical projects conducted separately in different institutions. Research and development conducted by this approach would lead to constant ODL "reinventions of the wheel" rather than to the dissolution of borders that have no bearing on educational matters. In a sense, the IDRC's PANdora initiative is taking the Internet at its word, as a massive facility for the effective sharing of needs and coordination of effort. PANdora's nine complementary projects are creating a means for research teams in different nations to use the online media as a means to develop research and practical approaches of relevance to them all. In concentrating on specific ODL issues, and in ultimately combining the conclusions within a flexible transnational system, this collaborative initiative may have widespread implications for ODL methods internationally. Pursuing the metaphor of *Pandora's Box* to another level, the collaborative research process is seen as one in which numerous problems are revealed in the attempt to find the hope that lies beneath them.

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Chapter 3

Best Practices for Capacity-Building in Cambodian Distance Education

Doung Vuth, Chea Sok Huor & Chhuon Chan Than

Foreword by Mr. Doung Vuth (Government of Cambodia)

Mr. Chairman, Distinguished Delegates, Ladies and Gentlemen:

Today, it is a great honour and pleasure for me and my colleagues from Cambodia to attend the International Symposium on Information and Communication Technology (ICT) for Social Development. Cambodia values the opportunity to share its experiences in this area and to learn from the practices adopted in partner nations. I would like to offer my thanks to the ASEAN Foundation for organising this meeting, and inviting us from Cambodia to participate in this important meeting.

The meeting provides a forum for the promotion of e-learning measures and strengthening of regional cooperation in support of the socioeconomic and education development of our countries. We recognise there are many challenges associated with the development of e-learning and ICT infrastructures in Cambodia, but the potential benefits are many. At this meeting we will learn important lessons from our regional neighbours on how best to use ICT for science, maths and language curriculum development and teacher training.

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In Cambodia, we recognise that we are at the early stages of using ICT to broaden access and to improve the quality of education. We anticipate that ICT will become an increasing part of distance education, especially for expanding secondary and higher education opportunities. Therefore the Royal Government of Cambodia has set up the National Information Communication Technology Development Authority (NiDA) to develop and promote the national approach to e-learning standards. In this context, I would like to focus on the policies and strategies Cambodia is adopting to broaden e-learning opportunities, especially with respect to the Royal Government's National Education For All (EFA) Plan, and to specific reform measures in the education sector. In 2003, the EFA plan provided, for the first time in Cambodia, specific policies and strategies for the use of ICT in education. These were developed in consultation with national and international partners through a series of workshops and meetings in Cambodia and the region. The Plan was officially launched in March 2005.

In the Ministry's Education Sector Support Program (ESSP) and EFA Plan, two overarching policy objectives have been identified that will contribute to national ICT human resource development. Firstly, the Ministry will contribute to developing Cambodia's international competitiveness by reducing the technology gap with more developed countries. Secondly, the Ministry will enhance learning opportunities within schools and other institutions through the utilisation of ICT, multimedia and e-learning technologies. At present the number of computers in education remains comparatively low. We estimate that there are around 2,000 computers in schools and education offices across the country. However, it should be remembered that until 1994, computers in education in Cambodia were virtually non-existent.

A key strand of the Ministry's ICT program is to strengthen networking opportunities, in a number of ways. Firstly, we are extending the Ministry's own internal network between the central offices of the Ministry of Education, Youth & Sport (MoEYS) and 24 provincial departments, as a means to improve information exchange for better planning and management, and to support decentralisation. This program involves approximately 3,000 managers and senior technical staff. We anticipate extending the network to 183 districts and a further 2000 staff in the next two to three years.

The trainees at teacher training colleges in Cambodia are required to spend at least two hours per week using ICT for teaching and learning. Increasingly, we are using ICT to improve access to and quality of teacher training programmes. For example, we have created mobile ICT training resources which travel around the more disadvantaged provinces. This has enabled approximately 5,000 teachers to learn how ICT can enrich more traditional forms of teaching and learning. In addition, trainee primary and secondary school teachers are receiving ICT instruction related to improving teaching of the maths, science and language curriculum.

We are learning a number of lessons from these programmes. Firstly, ICT should not be seen as replacing traditional teaching, but rather as a collection of supplementary and complementary tools. Secondly, we have seen that in remote areas the use of ICT is a more cost-effective way of providing training than bringing teachers in for workshops and seminars. In conjunction with some donors, we intend to conduct a comprehensive evaluation of this programme as a basis for seeking support for its expansion. We are also piloting the use of ICT support materials in the revision of the school and teacher-training curriculum. For example, we are testing the use of spreadsheet methods in enriching the maths and science curriculum. We are also using other readily available software to enrich the teaching of the Khmer language. The Ministry faces a number of constraints in expanding ICT in education. While an Internet service provider offers preferential rates to MoEYS, for example, the recurrent costs remain high. Another problem is that not all offices or schools have electricity, and the Ministry is investigating innovative ways of dealing with this. In particular, we see opportunities for increasing public/ private partnership in ICT.

In conclusion, we are committed to continually sharing our experiences of the education reform programme with our Asia-Pacific friends, and their strong commitment to supporting projects that involve ICT for social development, and enhance teaching and learning. I hope our projects will rapidly move towards best practices, in the interests of fulfilling the UN's Millennium Development Goals (MDG). This is a good time for us to evaluate the actions and results that benefit our region. Thank you.

Doung Vuth

Ministry of Education, Youth and Sport, Government of Cambodia
Jakarta, May 23, 2006

Best Practices for Capacity Building in Cambodian Distance Education

1) Background and Objectives

Since 1998, higher education in Cambodia has changed from public university to private university. Private universities have increased every year in that period, until now Cambodia has more than 30 universities including the public ones. All universities provide the traditional education system (classroom, face to face study). In early 2005, eLearning was created for the first time in Cambodia. The International Institute of Cambodia (IIC) is an institute with a special interest in providing and promoting tertiary education in Cambodia with the joint support of the Asia Foundation (TAF), the United States Agency for International Development (USAID), the Internets Network, SDLearn, and the IDRC's PANdora projects. The current PANdora project (see *Chapter 2*) aims to provide a basis for ICT developments in distance education, by studying:

- the computer facilities of learners and teachers;
- computer-based work methods; and
- attitudes to distance education.

To understand the context of e-learning in Cambodia, existing studies on e-learning initiatives in developing countries were reviewed. Cambodian documents such as the Policy for Curriculum Development (2005-09), the Current Level of ICT in Education and Policy, and Strategies on ICT in Education in Cambodia were examined, to provide guidance on research implementation. The Asia Foundation also assessed reactions to early e-learning initiatives. This review phase oriented the team to the need for new data in the project.

2) Survey Methodology

The study has paid particular attention to three provinces (Phnom Penh city, Kampong Cham, and Banteay Meanchey). A sample of 100 participants has been studied by means of a questionnaire. The sample has been drawn from:

- the private sector and NGOs;
- universities (lecturers and students); and
- government officers.

The breakdown of participation in the three provinces is: Phnom Penh (50%); Kampong Cham (30%), and Banteay Meanchey (20%). The sample includes individuals who are familiar with e-learning courses in two of the provinces, and others who are not (Phnom Penh).

Before the questionnaires could be administered, training was provided to all those involved in conducting the interviews. The questionnaire and training were prepared by the project core group in Phnom Penh, and communicated to the other PANdora project partners in Laos and Viet Nam, for translation and adaption if necessary. The training aims were to improve the knowledge and skills of the project assistants in using questionnaires, interviews techniques and communications.

The new data were collected in one-on-one interviews, so as to understand the identified target groups' perceptions and experiences of e-learning. A *Microsoft Access* database was developed for tabulation of the data and graphing of key findings. This survey tool was made available to the other PANdora projects on the network's web site (see *Chapter 2*), so that they would not have to duplicate the effort in conducting similar studies.

3) Results

Descriptive statistics were used to analyse the sample's educational level, IT knowledge, Internet connectivity, and other questions related to e-learning and distance education.

The sample. The 100 interviewees comprised 68% males and 32% females, of whom 65% were less than 25 years old, and 35% were between 25 and 34 years. They work on the staff of universities (24%), NGOs (19%), as students (study only: 18%), in business/industry (12%), government (10%), training centres (6%), schools (5%), or in other work (6%). Their occupations are Student (51%), Lecturer/Teacher (17%), Administrator (15%), Staff (10%), Manager (4%), Coordinator (2%) and Other (3%).

Type of Education. The sample was trained in campus-based institutions (34%), Open University (34%), other university (11%), business training (9%), industrial training (6%), distance education (5%), NGOs (4%), and Other (10%). The languages used in their education was Khmer (93%), English (70%), French (2%), and

Chinese (1%). Although Khmer is the national language, English has become popular in Cambodia since the nation changed its economy system from planning to market economy. Most Cambodians in companies, NGOs, and government speak English, and nearly all students study English as their second language.

The 5 respondents who had studied previously by distance education were all IIC students, supported by TAF and USAID. E-learning is not yet well known in Cambodia. Since IIC has introduced offered its e-learning programme, Cambodians have become more aware of its advantages.

Computer Facilities. The computers used by the sample in their work are: PC (91%), Mac (2%), and Other 7%. The computer operating systems are Win XP (73%), Win 2000 (20%), Win 98 (18%), Linux (6%), Win Me (2%), Win 2003 (1%), and Other (1%). Win XP is the most popular platform in Cambodia because the colour is good, and its use is simple and fast. The sample's computer RAM sizes are 64 mb (1%), 128 mb (33%), 256 mb (18%), 512 mb (7%), and 1 gb (1%). Forty per cent of the sample don't know about their RAM size.

Many Cambodian students and workers are seeking independent knowledge of ICT through self-study, in order to improve their studies and job prospects. Most computer users, especially rural ones, do not have their own computers, but use them in universities (52%), in the workplace (24%), in Internet cafés (24%), and at home (13%). Those who have their own computers usually bought in the last 4-5 years, with 128 mb RAM capacity. Now that computers are becoming less expensive, people can afford to buy RAM capacity from 256 mb to 1 gb.

The Internet in Cambodia is very expensive, depending on the speed of access. Internet cafés charge very low hourly rates, but provide very slow connections. The usual internet connection speeds of the sample members are: 28.8 kps (1%), 56 kps (14%), 128 kps (13%), 256 kps (1%), ADSL (5%), and T1 (1%). Once again, a high proportion of the sample (65%) doesn't know the answer to this question. The reliability of their internet connections is described as: very reliable (3%), reliable most of the time (11%), not very reliable (12%), OK (32%), very unreliable (6%), and don't know (36%).

Using other media to learn. Other media used by the sample for their learning/ teaching are: the telephone (16%), audiotape (17%), radio (13%), TV/videotape (32%), film (2%), none (45%), and other (3%). Although many types of education in Cambodia have media-based materials, relatively few people seem to use those options, hence the low proportion (45%) stating that they use the media to teach/ learn. People use audio media when they study foreign languages.

The exception, however, is the cell-phone. Only 14% of the sample never uses "texting" (SMS) for their general purposes, and 24% uses it ever day. The sample's responses about their computer and cell-phone usage are presented in [Table 1](#).

Table 1. Computer and cell-phone usage for different purposes.

	Every Day	Often	Some times	Never
I use e-mail	4	27	50	19
I use the World Wide Web	34	8	49	9
I use online discussion boards	4	6	30	60
I use online Text-chat rooms	1	14	27	58
I use "texting" (mobile SMS)	24	29	33	14
I use Internet telephone	2	4	17	77
I use online audio-conferencing	1	2	15	82
I use online video-conferencing	1	3	11	85

Use of online applications. In using the Internet, most of the sample use e-mail with friends, family, or for business (81%), and 50% use it sometimes. Only 19% never use e-mail. According to [Table 1](#), 85% do not use internet for online audio- or video-conferencing, and most of them don't know about these conference systems. Knowledge of the Internet in Cambodia is still poor and people do not yet get full benefit from it.

Attitudes to Distance Education (DE). DE plays an important role in Cambodia in reducing the education gap between the cities and the remote provinces. Moreover, DE helps workers in the countryside and busy people who have no time to attend classes, but still want to upgrade their knowledge. Materials and documents supporting DE is still poor, however, and the capacity of teachers needed for DE work is generally poor. Only 46 persons have trained in the DE skills offered by SDlearn, for example. Most of the current sample was unaware of DE, though stated (75%) that it sounds important for Cambodia, and that they would like its national role to be improved. On all of the attitude statements about DE in [Table 2](#), the sample was very positive.

Table 2. Response to attitude statements about distance education.

Statements:

- 1) DE plays an important role in my country?
- 2) The role of DE in my country could be improved
- 3) Teachers and trainers in my country lack DE skills
- 4) DE can bring education to remote communities in my country
- 5) The public will never accept DE in my country
- 6) Politicians will never accept DE in my country
- 7) DE can play a positive role in assisting women's groups in my country
- 8) DE can never be as good as face-to-face education
- 9) More training in DE skills is needs in my country

	Agree	Agree slightly	Undecided	Disagree slightly	Disagree
1	75	14	8	2	1
2	72	22	3	1	2
3	73	17	5	2	3
4	57	21	12	2	8
5	18	18	17	11	36
6	18	14	25	6	37
7	64	21	8	4	3
8	38	31	9	4	18
9	86	5	7	1	1

Conclusions

In Cambodia, relatively few people have knowledge of IT or of how to use the computer. Only university students and the younger generation know how to do so. Internet facilities in the country are still poor, and most people don't know about its educational benefits, especially if they don't understand English. The sample chosen for interviewing in this study tends to know more about computers and the Internet than the general public, because it was composed of students, lecturers, NGOs staffs and government officers. Even they, however, are unfamiliar with much of the Internet's potential.

A few people have their own computer at home, and most access is in the workplace, computer centres or Internet cafés. Internet usage in Cambodia is expensive compared to neighbouring countries, and is available in particular areas only. It is therefore interesting to note the high proportion of cell-phone users in the country, for this technology may have the potential to become a useful DE medium in the future. The great majority of the sample's members show very positive attitudes towards the potential of DE in Cambodia. It is encouraging that they are educated people who are, or will become, key decision makers in the country. It is important for Cambodia to use DE methods in upgrading its educational system, in reducing the educational gap between cities and remote areas, and in providing increased study opportunities for rural workers and busy people. Cambodian society in general is very hungry for the educational application of ICT technology, in the interests of developing the national economy and eliminating poverty.

Needs of Medical Distance Education in Mongolia

D. Amarsaikhan & S. Oyun

Introduction

The purpose of this study is to identify the particular needs and priorities of distance education (DE) in rural areas. Physicians and medical workers in rural areas tend to select postgraduate continuing education rather than formal academic training, and there are many areas in which they need upgrading. Currently, their knowledge of DE is low, though they do believe that it can save them time and money. An important priority, therefore, is to develop DE curricula based on research indicating current social and medical needs.

For this purpose, the Postgraduate Training Institute of the Health Sciences University of Mongolia (HSUM) has, since 2003, implemented an IDRC-supported project entitled *ICTs for Health Services in Rural Mongolia*. It has launched a distance learning centre at HSUM, and at hospitals in 10 rural areas. The physicians who work at these hospitals all have Internet connections and engage in online distance education and diagnostic activities. This *Chapter* indicates the curricular decisions being based on this research, for the benefit of medical workers in selected rural areas.

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Survey Method and Materials

The research took the form of a survey to collect data from medical trainees, in four categories: 1) the trainee's history, 2) attitudes to DE, 3) knowledge of DE, and 4) its needs and priorities. The questionnaire content also included questions about the kinds of course that are important, and on what needs to be improved. The questionnaire was distributed in selected rural areas, during existing training and seminars. In addition, it was posted on the Web. Trainees were given 15 minutes to respond to it. The research team had the full participation of trainees, and all parts of the questionnaire were made clear to them. Not all questionnaires were returned on time, however. Data were collected from a total of 231 physicians and medical workers.

Results

The following statistics show the demographic and psychographic characteristics of the 231 survey participants (75% female, and 25% male).

1) Occupation of participants:

- physician in department (46%);
- head of department (20%);
- inspector (8%);
- head of family physicians (3%);
- family doctor (8%); and
- other (15%).

The participants work in:

- rural hospitals (69%);
- local health centres (physicians and medical workers: 25%);
- professional inspection authority (2%);
- private (2%); and
- other (2%).

How long have you been working?

- At least 15 years (46%);
- 11-15 years (18%);
- 6-10 years (17%);
- 3-5 years (10%); and
- 1-2 years (7%).

2) Continued postgraduate training:

- doctoral degree (0.4%);
- master's degree (5%);
- residency (66%);
- sub-specialist (26%);
- advanced (39%); and
- combined sub-specialist and advanced (63%).

Credit courses are a major component of postgraduate training, and we need to identify their quality, processes, and the satisfaction of trainees in them. In recent years, physicians received credits from:

- courses (24%);
- seminar (37%);
- training (47%); and
- other (22%).

Sixty per cent of the sample received credits from both courses and training programmes. They regard credit course status as:

- good (21%);
- bad (68%); and
- don't know (12%).

"What kind of style of credit training is best?"

- traditional training (51%);
- distance learning (24%); and
- at their workplace training (16%).

Many participants may have chosen traditional training owing to the low quality of workplace training, and their lack of awareness of DE.

The question “Will you sign in your interesting postgraduate continue training?” was answered: no (81%); and yes (8%). Reasons for postgraduate training dropout are:

- not enough training (37%);
- lack of finance (53%);
- low training quality (49%); and
- lack of human resources in remote areas (39%).

3) Awareness of distance education

Physicians answered the question “How well do you know about DE?” as follows:

- well (16%);
- not well (54%);
- poorly (22%); and
- no opinion (7%).

The perceived benefits of distance learning are:

- include save time (70%);
- at the workplace (70%);
- save money (80%); and
- access new information (51%).

Eight-nine per cent answered positively to the question “If possible, will you attend DE?” Fifteen per cent had already been involved in DE, of which all had computer-based training and 12% had Internet training. Their reasons for not taking e-learning options were:

- can’t use computer (37%);
- no awareness of DE (22%); and
- have enough credits (12%).

The question “If your computer had an Internet connection, would you access e-learning?” was answered: yes (56%) and no (44%). We identified their computer knowledge as:

- beginning (32%);
- intermediate (36%);
- advanced (36%); and
- no opinion (17%).

4) DE curriculum planning.

The sample’s priorities for DE are:

- medicine (37%);
- medicine and traditional medicine (15%);
- public health (12%);
- medicine and public health (20%);
- traditional medicine (7%);
- dentistry (4%);
- pharmacy (3%);
- bio-medicine (3%); and
- other (10%)

The sample was also asked about the priorities of DE in specific disciplines. They responded:

- internal medicine (51%);
- gynecology (22%);
- pediatrics (19%); and
- surgery (27%).

Within the internal medicine category, three priority areas were identified:

- cardiology (28%);
- pulmonology (22%); and
- gastroenterology (33%).

The sample would like to study theory (34%), clinical practice (13%), or both (49%) through DE. They would be interested in the following types of clinical medicine training by DE:

- disease factors (26%);
- treatment (30%);
- diagnosis (38%);
- prevention (39%); and
- clinical symptoms (40%).

Physicians want clinical knowledge in:

- public health (47%);
- environment (12%);

- epidemiology (10%);
- maternal and child health (16%);
- labor health (6%);
- toxicology (4%);
- health management (5%); and
- psychiatry (4%)

Of all the participants, 37% think their public health knowledge is low. They stated that they would like to take the following subjects anywhere and at any time:

- traditional medicine (27%);
- acupuncture (6%);
- moxibition (2%);
- blood-letting (2%);
- manual (12%); and
- rehabilitation (12%).

We asked them, “How well do you know the English language?”:

- beginning (48%);
- intermediate (29%);
- advanced (3%); and
- no opinion (19%).

We conclude, therefore, that we need to add English lessons to the medical DE programme, and to translate some medical curricular materials into English.

Conclusions

Rural area physicians tend to select postgraduate continuing training rather than academic training. Physicians and medical workers have a low awareness of distance education, but they assume that it could save them time and money, and could increase their knowledge in important areas. We are now planning DE curricular for them based on these research findings. Priority areas for the creation of medical DE materials include disease factors, prevention, and diagnosis.

Chapter 5

Using Open Source Software for Open and Distance Learning

Batpurev Batchuluun & Uyanga Sambuu

Introduction

The demands on higher education in Asia require a fundamental change in direction. Information and communication technologies (ICT) facilitate that change. In e-learning, open-source software (OSS) providing cost-free learning platforms have paved a new road revolutionising teaching and learning methods. OSS e-learning platforms have been found to be valuable, extensible, versatile and powerful tools that can assist in many educational tasks, and in many organisations. Many functions can be built into OSS packages, even when they are primarily designed for learning (content) management. Distance education (DE) methods using OSS is being rapidly developed in most Asian countries. In this chapter, we discuss ways in which OSS instruction can be designed and implemented.

What is OSS?

OSS is software whose licenses give users the freedom to run the program for any purpose, to study and modify the program, and to redistribute copies of the original or modified program without having to pay royalties to their original developers. The market share of OSS is constantly increasing, and in many markets is now significantly higher than commercial software. Nowadays, OSS can

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be the most reliable software, with the best performance, and superior security. It is feasible that the openness of open-source code may aid attacks upon it, since hackers can discover flaws in it with step-by-step precision. The more bugs that are revealed and fixed, however, the more secure the software becomes.

A major advantage of OSS is the cost of ownership, usually far less than that of proprietary software, especially as the number of competing platforms increases. Adopting any ICT approach is likely to be expensive, involving costs for infrastructure, software, and training (Wheeler, 2005). We can reduce these costs by focusing on OSS rather than proprietary software. Many aspects of the hardware infrastructure cannot benefit from OSS. For example, a leased line Internet connection will cost the same regardless of the software used on it. However, other areas can see significant cost benefits. Users of Linux-based servers as opposed to commercial options, for example, can greatly reduce the cost of the multiple servers they require for web, email, file, print, and firewall. These savings occur in two forms: firstly, there is no need to purchase licenses for the operating systems; and secondly, since the operating systems can be configured for the specific job at hand, it is possible to operate a lower specification machine than comparable commercial alternatives require. The biggest cost saving is in the acquisition of the software itself. With no license fee to pay, OSS is free, and in many cases without restriction of use or modification. An organisation can customise its OSS for its own needs, an extremely costly, if not impossible, option with most commercial software.

Using OSS in Distance Education

Hundreds of commercial and non-commercial DE applications are now available. Leslie (2004) has identified over 50 such systems based on OSS alone. This number would increase dramatically if we could add the software developed locally for particular institutions, and not made publicly available. In addition to those described above, the advantages of using OSS in DE include the low costs of students' home systems, and the fact that the software tends to run well on older hardware, which makes it appropriate for school networks, and the developing world.

Considering the economic savings and technological advances being made in OSS, the current research project was designed to assess the advantages of adopting OSS learning (content) management software for DE in Asian institutions.

SWOT Analysis of OSS

1) Strengths

Construction of course content:

- OSS allows the delivery of multimedia content;
- archiving of course materials;
- quality control measures;
- types of course: adult education, general studies, language education, etc;
- timely content: course material can easily be updated;
- high efficiency of information delivery; and
- SCORM compliance (shareable learning materials).

Teaching and learning

:

- OSS is available for use in project-based, inquiry-based, multitasking, individual/collaborative learning;
- routines to record and monitor student and educator performance;
- keeping track of student assessment: records (e.g. exam results), are kept in the database;
- dissemination (the sharing of core course content and new research findings improves the quality of all education);
- convenience and flexibility: flexible teaching and learning;
- scalability: the extent to which the software can be adapted to the needs of student groups and organisations of different sizes;
- learner-centred design logic; and the
- availability of additional OS modules from other developers.

Communication:

- OSS allows communication among teachers, students, between teachers and students, and with parents;

- understanding of legal and ethical issues;
- ability to collaborate effectively;
- community building: DE allows students to engage in discussion with one another; virtual communities are built in cyberspace; and
- communicate with system developers.

Cost of education:

- OSS reduces expenditure on course books and printing;
- ensures timely dissemination of incidental or urgent information;
- submission and automated marking of student assignments;
- delivery of courses as part of DE programmes;
- lower costs for students: travel expenses and time can be saved by remote DE students;
- eliminates the cost of commercial LMS systems; and
- reduces the cost of developing additional modules.

Business opportunities:

- Due to the number of students that can enroll in a distance learning program, DE using OSS may be profitable; business opportunities are created for Internet portals, universities, and software vendors.
- OSS code can be released for commercial purposes to help pay other educational costs.

2) Weaknesses

Policy:

- There are no detailed OSS policy regulations as yet; and
- many government, including that of Mongolia, have not yet declared their support for OSS.

Course content:

- There is currently a lack of OSS content developers; and
- time and energy are required for converting hard-copy materials into electronic formats.

Infrastructure development:

- There is currently a lack of infrastructure support for OSS; and
- a lack of ICT professionals skilled in OSS programming.

Technology:

- OSS is not widely used or accepted in many Asian countries (e.g. Mongolia), and only a few companies are currently using it;
- there are difficulties in determining true costs of ownership;
- there is little technical/ user documentation as with commercial software; and
- regional localisation of OSS is difficult.

3) Opportunities

Policy:

- Detailed OSS policies and documentation are needed; and
- collaboration must be fostered among corporate, academic and educational organisations.

Dissemination:

- The Internet can transfer large volumes of information to multiple, distributed recipients at low cost.
- Even in situations where Internet connections are not available for geographical and economic reasons, CD and DVD materials can be used to distribute OSS-related information.

Teaching and learning:

- OSS methodology guides should be developed and disseminated for educators;
- educators and content developers should be prepared for OSS use through training programmes; and
- OSS experiences should be widely shared.

Technology:

- OSS should be customised and localised; and
- code openness facilitates bugs finding and fixing.

4) Threats*Technology*

:

- OSS developers may cease their ongoing source code development; and
- OSS could become more vulnerable to attack than commercially developed software.

Selection and customisation of Moodle software

in Indonesia, Viet Nam, Mongolia and Sri-Lanka

Farrell (2003) ranked *ATutor*, *DotLRN*, *ILIAS*, *LON-CAPA*, and *Moodle* highly for DE purposes, out of 35 open-source learning management systems (LMS). With COL's approval, the PANDora project adapted the same survey instrument for a semi-formal study of teachers, students, and educational administrators' favourite learning management system software. *Moodle* emerged as the clear LMS leader in their perceptions and experience. The research team is currently customising *Moodle* for use as a DE and campus-based tool in their institutions. The latest release of *Moodle* is being used - 1.5.4 (2006-05-30), available from: <http://download.moodle.org/modules/>

a) Moodle modules customised to date:

Module	Information
1) Student workload	This module allows teachers to determine the readability (fog index) of any text assignment that s/he submits. <ul style="list-style-type: none"> • URL: www.elearning.mn/eng/lms/

2) SMS	This module allows users to use SMS alerting functions for upcoming examination deadlines. <ul style="list-style-type: none"> • URL: www.pandora-asia.org
3) Viet Nameese Unicode converter	This module allows users to convert Viet Nameese win-1258 encoded content to UTF-8 encoded content. <ul style="list-style-type: none"> • URL: www.netnam.vn

b) Moodle's main modules:

Module	Information
1) Appointment	This is a simple module that allows appointments to be made for a given week or topic.
2) Assignment	Assignments allow the teacher to specify a task that requires students to prepare digital content (any format) and submit it by uploading it to the server.
3) Book	Makes it easy to create multi-page resources with a book-like format. This module works very well - the only reason it is not yet standard is that it must be converted to a multi-page resource type.
4) Chat	The Chat module allows participants to have real-time synchronous discussion via the web.
5) Choice	A choice activity is simple - the teacher asks a question and specifies a choice of multiple responses.
6) Dialogue	This module allows students/ teachers to start two-way dialogues with others. The functionality of this module has been taken over by the new Messaging feature in <i>Moodle 1.5</i> , and the module will be removed in <i>Moodle 1.6</i> .
7) Exercise	This module is like a workshop without the peer assessment: more advanced form of Assignment. The functionality of this module may eventually be integrated into the Assignment module.

8) Flash	The <i>Flash</i> activity module allows developers to embed their movies in <i>Moodle</i> in an integrated way, so that they can take advantage of the grade book, backup/ restore and so on.
9) Forum	Discussion forums can be structured in different ways, and can include peer rating of each posting.
10) Glossary	This module allows a dictionary or list of definitions to be maintained.
11) Hotpot	This module allows quizzes created by the <i>Hot Potatoes</i> software to be integrated into <i>Moodle</i> as activity modules.
12) Journal	The teacher asks the students to reflect on a particular topic, and the students can edit and refine their answers over time. This module has been replaced by the new Online Assignment sub-module.
13) Label	This module allows inserts of text and graphics among the other activities on the course page.
14) Lesson	This module allows a series of pages to be entered. Each page can have a question at the end, and can lead to any other page.
15) Object	This activity module allows easy incorporation of learning objects from a UK materials repository into a <i>Moodle</i> site. The module is provided in this form as a temporary measure. Future versions of it will be rewritten to make them part of the Resource Repository sub-module.
16) Questionnaire	Based on <i>phpESP</i> , this module allows custom surveys to be created.
17) Quiz	This module allows the teacher to design and set quizzes with a wide range of question types.
18) Resources	Resources are content - information the teacher wants to bring into the course.
19) Scheduler	This module allows students to schedule one-on-one time with the teacher.

20) SCORM	A module to load and play SCORM-compliant content packages. Currently supports SCORM 1.2.
21) Survey	The Survey module provides a number of verified survey instruments that have been found useful in assessing and stimulating online learning.
22) TUI	The Test of Unconscious Identification is a psychological test. Tests of this kind are popular in current psychology.
23) WebWork	This is a collection of scripts in PHP and Perl to allow <i>Moodle</i> to communicate with <i>WeBWork</i> , a system for testing mathematics. The installation is currently recommended for advanced users only.
24) Wiki	Implements wiki pages as a <i>Moodle</i> activity. Based on the <i>ErfurtWiki</i> library.
25) Workshop	A Workshop is a peer assessment activity with a huge array of options. It allows participants to assess each other's projects, as well as exemplar projects.

Conclusions

Utilisation of OSS in the education system, especially in DE, has rapidly gained momentum throughout the world, and it is now a convenient time to introduce and utilise OSS-based distance education in the Asian context. We recommend the need to:

1. foster wide utilisation of OSS for DE across Asia, and specifically among the partner countries in this project;
2. to develop policy documentation for using OSS in DE;
3. conduct research into the use of OSS in DE;
4. learn from the best practices of using OSS for DE in other parts of the world;
5. conduct tests with specific groups and create a replicable model for introducing OSS-based DE;
6. customise OSS-based DE systems to the Asian situation;
7. organise training for teachers and tutors, to provide them with the technological skill for developing OSS-based DE; and
8. foster active collaboration between professional, academic and educational organisations in developing OSS-based DE systems.

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Chapter 6

Innovative ICTs in the ASEAN Region: taking advantage of technological ubiquity

Felix Librero

Introduction

The major topics for discussion in this Symposium are broad and cover a wide range of concerns requiring separate full dissertations. I shall address some of the innovative uses of information and communication technology (ICT) in the region. Much of the information I will share with you deals with educational concerns due in large measure to our experiences at the University of the Philippines Open University (UPOU) in the use of short message service (SMS) technology, a very popular component of mobile telephony.

SMS technology, whether through cell-phones or personal digital assistants (PDAs), is a worldwide phenomenon. It has caught on so rapidly among educators the world over that within a period of about five years from the time the concept became an educational talking point, mobile learning using telephony has shifted from a merely theoretical discussion to actual project implementation. In Europe, tests have been conducted at the Institute of Education, Learning and Skills Development Agency, and the National Research and Development Centre for Adult Literacy in the UK. On the basis of these experiences, the following lessons have been learnt (Stead, 2005):

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- a) Mobile learning works, and reaches places other learning cannot. It empowers and engages the learner; the learner is more comfortable engaging in private and personal subject areas using a mobile device compared to traditional methods.
- b) It is best used as part of a blended learning strategy. Use of mobile devices in combination with group activities, paper-based materials, other ICTs, and the things teachers and tutors usually do has been found most effective.
- c) It is a collection of pieces to be fitted to a learning need, not a single solution. Mobile learning is a collection of technologies and devices in a teacher's tool box. These tools include text messaging, audio-based technologies such as *iPod*, MP3 players; learning modules on PDAs, materials from camera 'phones, and online materials such as blogs.
- d) Mobile ICTs are not just for one-way teaching, but for creating, collaborating, and communicating. This mix has been found to be useful and effective with most learners, particularly those who have dropped out of school.
- e) Mobile learning can be bridged into ICT. Many individuals, particularly those who have dropped out from school or are socially disadvantaged and have not learned basic skills in the use of ICTs, do not have the confidence to use them. Exposed to mobile learning tools, however, they seek additional information and skills to use other ICT-related tasks such as word-processing and using the Internet. Mobile learning can lead to more sophisticated uses of technology.
- f) Practice makes perfect, just do it. m-learning can be fitted into one's teaching strategy through actual use, because the need for technical understanding is minimal and the ability to use the technology is learned "on the job." This does not imply that one needs to undertake formal training in m-learning methodology before one attempts it. It means that the teacher and learner can get into it together and will actually learn together.

The European experience of m-learning points out that it is powerful for disadvantaged sectors of society. Similar experiences have been recorded in North America and in Asia. By and large, the discourse on SMS technology in education has been focused on its potentials. In Southeast Asia, however, particularly in Thailand and the Philippines, specific projects have been undertaken and major educational experiences have been recorded. In Thailand, m-learning has proved useful as a means to conduct tests of student performance on specific subject matter (Whattananarong, 2006). In a Thai experiment, for example, it was found that students who took the test by mobile methods performed comparably with students who did so by conventional methods.

The proportional use of mobile telephony for education is not well recorded in the literature. There is a voluminous amount of informal knowledge about the practical uses of mobile telephony in universities. In most Asian universities, both open and traditional, cell-phones are increasingly used to inform students on a variety of education-related topics. The activities for which cell-phones are extensively used can be classified into three groups (Suplido, Bonito, Escubio, and Mariano, 2003).

- 1) In academic matters, cell-phones using SMS techniques are used to announce lecture alerts (changes of schedule), schedules of focus group discussions, examination reminders, deadlines for projects and papers, new courses, grades, schedules for consultation, availability of library resources, and so on. These activities usually involve extensive interaction between the teachers and students, as in consultations about course requirements.
- 2) In extra-curricular matters, student groups and organisations use the cell-phone to promote activities such as job fairs, social affairs, and discount opportunities, and in text-voting during student council elections.
- 3) In administrative matters, the following details have always been available over the 'phone: university admissions, fees, university-wide activities, availability of scholarship grants, marketing campaigns, study surveys and policies, alerts to parents/ guardians on students' performance, emergency information such as bad weather alerts and suspension of classes.

In general, mobile telephony, particularly SMS technology, is a powerful information dissemination tool due to the following features (W2Wave.com):

- It saves time. You can contact hundreds of individuals instantly.
- It reduces costs. You can contact individuals for a fraction of the cost of voice calls.
- You can communicate with anybody, anywhere.
- It provides for two-way communication.
- It is highly interactive.
- It provides a direct response mechanism.
- Cell-phones are effective promotional tools.
- Individuals can read messages in their own time.

To pursue the social development potential of mobile learning using SMS technology, the IDRC's PANdora initiative has undertaken a comprehensive study in the Philippines and Mongolia. This project, (*Viability of Mobile SMS Technologies for Non-Formal Distance Learning in Asia: see Chapter 7*), seeks to determine the utility of SMS technology as a basic tool in non-formal education. It is based on the m-learning experiences of the University of the Philippines Open University (UPOU). The project seeks to determine specific answers to the following questions (Ramos, 2006):

- 1) How feasible is it to use SMS for nonformal distance education (DE)?
- 2) What are the factors that motivate or hinder people in using SMS for DE?
- 3) What are the best marketing, design and instructional design strategies for promoting, attracting, and sustaining SMS-enabled DE programs?

The Ubiquity of SMS Technology

The cell-phone is one of the most successful technologies of the past two decades, and continues to grow at an unprecedented rate worldwide. The global growth of mobile telephony is indicated in [Table 1](#).

[Table 1](#). Projected global mobile penetration levels.

Continent (%)	2005	2006	2007 (%)	2008
Western Europe	101.4	106.3	108.9	110.3
North America	67.6	74.0	79.4	83.7
Eastern Europe	63.6	74.3	79.3	82.8
Latin America	43.3	50.7	53.3	55.0
Middle East	38.0	45.4	50.9	54.5
Asia/Pacific & Japan	22.5	26.2	30.0	33.9
Africa	21.0	27.3	32.2	36.0

Source: Taaffe (2006)

In the Philippines, a relatively high percentage of the population has cell-phone access because it is low cost, has easy connectivity, is used on a very personal level, and is capable of getting the user's attention at any time. The Philippines is widely touted as the texting capital of the world due to the fact that the daily volume of text transmissions is extremely large. Currently, the largest proportion of users of cell-phones for text messaging is comprised of low-income groups such as students, daily wage earners, market vendors, drivers of passenger vehicles, barbers, beauty parlour workers, ambulant vendors, domestic helpers, and, of course, criminal elements. Frequently, these people own more expensive models than those used by professionals such as university professors!

The ubiquity of the cell-phone in the Philippines cannot be overstated. It really is all over the place, from the President of the country to the lowest-paid office clerk in a small government office. It is the major means of social communication in the country today. When you send short messages, you do so asynchronously, so that before you actually send the message you can reflect on it first. When you reply to an SMS message, you can do it at any time, at your convenience, and you can reply privately, even send your message anonymously. All considered, SMS technology caters to the Filipinos' cultural tendency to be non-confrontational in their communication actions. In view of these clearly positive features, it was considered that the technology might be useful in information dissemination and mass education. This is the rationale behind UPOU's m-Learning project.

The 700UPOU Experience

In February 2003, we at the UP Open University, launched a mobile Learning (m-learning) project in collaboration with SMART Communications, Inc., a major cell-phone service provider in the country. The project is called TXT 700UPOU, and essentially uses SMS technology to provide educational materials to people “on the go” (Suplido, Bonito, Escubio & Mariano, 2003).

The UPOU m-learning project has the following guiding principles:

- a) Authentic communication is achievable. SMS technology is able to provide service with no technology access barriers, no training necessary, faster response time, with automated responses from tutors if necessary. In addition, learners can find it easier to ask or respond to questions through texting.
- b) Learner autonomy is possible. The hardware needed is personally owned and does not have to be shared. Learning can take place outside of work hours and can take place during “unproductive” work times. The learner is not tied down by the need to access other technologies, and the technology can be adapted to people with special needs. Furthermore, the use of this novel technology for learning provides a motivational stimulus for learners.
- c) There is opportunity for student reflection. With SMS technology, the learner is able to take time to respond to the questions and issues raised. A feature of SMS technology that seems to be a limiting factor is the number of text characters that can be transmitted at a time. This can force the learner to prioritise his messages, however, possibly promoting higher-order thinking.

The m-learning model. Six principles govern the development of modules in the UPOU m-learning program.

- 1) Topics are identified with popular appeal. Given the typical uses to which cell-phones are put in the Philippines, it was decided that topics of general interest would be selected for the project.

- 2) The specific topics for which m-learning modules have been developed include mental math, spelling (English), use of English idioms, healthy lifestyle, nutrition, physical exercise, smoking cessation, and stress. All of the modules were designed to include: learning objectives, units of instruction leading to the achievement of objectives, and assessment measuring achievement of the objective.
- 3) Pre-test materials are developed for learners to try out to assess their knowledge. Text messages transmitted to users (texters) encourage them to test their knowledge on particular topics, and to obtain and study UPOU modules in order to learn what they don’t know.
- 4) Learners are informed of the importance of further study on particular topics. They are encouraged to learn more about the topic because it is information that they will find useful in the future.
- 5) Handy, small-size manuals are printed that the learner can use to study at his/ her own pace. These refer to the modules that discuss the subject matter in more detail.
- 6) Post-tests are developed.

Instructional design considerations. In developing the mobile modules, UPOU instructional designers were guided by the need for:

- a) *Accessibility.* Course materials were designed for use by a diverse audience, so that there would be no restriction on who might be allowed to take the courses, considering on the broad demographics of cell-phone users, and the technology’s accessibility to groups previously excluded from the courses.
- b) *Interactivity.* There should be points of automated interaction between the user and teacher for drill and practice, and personal interaction for feedback and consultancies.

- c) *Usefulness*. The materials' content must be useful to the user; but mere assumption of its usefulness is not sufficient to ensure that the user will seek the information. The presentation of the information must be appealing, in order to get the user's attention and interest. Ultimately, the user will use the information when s/he has learned it.
- d) *Unobtrusiveness*. Teaching/learning episodes must be delivered in short capsules, so that the learner considers them to be part and parcel of the things they normally do.
- e) *Immediacy*. Instant feedback should be possible, whether automated or personal.
- f) *Adaptability*. A learner proceeds at his/her own pace and can skip or repeat some parts of a module depending on specific needs.
- g) *Ease of use*. Menus and commands employed should not be complicated, but easy to follow.
- h) *Privacy*. The learner maintains privacy throughout the program, to avoid the stigma of non-performance and to minimise fear of making mistakes in public.
- i) *Suitability*. SMS technology can deliver materials through various options. The advances in mobile communications should be exploited to provide materials developed in various formats.

Instructional design limitations in using SMS technology

There are numerous positive aspects of SMS technology that favor good instructional design. There are equally numerous negative aspects, however. For example, the basic Generation-1 cell-phone has a small screen, small keypad, some phones have monochromatic screens, and text messages are usually limited to 160 characters. In addition, there is no point-and-click navigation option, the acceptability of text spelling and grammar in an academic setting is questionable, there are limited many-to-many points of interaction (cell-phones are more suitable for independent learning), learners cannot use the cell-phone to track down their

own progress, multimedia (MMS) cell-phone users in the Philippines are still relatively few in number, and face-to-face interaction is an option available only to those with 3G cell-phones.

How does cell-phone learning work? Here is a typical situation. A student may be sitting on the bus from residence to work or business or school. He is waiting to get to the bus stop where he must get off. There is enough time to take out the cell-phone and to key in "7008768" (or "700UPOU"). This yields an auto-response asking what information is requested from UPOU. The user ticks m-learning. In return, he is given a selection of topics, ticks the topic of choice, and sends the request. The next message received is a set of matching-type questions requiring responses. After this brief diagnostic test, the evaluation result appears. If the user has passed the diagnostic test, congratulations are given. Otherwise, encouragement to read up on the topic is given. The title of a pocket-sized print material on the topic is provided, and information about how to obtain this from UPOU. The module may cost 50 pesos, or one US dollar. After reviewing the print material, the learner may decide to take the diagnostic test again, and would probably pass it. Next, a certification from the UPOU can be requested, indicating a pass on the diagnostic test for that particular topic. The learner can do this for a wide range of topics that have been developed to this point.

From the beginning, UPOU's partner in this innovative use of cell-phones for educational purposes has been SMART Communications, Inc., a subsidiary of the Philippine Long Distance Telephone Company. SMART's main role has been to provide the delivery system and marketing, through text broadcasts to its subscribers. UPOU's role has been to develop the materials and to program them for delivery through SMS technology. In the first 12 months of the project, 700UPOU received 9,000 inquiries, rather less than expected. This may be due largely to flawed marketing of the project. There are many things that need to be fixed in the project, both in the University and the telephone company, and we are looking into the possibility of reviving and improving it.

Issues that need to be addressed. The UPOU experience has highlighted the following concerns:

- a) Course developers, instructional designers, tutors, and learners have to design their questions and responses to the 160-character cell-phone limit.
- b) The telco selected as partner in this kind of project must be reliable: i.e. must be able to provide the service 24/7.
- c) There is a need for in-house technical support capability, especially if programming support is not provided by the telco. In the UPOU experience, the telco has merely provided infrastructure and some marketing support.
- d) There is a need to harness the strengths of MMS which, if designed correctly, could address the learners' multiple intelligences. For example, picture messages could be used to illustrate mathematical concepts for visual learners.
- e) There is a serious need to promote m-learning projects using SMS, given the users' conventional perception that the SMS technology is something they can only use for entertainment and personal communication.

Some Lessons Learned

- 1) The individual uses the cell-phone generally for purposes other than getting educated, which seems to be an unplanned and unintended outcome.
- 2) Getting the cell-phone user interested in educational content largely depends on the creativity of the instructional designers. A user must not sense an attempt to "lecture", but must be glued to the content. This may be achieved by employing content treatment techniques and instructional design techniques that are appealing.
- 3) The user is especially likely to terminate an unenjoyable SMS activity in view of the fact that it costs money. An appropriate question is, why are texters actually willing to spend money for messages that they forward to friends, and yet unwilling to spend to access knowledge that they need to study?

- 4) Cell-phone users must feel the urgent need to access, on their own volition, information by responding to the messages they receive. If not, they will not easily respond to broadcast messages, because this also means that they have to pay for the responses they make. In this situation, broadcasting a text message is probably more useful for two reasons: 1) the user is not spending to access the information; and 2) the user is receiving the information automatically whether s/he likes it or not. The hope, of course, is that the user will become more interested in the topic, and will seek more information voluntarily, by sending the appropriate response message.
- 5) SMS technology is an effective tool for public information campaigns, specifically through text broadcasts where the information is initially received passively rather than sought actively. Succeeding communication experiences will be dictated by the influence of the initial information on the receiver. The subscriber who receives the initial information may decide to seek more or simply ignore it.

The UPOU experience has confirmed out that SMS technology can be a powerful tool in information dissemination, and not merely in formal education. There is wisdom in testing this concept on a regional level, where the impact of SMS can be magnified. The next section of the paper, therefore, illustrates this by proposing a regional SMS-based information campaign on a current priority issue for the ASEAN nations, avian 'flu.

Information Campaign on Avian 'Flu Through SMS Technology

It is hereby proposed that a regional information campaign on avian 'flu be undertaken with the following features and components:

- Campaign goal. The overall campaign goal should be to inform and educate the ASEAN public about the causes, control measures, and cure for the avian 'flu.

- Coordinating agency. The ASEAN Foundation could serve as the regional coordinator for such a project, responsible for designing the regional information campaign and for generating the funding resources required.
- Country participation. All ASEAN countries should ultimately be involved in the campaign. There should be a focal agency to coordinate all activities relating to the campaign in each of the countries. As well as the focal agency, telcos should be involved to provide the channels through which information is disseminated.
- Development of information materials. Under the auspices of the ASEAN Foundation, information materials should be designed, developed, and produced for distribution to the focal points and participating telcos.
- Basic strategy. Short messages on avian 'flu should be composed, programmed, and broadcast regularly to cell-phone users in all countries of the region.
- Role of the telcos. The telcos should agree on specific software to be used in the dissemination of information. This should have the capability of broadcasting text messages to the telco subscribers.

General procedure. Implementation of the regional information campaign should follow the following general procedure:

- 1) In general, the regional information campaign would be organised and implemented under the auspices of the ASEAN Foundation. The Foundation would liaise with governments in identifying national agencies to serve as focal points of the campaign. It is suggested that the focal points should be information agencies in the member countries.
- 2) The ASEAN Foundation should appoint a regional campaign planning and management team responsible for the implementation of the campaign.

- 3) The regional information campaign should be undertaken using SMS technology.
- 4) Information materials should be developed and distributed to focal points and telcos participating in the campaign. These materials should be in the form of text messages broadcast to all subscribers of the participating telcos. Content of these text broadcasts should include general information about avian 'flu, outbreaks in specific regions, procedures being following to prevent the spread of avian 'flu, and other important pieces of information that the public ought to have.
- 5) The information campaign's planning and management team should implement an evaluation of the project, and recommend future action to be taken. A suggested evaluation model shall is process documentation.

The unfulfilled promise of cell-phone technology in social development is enormous. It is proposed that the ASEAN Foundation should take advantage of this technological revolution by organising a team to prepare a detailed project document for an ASEAN regional information campaign about avian 'flu.

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Chapter 7

Viability of SMS Technologies for Non-Formal Distance Education

Angelo Juan O. Ramos, Jerome Trinona & David Lambert

Introduction

One and a half billion people around the world, are walking around with powerful computers in their pockets and purses. Today's high-end cell-phones have the computing power of a mid-1990s personal computer, while consuming only one one-hundredth of the energy. Most users, however, do not seem to realise the vast potential of the cell-phone for education, or for the communication function for which it was originally designed. Most educators, on the other hand, still see the computer and the cell-phone as very different devices, with the tiny cell-phone being a much more personal and ubiquitous accessory, especially among young people. But with dropping prices and increasing functionality, it is virtually certain that not too far into the future, all students will have a cell-phone. This is enough reason and motivation for educators to explore the possibility of making the cell-phone as an important tool in the educational systems of developed and even developing countries.

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Mobile Learning and the Cell-phone

Whereas e-learning delivers educational content via the Personal Computer (PC) and the Internet, m-learning takes this further by making online learning content available anywhere in the world through portable, mobile devices such as laptop PCs, Personal Digital Assistants (PDA), the cell-phone, and the *Smartphone* (PDA and cell-phone hybrid). Most of these efforts, however, focus on content that caters to the formal education sector, and tends to use more advanced functions such as multimedia messaging services (MMS), Java applications, GPRS (General Packet Radio Service) for fast mobile Internet connections, and Bluetooth technology for establishing remote connections. In Japan, telecoms companies such as NTT-DoComo's *Pocket Eijiro*, an English language dictionary site, receives more than 100,000 hits per day. Costing \$1.53 per month plus tax and service charges, it is the 4th most popular online site accessed by Japanese users through the cell-phone. In the United States, companies such as the Princeton Review are already offering cell-phone-delivered test questions for scholastic achievement tests. In the Philippines, Short Messaging Services (SMS) remain the most utilised service for most cell-phone users, despite the introduction of more advanced cell-phone technologies.

Cell-phone operators constantly come up with innovative break-through services, such as multimedia and Java applications, online games, lotteries and downloads. Such operators fall short of delivering educational content to their millions of subscribers, however. Currently, there are limited efforts to use and integrate the cell-phone and SMS into education. So far, the UP Open University offers SMS-based mobile courses in English, math and sciences (see *Chapter 6*). This initiative, however, is still directed towards the formal education sector. The *Text-2-Teach* program supported by the Philippines' Department of Education utilises SMS, but only goes as far as to provide a way for educators to request educational content to be delivered to them, not by SMS but by satellite television.

The Molave Development Foundation (MDFI) is spear-heading a research study to determine the feasibility of using SMS techniques in non-formal education. This research, among others, is examining the socioeconomic and gender-based factors that motivate or hinder cell-phone subscribers to use SMS for non-formal education.

The project, called *Viability of Mobile SMS Technologies for Non-formal Distance Learning in Asia* is a component of the mega-project dubbed PAN-DORA, or Pan Asia Networking Distance and Open Resource Access.

The MDFI is the lead agency for this research project, in a partnership with two organisations in Mongolia; the English for Special Purposes Foundation (ESPF) and the Health Sciences University of Mongolia (HSUM), both based in Ulaanbaatar, as well as the Alternative Learning Services, in the Department of Education of the Government of the Philippines.

Project Activities and Updates

Launched just one year ago, in 2005, the Philippines section of the project has already completed major activities.

1) Preparation and formative evaluation

- Inventory of equipment and personnel: because of MDFI's experience in running various development and research projects, its staff has been trained and has developed the capacity and knowledge to run the research.
- Training and capacity-building: activities handled by the team have involved developing the capabilities and knowledge of stakeholders through activities such as seminars and training-of-trainers workshops.
- Research methods: MDFI has experience in social development research, having successfully conducted a previous IDRC-funded project on "ICT and Distance Learning for Water and Sanitation".
- ICT-enabled learning materials development: MDFI has developed previous interactive and multimedia-rich learning modules for health education and hygiene promotion.

MDFI also has a pool of consultants and experts who can assist in the conduct of the research as needed for:

- research design;
- database systems development and management;
- technical writers; and
- instructional design experts.

Selection of Equipment

The team explored various technical options in order to come up with a viable and cost-effective system for delivering educational content via SMS.

Cell-phone Operators. Philippine cell-phone service operators have various services and technologies that can be used by the project. These services, however, are primarily designed for profit and commercial purposes. A typical SMS costs one peso. The existing telco business model would require the users (in this case, the students) to pay more than twice the usual SMS rates: 2.50 pesos, or US 5 cents. It might become a burden to the students if the project were to proceed under this arrangement.

Locally-installed Cell-phone Systems. The project has considered developing its own system whereby cell-phone would be interfaced with the personal computer, along with open-source or proprietary GSM software to facilitate the exchange of data and learning between the server and student. This possibility is being explored. The project is also looking at a more automated and user-friendly approach, both for the students and the projects' administrators.

GSM Data Terminal. The MDFI team has met with representatives of the Applied Science Technology Institute of the Department of Science & Technology (ASTI-DOST), and has examined a hardware and software solution they have developed called the GSM Data Terminal. This is a viable and efficient option for the project. The GSM Data Terminal is a PC card unit that is installed in a computer's card slot to send and receive SMS messages. The software can be customised according to the user's needs, as in setting up algorithms for a learning management system (LMS). The Mongolian research partners are also considering using this system.

Surveys, Focus Group Discussions, and Interviews

Situational and Stakeholder Analysis

Baseline Study. A total of 123 ALS students from the six districts of Manila (aged from 12 - 48) participated in the survey through questionnaires administered through the Teacher Community Coordinators (TCCs) of ALS. The baseline survey was conducted to get an initial assessment of the student's learning preferences, as well as their "texting" and cell-phone usage. The survey data were collated and analysed using *Epi Info 6.0* and *Microsoft Excel*.

Age and Gender Distribution

- 52% of the sample are male and 48% female;
- the predominant ages for men and women are 12 - 48 and 14 - 36 respectively;
- the oldest respondent was 48, and the youngest 12;
- the majority of males were aged from 15 to 23, and the majority of females from 15 - 19; and
- the men's mean age is 19 and the women's is 19.3.

Weekly Income of Breadwinners

- 49% earn at least 550 pesos per week;
- 7% earn 250 - 549 pesos per week;
- 6% earn less than 250 pesos per week; and
- 38% are unaware of their household's weekly income.

Family's source of income

- 45% are employed with private firms or government;
- 18 % are self-employed with their own business;
- 10% are vendors;
- 7% are drivers; and
- 2% are unemployed.

Educational Level

- 82% of total respondents have reached secondary level;
- 31% have reached 1st year high school;
- 25% have reached 3rd year high school; and
- 24% have reached 2nd year high school.

Reasons for dropping out of formal education

- 36% of respondents dropped out of school for financial reasons;
- 16% had to work;
- 4% stated that they have no time to study; and
- 44% have other reasons; the majority of this group (31 responses) said that they stopped going to school because they want to spend more time with friends.

Cell-phone Usage and SMS Preferences

- 36% have 2 cell-phones per household;
- 24% have 3 cell-phones per household;
- 24% have at least 4 cell-phones per household; and
- 16% have 1 cell-phone per household.

Percentage of Cell-phone load (credits) allocated to SMS

The majority of respondents (81%) allocates at least half of their prepaid cell-phone credits to SMS usage.

- 41% of respondents allocate 51-70% of their load credits to SMS use;
- 28% allocate at least 71% of their load credits to SMS;
- 12% allocate 50% of their load credits to SMS;
- 12% allocate 20% of their load credits or lower to SMS; and
- 7% allocate 21-49% of their load credits to SMS.

Do students want to learn through SMS?

Eighty per cent of the sample is open to the idea of learning through SMS. Twenty per cent state that they are not

Does the sample want to allocate part of their SMS load to learning?

The majority of respondents (81%) said that they would set aside a portion of their load credits to learn through SMS. Sixteen per cent said they would not. Three per cent was unsure.

What subjects do they prefer to learn via SMS?

- Math is the most preferred subject for the SMS format (34%), followed by English (30%) and Science (20%);
- Male respondents prefer Math (20%) over English (14%) and Science (13%);
- Female respondents prefer English (16%) over Math (15%) and Science (7%);
- 12-19 year olds prefer Math (24%) over English (20%) and Science (20%); and
- 20-27 year olds prefer Math (19%) over English (11%).

Consultative Meeting with Key Experts

MDFI has organised a consultative meeting with teachers and instructional designers from the Alternative Learning Services (ALS), and with research experts. This is the second part of a series of meetings in the preparation and development of learning contents for the SMS project. During the meeting, the following issues were brought up by the participants, considered important in the preparation of SMS-based learning content.

Information and Content:

- How using SMS in DE might affect or further contribute to the deterioration of English writing and reading skills;
- the educational levels of Learners who will use SMS; and
- limitations regarding the information that can be communicated through text messaging

Technology issues: signal problems and message errors:

- objectives and values;
- suitability of SMS for disabled clients;
- limitations in social interaction;
- alignment of SMS content to student learning competencies; and
- proper use of the SMS load for the purpose of the study.

Processes:

- If a client does not answer the question correctly, how can he or she receive clarification? and
- what steps are taken when a client backs out of the research (attrition)?

Staffing and Skills:

- the SMS model to be incorporated in the training of ALS implementers/ facilitators; and
- training to advance knowledge on instructional design.

Management & Structures:

- Content and design of materials will be collated and handled by ALS; and
- MDFI will design and handle the technology and the research aspect.

The Focus Group Discussions

A focus group discussion (FGD) on learning needs and SMS usage was conducted with a group of 5 women and 3 men aged from 19 to 30, all currently enrolled in the Functional Literacy Program of the Alternative Learning Services (ALS). The FGD was conducted in March 2006, at the ALS office in P. Gomez Elementary School, Manila. A facilitator from MDFI led the discussion, gathering responses from the participants using a set of prepared questions. The FGD found that:

- all of the participants have cell-phones;
- all of the participants are SMS users;
- everyone agrees that SMS is a cheaper way to communicate with friends and loved ones, and an important communication tool for work and business;
- all of the participants agree with the idea of learning through SMS;
- learning ALS through SMS would be very convenient if it allow learners to be with their family or at work while learning;

- the costs of transportation saved by using SMS can be reallocated to the SMS load used for learning;
- people want to learn subjects such as Math and English because this will allow them to get a high-school degree and find better jobs; and
- there was no observed difference between the men and women in their opinions regarding these preferences.

As an additional activity, each participant was asked to select five modules of interest to them, from the 292 existing secondary level modules used by ALS. These choices indicated the following learning preferences:

- communication skills: modules on English speaking and grammar; and
- critical thinking and problem-solving: modules on Business Math, and practical applications of Math.

Further focus groups have been conducted with people who meet with foreigners in the course of their work and need to be able to speak and understand some English. A preliminary list of such people included taxi drivers, shop assistants, teachers, bank tellers, waiters, and hotel staff. The team decided to target bank tellers and waiters. A list of questions was generated for the focus groups on two topics: 1) the participants' use of cell-phones and familiarity with SMS Text Messaging; 2) their need for English in their work, command of the language, and problems faced in learning English. Meanwhile, the Mongolian partner in the project (HSUM), used the same set of questions for two focus groups with 10 doctors and nurses in Ulaanbaatar, and 10 doctors and nurses in Bayankhongor, a remote area of western Mongolia. The overall participation in this round of focus groups included 21 bank tellers, 20 waiters, and 20 doctors/nurses. It was found that:

- all the participants have cell-phones;
- SMS messaging is very popular as it is cheaper than making regular 'phone calls;
- there is some resistance to sending SMS message as people find it difficult to use the keypad;
- the use of cell-phones for personal reasons during work is banned for bank tellers and waiters;

- the majority of the participants feels their English is poor;
- they all agree that knowledge of English would help them in their work, and that a good command of English would improve their job prospects;
- learning English is difficult for many of them because of the cost of courses, and conflict with their work schedules;
- bank tellers need English to communicate with foreigners and with the Bank directors who are mostly foreigners;
- there is a strong desire and motivation in almost all of the participants to learn English;
- the waiters and bank tellers need appropriate professional vocabulary and style, and social English; and
- the majority feels that it would be possible to learn English with SMS messaging as a key component of a course, and were attracted by the idea.

Preparation of Learning Content

Based on the above findings, the MDFI and ALS are now in the process of designing learning materials for pilot testing. The ESPF team has decided that SMS messaging will be a key element in an English course that will also include a workbook, dictionary and audio-cassette. The relationship between the SMS messages and the workbook is seen as important. The program has been designed so that the workbook materials need the SMS material for full comprehension messages, and for it to be possible to complete the required exercises. In general, the course is designed to simulate the process of learning English through SMS messaging, as follows:

- the participants are assembled in a classroom with a teacher/ facilitator (T/F);
- the participants work separately but can discuss the exercises together if they wish;
- the T/F gives each participant their first “message” on a card. The “message” gives information that is essential for them to be able to do a particular workbook task, and directs them to the relevant page;
- the participants do the task and take their workbook to the T/F to be checked. The T/F indicates which parts of the task are right/ wrong. If the exercise is all correct the participant is given the next “message”. If there are
-

- mistakes in the first task, the participant returns to their desk to try to correct them;
- the dictionary gives vocabulary for each task; and
- each student has a cassette on which they can hear the words/sentences spoken;
- they are given instructions on how to interact with the tape in practising the words and sentences. This they do in their own time outside the classroom.

Conclusions

The rapid expansion of mobile ‘phone technologies, and the particular popularity of text-messaging (SMS), offers major opportunities for non-formal education. The current project has examined the appeal of SMS-based learning for a broad range of working individuals in the Philippines and Mongolia, and has found a common enthusiasm for this novel method. The team is now developing a wide range of SMS-based materials to improve the social development potential of this ubiquitous new tool.

Using SMS Methods to Combat Avian 'Flu

Bambang Wijayanto

Across Southeast Asia, the need for disaster preparedness requires technologies that can gather information from, and deliver information alerts to the public at a moment's notice. The tools with the greatest public penetration for this purpose are the cell-phone, the short message systems (SMS) it provides, and the mobile networks that support them. This chapter presents a selection of SMS methods already available for public communication before and during times of social crisis. It illustrates how SMS technology can be the best tool for communicating with the largest population possible, including rural communities and people of different education levels. The current avian 'flu emergency is used to illustrate the range of educational response tools that SMS technology makes available.

We should remind ourselves that we cannot depend on one technology to fight a pandemic, but must blend all the technologies at our disposal (e.g. GSM, Internet (Wimax), PSTN (IVR), and GIS). [Table 1](#) presents the current statistics relating to GSM / Cell-phone technology penetration. The cell-phone technology is now the most accessible of all communication media world-wide. In the ASEAN region, it is used by 60% of all telecommunication users, with greater reach than fixed 'phones and the Internet. [Table 2](#) and [Figure 1](#) indicate the growth over the past decade of cell-phone usage in Indonesia. GSM Mobile Networks are already set up in every country in Asia. [Table 3](#) indicates that, compared to the Internet (WiMax) and public switched telephone networks (PSTN), mobile technology has the advantages of covering vast areas, rural penetration, low operational costs, capability of use anywhere and at any time, and, for that reason, high potential for distance education and monitoring functions.

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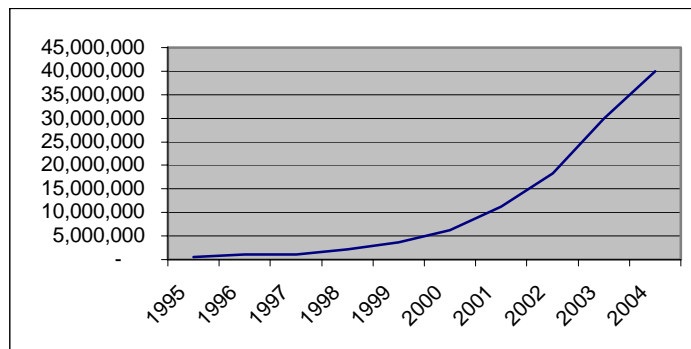
Table 1. International penetration of the cell-phone.

	Internet Users	Cell 'phones	Fixed Phones	Population
Africa	22,103,000	75,892,900	19,476,300	839,300,000
Americas	267,619,700	370,045,500	294,038,900	873,190,000
Asia	311,186,400	710,528,100	537,267,600	3,745,760,000
Europe	255,199,500	571,806,200	279,785,700	801,170,000
Oceania	16,583,500	19,833,800	12,984,900	32,030,000
World	872,692,100	1,748,105,400	1,143,553,700	6,281,460,000
ASEAN Region				
Brunei Darussalam	56,000	137,000	88,400	370,000
Cambodia	41,000	498,400	36,300	498,400,000
Indonesia	14,508,000	30,000,000	9,990,000	222,610,000
Laos	20,900	204,200	75,000	5,790,000
Malaysia	9,878,200	14,611,900	446,300	24,880,000
Myanmar	63,700	92,000	424,900	54,000,000
Philippines	4,400,000	32,935,900	3,437,500	82,650,000
Singapore	2,421,800	3,860,600	1,864,000	4,320,000
Thailand	6,972,000	28,000,000	6,176,000	61,970,000
Vietnam	5,870,000	4,960,000	10,124,900	82,480,000

Table 2. Technology Growth in Indonesia.

	Internet	Cellular	Fixed + Wireless
1996	110,000	563,107	
1997	384,000	1,067,700	-
1998	512,000	1,065,800	-
1999	1,000,000	2,220,900	-
2000	1,900,000	3,669,300	6,019,937
2001	4,200,000	6,222,600	6,636,212
2002	4,500,000	11,300,674	7,338,656
2003	8,080,534	18,549,838	7,807,087
2004	11,226,143	30,000,000	8,139,512
2005	16,000,000	40,000,000	8,209,994

Figure 1. Cell-phone subscribers in Indonesia (1995 – 2004).



The above statistics are from the International Telecommunications Union (2004).

Table 3. Comparison of technology benefits.

Criteria	Internet (WiMax)	PSTN	Mobile Technology
Covers a Vast Area	Low	Medium	High
Users Living in	Big Cities	Cities	Rural
Reliability	High	High	High
Affordability	Low	High	High
Responsiveness	High	Medium	High
Interactivity	Medium	Medium	High
Real-Time	Yes	Yes	Yes
Cross-Border and Cross-Nations	Yes	Yes	Yes
Operational & Maintenance Costs	Very High	High	Low
Anywhere Any time	No	No	Yes
User Skill (Education Level)	High	Low	Low
Skill Development & Maintenance	High	High	Low
Independence	Low	Low	High
As Monitoring/Distance Learning Tools	Yes	No	Yes
Based on Location Technology	No	No	Yes
Multi-Project Ready	No	No	Yes
Penetrates into Private Homes to Increase Campaign Impact	No	No	Yes
Need to determined pandemic location to setup the network	Yes	Yes	No

Mobile Applications

A set of mobile procedures will now be described harnessing the above advantages of mobile technology, by using 'push' and 'pull' techniques.

1) Social Monitoring/ Surveillance.

These applications gather and store text messages from individuals in situations such as an avian 'flu outbreak in their neighborhood. With this information, one could collaborate with key individuals and organisations (e.g, doctors, hospitals) in order to handle the situation. The remote individuals involved in the data collection process will be called *Agents*. Major advantages of this use of mobile technology is the fact that the networks are location-based and use HLR, the home location register by which details of all subscribers in the region are stored in a database. Thus, the sender of a message can be automatically located, and data can be pushed to a GIS (geographic information system) for uploading to a web server.

To be capable of instant recognition by the system, each text message must follow a fixed shorthand format, in which the users have been trained. Here are examples:

a) **Agent registers with service (e.g. ICT4D Collaboratory).**

- **Send SMS**
ICT4D AV AGENTREG [Name]#[Address]#[Edu]#[Job]#[Birthday(MM/DD/YY)]
- **Sample:**
ICT4D AV AGENTREG harry potter # kuala Lumpur # bachelor # teacher # 12/05/77

Automatic reply:

Thank you Mr/s. Harry Potter for assisting with the ICT4D AI surveillance and education campaign. Your help in the effort to prevent AI's spread is much appreciated.

b) **Agent reports a specific Avian 'Flu situation.**

Shorthand keywords such as the following should be used by registered agents only:

- HI = Human Infected
- HD = Human Death
- SI = Suspected Infected
- BD = Bird Death
- BI = Bird Infected
- **Send SMS:**
ICT4D AV AGENT <HI|HD|SI|BD|BI> <Total Number>
<Comment>
- **Sample**
ICT4D AV AGENT BD 55 My bird died suddenly. I think it's AI
- **Automatic Reply**
Your Report has been saved. Thank you for your participation as one of ICT4D's AI surveillance and education agents

c) **Identifying the total number of registered agents.**

- **Send SMS:**
ICT4D AV AGENT TOTAL
- **Sample**
ICT4D AV AGENT TOTAL
- **Automatic Tally:**

The total of registered Agents for the ICT4D AI surveillance and education project is : xxxxx people.

d) **Providing support to agents.**

This sub-module monitors agents' requests for support, and takes advantage of the fact that the network contains experts

with many specialisations (doctors, social workers, etc). The agent uses specific request keywords such as:

- Health = a health-related issue
- SOS = emergency circumstances (e.g. sudden death of hundreds of birds)
- EDU = requesting support material from the expert mentor.

The agent's message is routed to an appropriate expert of helpdesk with no charge, so that an answer or comment can sent back to with maximal speed.

- **Send SMS:**
ICT4D AV AGENT SUPPORT [HEALTH/SOS/EDU]
<Comment>
- **Sample**
ICT4D AV AGENT SUPPORT EDU Are there marks on an infected bird? Does it become green?
- **Immediate Reply**
Your request for support has been passed on to an expert, who will follow up on it as soon as possible.
- **Rerouted message:**
From +628567123999: Are there marks on an infected bird? Does it become green?
- **Reply:**
If the question is unique, a manual reply (text or voice) may be given. If a database of 'frequently asked questions' has been assembled, the reply may be automatic.

2) Constructing Mobile Knowledge-Based Systems.

The sub-application that collects information and requests from the public/ agents re-routes it appropriately, is a *knowledge-based system*, arranged in terms of keywords such as INFO, STATISTIC, HELP, etc. Based on the cumulative information received by the system, selected agents can receive **mobile alerts**, and instructions in functions about which they have been trained or warned, such as

functions about which they have been trained or warned, such as exterminating the birds they own. The message 'push' system can be used region by region, or in specific areas infected by the avian 'flu virus.

a) **Requesting Referring Hospital Information.**

- **Send SMS:**
ICT4D AV HOSPITAL <Districts|Optionally>
- **Sample**
ICT4D AV HOSPITAL
- **Automatic Reply**
RS. Persahabatan Jakarta Timur DKI
RS. Tarakan Jakarta Utara DKI

b) **Requesting a Avian 'Flu Statistics Report.**

- **Send SMS:**
ICT4D AV STAT <Districts|Optionally>
- **Sample**
ICT4D AV STAT <Districts|Optionally>
- **Automatic Reply**
Statistic for AV:
HD:1
HI:10
BD:200

c) **Requesting Avian 'Flu Updates.**

- **Send SMS:**
ICT4D AV INFO
- **Sample:**
ICT4D AV INFO

- **Automatic Reply:**
Do you know that on 2 February 2005, the first of four human cases of H5N1 infection from Cambodia were reported?
- d) Providing Avian 'Flu Updates.**
(registered agents only)
- **Send SMS:**
ICT4D AV INFO ADD <Information>
 - **Sample:**
ICT4D AV INFO ADD On 21 July 2005, the first human case of H5N1 in Indonesia was reported.
 - **Automatic Reply:**
Thank you Mr/s. Harry Potter for your information and participation as one of ICT4D's AI surveillance and education agents
- d) Requesting Tips for Fighting Avian 'Flu.**
- **Send SMS:**
ICT4D AV TIPS
 - **Sample**
ICT4D AV TIPS
 - **Automatic Reply**
Indication of AV suspected is : bla bla bla.
- e) Requesting Related ICT4D Information.**
- **Send SMS:**
ICT4D INFO
 - **Sample:**
ICT4D INFO
 - **Automatic Reply:**

ICT4D held a symposium at the Sari Pan Pacific Hotel, Jakarta, attended by delegates from 12 nations.

3) Mobile Donations.

A major advantage of using mobile data applications is that they can be used within a micro-payment system to develop a mobile donation function. The system must be audited regularly to maintain donors' trust.

a) **Donate Money to the AI Campaign.**

- **Send SMS:**
ICT4D AV DONATE <2500/5000/10000/Free Amount>
- **Sample**
ICT4D AV DONATE 2500
- **Automatic Reply**
Thank you for your donation to the Avian Influenza Campaign. Your account is credited with: Rp. 2,500.

4) Mobile Coordination.

Applications are available to support the coordination efficiency amount of the campaign team members. With these tools, information gaps can be minimised.

5) Mobile Polling.

Interactive applications are available to 'dig' information from the public on avian 'flu related issues. These tools include statistical support. The polling is made possible by cross-tabulating the person's information with an ID number in an existing or external database.

- #### a) **Requesting a Polling Question** (the person wishes to assist in the current poll).

- **Send SMS:**
ICT4D AV POOL Q
 - **Sample:**
ICT4D AV POOL Q
 - **Automatic Reply:**
Avian 'flu is not a real pandemic but a false alarm
:
A. Agree
B. Doubt
C. Disagree
D. Don't Know
- b) Responding to the Poll.**
- **Send SMS:**
ICT4D AV POOL A/B/C/D
 - **Sample:**
ICT4D AV POOL A
 - **Automatic Reply:**
Thank you for your participation for ICT4D Poll. Your response is saved in our database. To view the current results, send [ICT4D] [POOL] [STAT]
- c) Viewing the Current Poll Results.**
- **Send SMS:**
ICT4D AV Stat
 - **Sample**
ICT4D AV Stat
 - **Automatic Reply:**
STAT:
Avian 'flu is not a real pandemic but a false alarm
212 people have voted on this:
Agree (50%); Doubt (20%); Disagree (30%);
Don't know (0%).

7) Mobile Auto Reply/ Adaptive.

This application is integrated with almost all sub-system of the mobile data application, so that any messages sender will always received some kind of reply from from the system, with tagline promotion, and information.

8) Mobile Scheduled Broadcasts

Applications can be used to control a broadcast on a pre-determined schedule. One can set up the broadcast for a specific group, area, or time.

Conclusions

There are unlimited possibilities for harnessing current cell-phone applications for public education, information, and surveillance in social development and disaster contexts. The simple prototype offered in this chapter is just one example of the potential use of mobile technology in support of an avian 'flu surveillance and education project.

Instructional Design Training for ICT-Based Distance Learning In Asia

Felix Librero

Introduction

Ironically, one of the most neglected aspects of educational delivery is the design of the content itself. Copious amounts of information are available in the principles of effective educational design, though it seems likely that these are rarely considered in the day-to-day preparation of educational materials. The primary objective of the current project was to ascertain the needs of DE institutions, faculty members and materials developers for training in instructional design across domain/discipline areas and media types. A training needs survey was conducted to determine:

- 1) the main responsibilities of the faculty and staff members performing instructional design tasks;
- 2) whether or not instructional designers in the open universities involved have had formal training in instructional design;
- 3) the types of training instructional designers have had; and
- 4) specific topics that instructional designers would include in an instructional design training course.

Procedure

The survey was conducted among instructional designers from the Open University Malaysia (OUM), Sokhuthai Thammathirat Open University (STOU) of Thailand, Universitas Terbuka (UT) of Indonesia and the University of the Philippines Open University (UPOU). A two-page survey instrument designed and pre-tested among instructional designers at IGNOU in New Delhi was used. Contacts at these universities were identified through their rectors before and during the 19th AAOU Annual Conference in Jakarta, Indonesia (2005). Copies of the survey questionnaire were distributed to the contacts, who asked the instructional designers at their universities to complete the questionnaire. Since not all the instructional designers would be attending the AAOU conference, the contacts were given two weeks in which to retrieve the accomplished questionnaires, and to send them to the researchers.

The principal investigator also interviewed officials and representative instructional designers at UT in Jakarta, and officials from the Open University Malaysia (OUM), who were attending the AAOU conference. A week after the conference, the principal investigator visited STOU, and interviewed university executives and instructional designers. As before, the STOU contact was given ample time to distribute/ retrieve new questionnaires.

Results of the Survey

Out of a potential respondent number of about 80, based on estimates by contacts, the project retrieved 38 usable questionnaires. Data were processed using descriptive statistics.

1) Demographic Information.

Nine of the 38 respondents are from the OUM, 8 from STOU, 11 from UT, and 10 from the UPOU. The majority of respondents were either assistant professors/ lecturers (34%), or associate professors (32%). Over half of them hold a master's degree, over a quarter hold a doctorate degree, and about one-fifth have earned a bachelor's degree only. More than a third of the respondents claimed they have been doing instructional design work during the last 1-5 years, and over a quarter said they have done so in the last

16-20 years. Over half said they have been doing ID work for more than 11 years, which means they have ample ID experience.

2) ID Responsibilities.

When asked about their main responsibilities, the respondents claimed to be doing varied tasks associated with ID work. Many of them claimed to be responsible for more than one ID activity. The specific tasks by more than 50% of the respondents included:

- designing, developing, and evaluating instructional materials and programs (82%);
- providing consultation and advice to colleagues on ID matters (60%);
- organising and making presentations in ID training sessions (54%);
- conducting formative and summative evaluations (53%);
- designing lessons, developing assessment instruments, and measuring student learning (53%);
- conducting needs analyses (37%); and
- undertaking research and evaluation (50%).

3) Relationship Between ID Responsibilities and Training.

A cross-tabulation of responses relating to the respondents' training and their designation as ID specialists indicated that the majority (60%) of those designated responsible for ID work have had formal training in ID. Only 21% claimed that they did not have any formal ID training. Fifty-eight per cent of the sample believes that their main role is as a full-time faculty member who also does ID work. That is to say, teaching is only one of their functions. A third of the sample (37%) claims to be a full-time ID practitioner.

4) Nature of ID Training Experienced

Those who claimed to have had formal training in ID were also asked about the nature of their training. Seventy-four per cent of them indicated that they had attended workshops and short courses on ID, and 32% had been in formal ID courses. Three respondents claimed to have earned degrees on ID topics. Sixty-three per cent of them indicated that the courses they have attended dealt with ID principles. Other respondents had taken

part in courses on the development of web-based material, open and distance learning, and development of non-print materials. Most of the ID specialists of the four open universities participating in the survey appear to have all had the benefit of recent training. Over 60% claim to have undergone ID training in the last five years. One respondent stated that s/he received such training more than 25 years ago.

When asked whether or not their respective open universities conduct in-house training in ID, 63% reported that they did. Twelve individuals (32%) said in-house ID training is not available to them. Of the 24 respondents who reported that their open universities offer in-house training, 21 reported that their courses dealt with ID principles, while others said their training dealt with the development of DE materials. Other in-house training included the development of evaluation and assessment instruments, online teaching and learning materials, DE management and needs analysis. Respondents from institutions running their own training courses were also asked about the sources of their training materials. The majority (68%) reported that their ID faculty members were the ones who produce their training materials. Thirty-seven per cent reported that they depended on training materials from other universities, or from external consultants (34%).

5) Self-Ratings as IDs.

In their ID functions, 47% of the respondents reported that they employ Gagne's model of ID. Others claim to follow the ADDIE model (32%), Dick & Carey model (29%), or a constructivist model (26%). The ID specialists in these open universities evidently follow generally accepted ID principles. An interesting result of the survey, however, is that 63% of the respondents claim to be proficient as IDs but state that they still need additional training. In other words, it is clear that they are not satisfied with their current levels of ID skill. Only 8% claimed to be very proficient in ID.

A number of specific topics were suggested that should be included in ID training courses. For example, methods and media were mentioned by over half of the sample. Additional topics were: design of lessons plans (47%), and application of research results and theory (47%), curriculum design (45%), evaluation techniques (37%), and needs analysis (32%).

6) Recommendations for ID training.

When asked where they would prefer an ID training course to be held, the majority (71%) said they did not really care. Twenty-four per cent, however, looked forward to attending an ID training course at another open university in the region. Only one respondent said that the training should be in-house.

Since they also qualify as trainers, the sample was asked what role they would take in an ID training course. Eighty per cent said they would prefer to participate as trainees. Only 8 respondents would offer their services as trainers. Of these, all felt they would be ready to handle topics like "development of instructional materials" and "principles of instructional design". Other topics they said they could handle include media selection and production, curriculum design, needs analysis, monitoring and evaluation, and lesson plan preparation. Eighty-four per cent said that they would prefer blended training (online combined with face-to-face), while 30% said they would prefer completely face-to-face training. Only 3 respondents said they would attend online training, and 2 said they would prefer printed toolkits. As to the duration of the training, no consensus was expressed: 37% said that 30 days would be enough if the training took a blended form. The 9 respondents who suggested face-to-face training said that 7 days would be enough for it.

Conclusions

The study examined the instructional design training of materials designers and faculty members at four Asian open universities. While the majority of respondents claim to have received training in theoretical and practical aspects of instructional design, few of them express confidence in their grasp of principles involved. Most stated that they would willingly attend new programmes of training on the topic, designed to increase the educational effectiveness of the learning materials they create.

Summary: Establishing a Collaboratory as an Infrastructure for International ICT Research



Jon Baggaley & Eddy Bahfen

Summary of the Preceding Chapters

The papers in this book have covered a wide range of current social development concerns. Their prime emphasis has been on issues affecting Asian society, but these same concerns apply world-wide: i.e., the question of how to use information and communication technology (ICT) for the betterment of society. The invention of new technologies has always outstripped the ability to use them well; and the authors in this book have sought to overcome this problem by considering innovative uses of ICTs as well as the technologies themselves. The publication has been generated by the International Symposium on *Information and Communication Technology for Social Development*, held by the ICT4D ASEAN Collaboratory in Jakarta (May 2006). This two-day event brought together a distinguished group of Asian educators, social development experts, and educational technologists (see the delegates' list at the end of the book). They presented findings from their current research, and they speculated about new studies supporting the urgent priorities of the Southeast Asian nations.

Dr. **Jon Baggaley** is Professor of Educational Technology, Athabasca University, Canada. **Eddy Bahfen** is with DAI Inc., Jakarta. The project discussed in their chapter is supported by the PANAsia Networking programme of Canada's International Development Research Centre (IDRC); www.idrc.ca.

The first chapter in the book is by the Symposium's keynote speaker Professor Colin Latchem, stressing the importance of research and evaluation in social development. Without them, we are limited to imperfect uses of the media, and to repeating old mistakes with each new technology that comes along. The second keynote speaker at the Symposium, Professor Naveed Malik, is the coordinator of a network of distance education researchers spanning 12 Asian countries, known as PANdora. Together with his co-leader, Professor Tian Belawati, he is supporting nine research projects on educational technology issues. These studies, funded by the International Development Research Centre (IDRC) of Canada from 2005-08, are summarised in the book's second chapter. Six of the remaining chapters in the book are by researchers involved in the PANdora network. At the end of their first year of funding, these studies are revealing the social attitudes that aid and hamper social development uses of ICT, and new programming techniques that can facilitate them. The chapters by keynote speaker Professor Felix Librero, for example, stress the unique opportunities offered by the technology that has rapidly become the world's most accessible ICT tool, the cell-phone, and the urgent need for training in the skilled use of such technologies. Papers from Indonesia and the Philippines emphasised the great potential of the mobile cell-phone, particularly in relation to pressing social concerns such as public education on avian 'flu.

The PANdora studies are web-serviced by another IDRC-funded initiative, the ICT4D Collaboratory at the ASEAN Foundation (AF), in Jakarta, Indonesia. The ICT4D infrastructure ensures that social designers and educators are not restricted to merely talking about technology's potential, but can also receive technical assistance in experimenting with them. The Collaboratory was originally launched by the IDRC's PANAsia Networking programme in Singapore in 1994, as one of the first Asia-Pacific regional test-beds for ICT. In its first ten years, the Collaboratory assisted a large number of regional development projects to enhance their activities and public presence, and to share their expertise and experience. It pioneered online e-commerce facilities, for example, so that Asia-Pacific development organisations could market and distribute their publications, videos, and other products on the Internet.

In 2003, the hosting and management of the Collaboratory was moved to the AF's offices in Jakarta, and became known as the ICT4D ASEAN Collaboratory. Since that time, it has deepened its

regional roots by drawing on the extensive ties among ASEAN's ten Southeast Asian member states: Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, the Philippines, Myanmar, Singapore, Thailand, and Viet Nam. The 'ASEAN+3' grouping includes China, Japan, and Korea; and additional ties exist with other Asian nations including Bangladesh, India, Nepal, Pakistan, and Sri Lanka. In 2006, the Collaboratory has completed an intensive 3-year programme of ICT activities serving these nations. The current Symposium and publication represents a useful summary of the skills and emphases that have emerged during that period. It is hoped that the book, and this final chapter about the Collaboratory itself, will provide a useful model for the development of ICT support for social development initiatives in the South-East Asia region and beyond.

The Collaboratory's Installation Phase (2003-04)

The ICT4D Collaboratory began the ASEAN phase of its existence in March 2003, with the signing of the relocation agreement between AF and the IDRC. It became operational in August 2003, on the appointment of its manager, Eddy Bahfen. During the first six months of operation, most of its activities related to the transfer of the Collaboratory's activities and assets from Singapore to the AF offices in Jakarta. Other activities included the hosting of three ICT seminars for local specialists.

Within two months, three other staff members were recruited:

- a system engineer, Purnadi Kertonugroho;
- a webmaster, Niko Atmadja; and
- A programme assistant, Ms. Nayu A. Ramadhaningsih.

Dominic Soh, employed by the Collaboratory in its Singapore phase, was engaged as principal technical consultant.

In October 2003, the Collaboratory's budget and work plan were established for its first year of operation; and the system engineer, webmaster, and programme assistant received training and orientation in Singapore. An Internet server was equipped with powerful air-conditioning units, 8 power outlets for additional servers at later stages, a gas-fire suppression system, server racks to optimise space, and a UPS in case of power failure. The 30 LAN

outlets of the ASEAN Foundation (AF) terminated in the server room. By November 2003, an Intranet had been created to make full use of the AF's 256 kbps bandwidth. As a result, all AF staff could now share file servers, network printers, and Internet access. In December 2003, firewall protection was added by the system engineer and principal consultant; and in January 2004, a wireless Internet (WiFi) infrastructure was added, representing a major leap in the AF's ICT infrastructure. The Foundation's work relies heavily on online connectivity, and the reduction of connectivity 'down time' by the installation of the Collaboratory substantially increased its efficiency and effectiveness.

Within its first 6-month period (August 2003 to January 2004), the Collaboratory had become capable of providing a wide range of ICT services.

The Collaboratory's ICT Services

1) The Collaboratory's Web Services.

In order to introduce the ICT4D to the public, a website was created: www.ict4dasean.org. The site allows interested parties to submit registration forms for the services offered by the Collaboratory. From the outset, its services included web hosting, for the paying partners secured during the Collaboratory's Singapore phase. Most of the original partner agreements were transferred to Jakarta, and new ones have been added. In addition, WebBoard/ mailing list facilities were installed, based on open-source software such as *Majordomo*, *Mailman*, and *Postnuke*. A library search engine was added, to locate books and publications.

The Collaboratory also created, and continues to provide, a video hosting service. Hosting a server to provide Video-on-Demand is an expensive and bandwidth-hungry challenge, however. More than 192 kbps is required, which in the SE Asia region is very expensive. The VOD bandwidth can also reduce that available for other, more critical services. For these reasons, the Collaboratory decided to outsource to another company for video streaming. The Singapore-based *OpenAsia* company was engaged, providing a favourable charge for streaming video hosting.

2) E-Commerce.

The online e-commerce system developed by PAN was already six years old when the Collaboratory was moved to Jakarta. In that time, commercial products for online shopping advanced considerably, and for its Jakarta operations, the Collaboratory migrated to a new e-commerce platform, *ihtml*, which is run as a shopping mall. A new agreement was signed between the Collaboratory and *eNets*, a Singapore based credit-card service provider, in November 2003, and the online shops were transferred with the help of the shop owners. The owners needed to participate in this activity because of the greater number of features in the new system, with which they needed to become familiar. For example, a shop owner has to decide how to categorise products, and how many levels of categories to use. Based on this activity, the shop owners provided evaluative input about the new platform. In July 2004, the new e-commerce facility began operation as the PAN ASEAN e-Mall (www.panaseanemall.org), and continues to thrive two years later.

3) ICT Conference Hosting.

In February 2004, the Collaboratory hosted the working sessions of the Distinguished Panel of Authors of the *Digital Review* publication, attended by 35 delegates. The *Review* is a joint initiative of the PAN Asia Networking Programme of the IDRC, the Asia-Pacific Development Information Programme (APDIP) of the UN Development Programme (UNDP), and Orbicom. The meeting reviewed how ICTs are being used across Asia-Pacific, in support of socio-economic development of its countries and territories. This was the first event hosting experience for the Collaboratory, and promoted it to the Asia-Pacific's ICT community.

In conjunction with the workshop, the Collaboratory sponsored a seminar on the *Strategic Role of ICTs in The AFTA Era* (1 March 2004). Twenty-six Asia-Pacific ICT experts shared their perspectives on the strategic roles played by e-Commerce, e-Learning, e-Governance, and ICT connectivity in the AFTA era.

On 2 March 2004, the Collaboratory joined with APTECH as the host of a seminar about ICT's educational trends. APTECH has extensive experience and expertise in ICT education/ training. The seminar was attended by 100 participants from secondary schools,

post-secondary schools, educational consulting agencies, and private companies. Its main objective was to provide information on how institutions can enhance the ICT curriculum

The Collaboratory's Consolidation Phase (2004-05)

In its first six months, the Collaboratory had developed three areas of strength: **web hosting, e-commerce, and ICT events management**. In the second phase of its operation (March 2004 to March 2005), it consolidated its approach by:

- completing the transfer of its web servers and agreements;
- providing web design training for small and medium-sized enterprise (SME) operators, focusing on the use of HTML, and software such as Macromedia's *Dreamweaver*, *Firework*, and *Flash*;
- setting up a mailing list so that its trainees could maintain contact with the Collaboratory and each other in order to solve web design problems;
- conducting a 3-day workshop on software for executives, providing hands-on training with popular applications (a number of foreign mission representatives in Jakarta attended this workshop); and
- developing a strategic plan with the assistance of by the IDRC's Partnership and Business Development Division, under a project called Business and Resources Expansion Strategy Development.

The Collaboratory also began to export its capacity to other parts of the ASEAN region (*next section*).

4) ICT Training for CLMV Countries.

In September 2004, the Collaboratory was invited to coordinate a workshop on *Introduction to E-Commerce and E-Business* at the Institute of Technology of Cambodia, in Phnom Penh. This event, supported by the Government of France, was attended by 33 government officials and university representatives from Cambodia, Laos, Myanmar, and Viet Nam. The workshop's objective was to familiarise participants with e-commerce and e-business, so that they could be involved in creating a supportive

environment for the effective implementation of e-commerce in their countries. In order to achieve this, educators and government regulators need a good understanding of e-commerce issues including current trends, trade practices, infrastructure, marketing, and legal and regulatory frameworks. If used effectively, e-commerce can reduce physical trade obstacles, increase market access, boost trade efficiency, and provide competitive stimulus for local producers and entrepreneurs.

5) The Distance Learning Technology project (PANdora).

Also in September 2004, the IDRC sponsored a meeting in Siem Reap, Cambodia, to discuss and define a regional collaborative DLT research project proposal. The Collaboratory was invited to attend the meeting, and developed a proposal with delegates from Mongolia, Sri Lanka, and Viet Nam, to evaluate open-source software with the objective of identifying and developing the most appropriate software for distance education practitioners in the Asia-Pacific region. The IDRC approved the proposal in December 2004, as one of the PANdora projects (see *Chapter 2, Project/3*). In the first of the project's three years, the Collaboratory has installed and updated 9 learning management system packages on its server for evaluation by the project, and has provided expert input in their analysis.

6) ICT for Home-based Workers (Indonesia, Malaysia, Thailand).

In May 2005, the Collaboratory embarked upon a collaborative project with the Mothers for Mothers (M4M) NGO, based in Kuala Lumpur. The M4M group is funded by the IDRC to coordinate a study of the facilities, attitudes, challenges and gender barriers affecting home-based working by women in Indonesia, Malaysia, and Thailand. The Collaboratory administers the Indonesian section of the study, and engaged Ms. Pande Trimayuni of the University of Indonesia as the project coordinator. Ms. Trimayuni and the Collaboratory Manager reported the preliminary conclusions of the Indonesian project at a debriefing meeting in Kuala Lumpur in April 2006.

7) Microsoft's Unlimited Potential workshops.

In early 2005, the Collaboratory approached *Microsoft Indonesia* with a proposal to assist the company's local ICT training efforts. This plan developed into a collaboration with *Microsoft's* global initiative, the *Unlimited Potential* (UP) programme. The UP programme strives to reduce the digital and information gap by assisting people with economic, social, and/or physical handicaps to become aware of the potentials they possess. The program's objective is to increase access to technology and information, and to improve the ability of communities to use ICT as a tool for improving their quality of life. *Microsoft* is working with NGOs to set up Community Training and Learning Centers (CTLCs) in rural areas of Indonesia. It was agreed that the Collaboratory would provide the services of its IT staff to conduct the "training of the trainer" (TOT) activities. These will be offered to trainers aiming to work in the CTLCs. *Microsoft Indonesia* bears the expenses associated with the training. In Jakarta, the Collaboratory hosts and staffs the training sessions at the 20 work-stations of its training room. Regular week-long sessions have been held from March 2005 to the time of writing.

8) Donor Management Software.

In line with the Collaboratory's mission and objectives to assist the development sector, the Collaboratory has developed a donor management software for NGOs. The package is a database customised for the rapid search and reporting of donor-related information. Several existing software products with similar functions are on the market, but tend to be costly. The Collaboratory's product, called *Donor Manager*, overcomes this cost problem. It has been developed with the expert assistance of Ms. Mayan Quebral, and the outsourced programming support of *Altelindo*, Jakarta. In June 2006, it has been made available at a modest cost on the PAN ASEAN E-Mall.

A New Planning Phase

In 2005-06, the Collaboratory has maintained its commitments to its existing projects; namely to providing:

- web hosting, e-Mall services, and e-Commerce training;

- Microsoft *Unlimited Potential* training workshops;
- upgrading of IDRC PANdora support (assisted by a July 2005 visit from Professor Jon Baggaley), with the addition of online audio-conferencing and blogging tools, learning management systems, and software evaluation facilities;
- integration of ICT4D services within AF activities;
- creation of an online database of the AF's 80+ projects, classified under the headings: 1) Social Development, 2) Science & Technology, 3) Environment, and 4) Culture & Information; and
- preparation for the next phase of Collaboratory activity, advised by Prof. Baggaley and by consultant Mr. Chin Saik Yoon. The new phase is designed to begin at the end of the Collaboratory's current 2003-06 cycle.

New projects during 2005-06 have included:

9) A learning object providing educational response to disasters.

As a spin-off from the Collaboratory's PANdora support, the Collaboratory has packaged a set of web sites into a web-based 'learning object', designed to assist in public education about tsunami crises. The project arises from a Collaboratory/ PANdora collaboration with Athabasca University in Canada. In the weeks following the December 2004 tsunami, a team of 12 university graduate students in distance education created online materials for Asian educators to use in teaching their communities about the Tsunami's impact, and to provide access to valuable online resources for people affected by the disaster. The four web sites provide detailed information on educational, scientific, health, and international aid aspects of the December 2004 tsunami. The Collaboratory was asked to support this educational approach to disaster response by designing and distributing a 'learning object' package of the materials. It created a package that allows the sites to be easily installed on an educational institution's web server with minimal coding adjustments. The material has been made freely available on the PAN ASEAN E-Mall.

Conclusions

The tsunami materials described in the previous section provide an example of the type of educational assistance that facilities such as the Collaboratory can provide in relation to social problems. The need for rapid ICT response to disasters has become a key priority for ASEAN since the December 2004 tsunami. In the intervening eighteen months, avian 'flu has become a serious threat, and is causing major losses of life and livelihood in the Southeast Asian nations. Similarly, in the weeks before the publication of this book, the major earthquake in Jogjakarta, Indonesia, has cost over 5,000 lives, and has left over half a million people homeless.

These are just three examples of the current social development needs that ICT can serve. To address them, and to summarise the activities of its first three years, the Collaboratory organised the International Symposium on *ICT for Social Development* (May 2006), from which the current selection of papers has been derived. The Symposium discussed new projects in relation to the use of wireless and SMS technologies for avian 'flu, as exemplified by Chapter 6 in this collection. It also moved forward a project designed to mobilise youth as ASEAN citizens, by developing youth-oriented websites in Cambodia, Laos, Myanmar, and Viet Nam. This project relates closely to the AF's SchoolNet projects which have provided ICT support for high schools.

Youth and avian 'flu are key priorities for the Foundation as it enters its 10th year (2007), and interesting possibilities are becoming apparent for connections between them. For example, as masters of the latest media (e.g. SMS, online and wireless technologies), the young people of the world are in a strong position to provide expert assistance in dealing with disasters, threats, and other social concerns. Experienced facilities such as the ICT4D ASEAN Collaboratory can provide the support needed by such initiatives. Planning for the next stage of the Collaboratory's activities (2006 onwards) is currently focusing on youth and avian 'flu issues accordingly.

Recognising connections between disparate initiatives is the cornerstone of a creative and innovative response to social concerns. As we have seen, the online database techniques designed for commercial use in the PAN ASEAN E-Mall can also be used to disseminate educational materials. Conversely, the learning object

repository developed for use in distance education (*Chapter 2, Project/6*) could be expanded to provide commercial materials and products. The SMS techniques used for educational purposes (*Chapters 6 and 7*), can be used to communicate disaster alerts (*Chapter 8*); and so on. In order to provide these innovative solutions, ICT research, evaluation and training skills are required, as well as the technical expertise necessary to run the physical infrastructures. In its 2003-06 development phase, the Collaboratory's staff members in Jakarta have developed expert capacity in each of these areas, as is evident from their diary of invitations to participate in international ICT conferences and training programmes. The ICT4D Collaboratory's experience can now be applied in advising the ICT role in social development internationally.

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List of delegates

International Symposium on Information & Communication Technology for Social Development

Hosted by the ICT4D ASEAN Collaboratory,
Jakarta (22-24/May 2006)

Mr. Abubakar Alatas	SEAMOLEC, Jakarta
Ms. Renelle Ivy Y. Adan	ASEAN Foundation, Jakarta
Ms. Hasliza Ahmad	National Youth Council, Singapore
Mr. Idaman Andarmasoko	Institute for Global Justice, Jakarta
Mr. Sunu Dwi Antoro	Universitas Terbuka, Jakarta
Prof. Jon Baggaley	Athabasca University, Canada
Mr. Batpurev Batchuluun	Infocon. Ltd., Ulaanbataar
Prof. Tian Belawati	Universitas Terbuka, Jakarta
Mr. Vu The Binh	Netnam, Hanoi
Ms. Suwannee Chailuekit	NECTEC, Bangkok
Dr. Alexander Chandra	Institute for Global Justice, Jakarta
Mr. Chhuon Chan Than	International Institute of Cambodia, Phnom Penh
Mr. Chin Saik Yoon	ICT Consultant, Penang
Dr. Amarsaikhan Dash	Health Sciences University of Mongolia, Ulaanbataar
Mr. Doung Vuth	Ministry of Education Youth & Sport, Government of Cambodia
Mr. Nur Hadisukmana	President University, Jakarta
Dr. A.P. Hardhono	Universitas Terbuka, Jakarta
Ms. Indy Hardhono	ASEAN Foundation, Jakarta
Ms. Cynthia Iskandar	Microsoft Indonesia
Ms. Monica Kappiantari	ASEAN Foundation, Jakarta

Mrs. Koesmarihati	Indonesia Telecom
Mr. Dri Kurniawan	Assessment & Application of Technology Agency (BPPT), Jakarta
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Prof. Felix Librero	University of the Philippines Open U
Ms. Mbak Ririn	MIK eLearning Centre, Jakarta
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Prof. Naveed Malik	Virtual University of Pakistan, Lahore
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Mr. Dimas Prasetyo	Universitas Terbuka, Jakarta
Mr. Yudhi Purnama	ASEAN Foundation, Jakarta
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Ms. Maria Tan	Commission on ICT, Government of the Philippines
Ms. Elaine Tan	ASEAN Secretariat, Jakarta
Ms. T. Wibullaksanakul	NECTEC, Bangkok
Mr. Bambang Wijayanto	PT. Dimensi Hijau Inforrama, Jakarta

Jakarta, Indonesia
June 2006.