

## **Utilizing Information and Communication Technologies to Achieve Lifelong Education for All: A Case Study of Myanmar**

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### Abstract

This paper examines the role of information and communication technologies (ICTs) in advancing the cause of education for all and lifelong learning. After examining the claimed benefits of ICTs for promoting education and schooling, and the characteristics of education and the basic education movement in Asia, the paper focuses on providing a case study of one country in South-East Asia, that of Myanmar, regarding the use of ICTs to achieve lifelong education for all. The paper reports on a research study being undertaken by the author which examines how ICTs are being harnessed to support educational needs in the formal education system in Myanmar, including basic education, teacher development, and in the higher education institutions under the Ministry of Education. The study focuses specifically on the applications of ICTs for increasing access and improving quality in the context of the Information Age. The research is based on a field survey and case studies of best practices and innovations in the applications of ICTs to education in the Myanmar education system. By identifying the conditions that must be addressed in making effective use of ICTs for learning and teaching, the results of this study provides much needed feedback to assist the Ministry of Education in Myanmar to operate most cost-effectively in this area. Although the paper specifically examines the situation regarding one particular country, lessons learnt from the experience of Myanmar have much to offer researchers, policy makers and practitioners regarding the applications of ICTs to education development in other parts of Asia, and indeed in other parts of the world. However, the extent to which the results of this research study are generalizable to other developing countries has yet to be ascertained, since this is beyond the scope of the study reported on in this paper.

**Key Words:** access and equity, basic education, distance learning, education and schooling in Myanmar, education for sustainable development, e-learning, information and communication technologies (ICTs), lifelong education for all, technological innovation

### Introduction: Lifelong Education for All in Asia

In 2000, most countries in the world, along with international aid organizations and non-government organizations, met at the World Education Forum (Dakar, Senegal) and committed themselves to achieving Education for All (EFA) by the year 2015. At the meeting they agreed to implement the Dakar Framework for Action on EFA, which consists of six goals

- (1) Expanding and improving comprehensive early childhood care and education, especially for the most vulnerable and disadvantaged children.
- (2) Ensuring that by 2015 all children, particularly girls, children in difficult circumstances and those belonging to ethnic minorities, have access to and complete free and compulsory primary education of good quality.
- (3) Ensuring that the learning needs of all young people and adults are met through equitable access to appropriate learning and life skills programmes.
- (4) Achieving 50% improvement in the level of adult literacy by 2015, especially for women, and equitable access to basic and continuing education for all adults.
- (5) Eliminating gender disparities in primary and secondary education by 2005, and achieving gender equality in education by 2015, with a focus on ensuring girls' full and equal access to and achievement in basic education of good quality.
- (6) Improving all aspects of the quality of education and ensuring excellence for all so that recognised and measurable learning outcomes are achieved by all, especially illiteracy, numeracy and essential life skills.

Basic education refers to that level and type of education which enables an individual, and the social groups and communities to which they belong, to function fully in the particular society in which they are located. That implies, at the most fundamental level, functional literacy and numeracy skills. However, what is classed as 'basic education' is, at least in part, context-specific in that the basic education capabilities an individual needs to function effectively in their particular society depends upon the social and economic context of their society. For example, the 'basic education' required by an average individual to function effectively in a highly technological, industrialized and modernized society like Japan or Australia, is significantly different to that required by an average person to function in a largely agricultural country such as Myanmar or Cambodia.

EFA stresses the importance of basic education and lifelong learning for all. As the authors of the report on Education for Sustainability (UNESCO, 2002a) note, the goal of basic education, whether it be delivered through formal or informal means, is not just to achieve skills

development for employability and citizenship, but also to inculcate in pupils a love of learning and to encourage them to get along harmoniously with others. Unfortunately many education systems in the Asia region are glaringly inadequate in achieving these goals.

Along with the Dakar Framework for Action on EFA (UNESCO, 2000), the Millennium Goals are also of considerable importance in providing a conceptual framework for achieving economic and social development, and greater equity and justice for all groups in society, partly through improved education and schooling. The Millennium Goals (2000) encapsulate eight main ways of assisting the developing countries of the world to achieve economic and social development, those that particularly relate most directly to education and schooling being: Goal 2: to achieve universal primary education; and Goal 3: to promote gender equality and empower women.

The countries subscribing to these goals view 'lifelong education for all' as being the essential foundation upon which the success of all of these goals depends. In both the Millennium Goals and the Dakar Framework for Action, education is seen as being the engine of development and a key to the fight to alleviate poverty and injustice throughout the developing world.

The critically important role of education has been raised at other major UN conferences of the 1990s, including those on human rights (Vienna, 1993), population and development (Cairo, 1994), social development (Copenhagen, 1995), and on food security (Rome, 1996).

Nowhere is the problem of illiteracy greater than in the vast and diverse Asia region, which is home to 60% of the world's total population of six billion people. Of the world's 890 million illiterates, 65% are in Asia, the majority of these (71%) being women and girls. Many millions of young people will never have the opportunity to set foot in a conventional type of school, while many working adults will never have the opportunity to regain the education denied them when they themselves were young.

As a result, governments are trying to mobilize innovative, alternative approaches to delivering high quality, relevant and effective education services to their populations, since universal education through conventional schooling is currently not affordable for the poorest countries in the region. In addition, populations living in isolated and remote geographical areas, and groups such as working children and youth, have little or no opportunity of receiving schooling if this is only available through attending conventional schools (UNESCO, 2002b). Such population groups face special problems which require innovative solutions.

In this regard, one of the lessons learnt from successful EFA activities over past decades, which is being integrated into regional and national EFA action plans, is the importance of exploring innovative alternative

modalities to providing traditional schooling, in achieving EFA, with particular reference to meeting the needs of groups with special needs such as those living in rural and in remote areas. For instance, the use of information and communication technologies (ICTs), both old (e.g., radio) and new (e.g., satellite communications), has been shown to be effective. This is a key matter that will be addressed in this paper, with particular reference to the situation in Myanmar.

### Potential of ICTs to Achieve Lifelong Education for All

#### *Main Potential Benefits of ICTs*

An excellent source of information on *Technologies for Education: Potentials, Parameters, and Prospects* is the book edited by Haddad and Draxler (UNESCO and AED, 2002) which examines potentials, parameters and prospects concerning technologies for education. In chapter 3 of this book, Wadi Haddad and Sonia Jurich give a helpful overview of the main potential benefits of ICTs, when applied to education. These main potential benefits are

- Expanding access to educational opportunities: ICTs have the potential to reach large audiences and become an alternative means to providing education for individuals who cannot attend regular schools due to geographical, social or cultural barriers, and because of time and cost constraints. Correspondence courses, and the use of radio and television, to reach scattered and rural populations, are potent examples. More recently, computer-related technologies are also being used. The main ways in which this can be achieved is through expanding existing systems for promoting learning, such as distance education.
- Promoting efficiency: ICTs promote the efficiency of the delivery of educational services by supplementing conventional delivery mechanisms through means such as: reaching learners in any place and at any time; the transmission of high-quality education services to remote areas with a low population density; high-quality multimedia modules, which are the product of a few instructional designers and master teachers, and can be shared with many schools and many learners; and, although start-up costs may be significant, technological networking allows for economy of expertise.
- Improving the quality of learning and teaching: In many schools, teachers are not well qualified, and many initial training courses do not include the preparation of teaching materials or the use of contemporary technologies for teaching. In addition, teachers are no longer the sole providers of information but facilitators of the learning process.

However, teachers can be empowered with high-quality educational videos and software. ICTs can contribute significantly to teacher development through facilitating the career-long professional development of teachers, and can break the professional isolation from which many teachers suffer.

- Improving management systems: Education systems are massive in terms of the number of personnel employed, the number of schools to be built and maintained, and the number of students to be accommodated. By any measure this is a massive undertaking to manage and maintain, and for which to ensure quality of input, process and output.
- Possibilities regarding lifelong learning and adult training: ICTs enable lifelong learning for all, anywhere and anytime, to be achieved. However, successful exploitation of technology for lifelong learning for all is dependent on a number of factors, namely: learners need generally to have a minimum level of basic education, including literacy; individuals need to have the capacity to pursue and manage their own continuous learning; and, those using ICTs need to be technologically literate.
- Enhancing training for the workplace through e-learning and other technological means: Traditional workforce training programmes cannot address new realities adequately since they are costly in terms of travel and time lost on the job, slow to be modified, and incapable of responding to new needs in a timely fashion. Network technologies have the potential to deliver timely and appropriate knowledge and skills to the right people, at a suitable time, in a convenient place. For this reason, e-training has become most popular in the corporate world.

#### *The Path to Realizing the Full Potential of ICTs in Education*

Haddad and Draxler (UNESCO, 2002, p. 9) suggest that “planning for effective use of ICTs in education necessitates an understanding of the potential of technologies to meet different educational objectives and, consequently, to decide which of these objectives can be and will be pursued. This decision affects the choice of technologies and the modalities of use.” There are some successful experiences. For example: The National Open School (NOS) in India uses print, audio, local radio for course development, administration, and testing in order to deliver educational materials to remote villages throughout India. The Telesecundaria program which uses educational television has been a successful project initiated by the Mexican government to reach rural children in isolated communities (Calderoni, 1998).

Haddad and Jurich (UNESCO and AED, 2002, p.29) also suggest that planning for the effective use of ICTs in education requires that educational planners fully understand the basic challenges of the various

Table I  
ICTs and their Potential for Education.

Technology	Outreach	Flexibility*	Sensorial Stimulation	Interactivity
Radio	High	Limited	Audio Only	Limited
Television	High	Limited	Audiovisual	Limited
Video	Low	High	Audiovisual	Limited
PC	Low	High	Audiovisual	High
Internet	Highest	High	Audiovisual	Highest

\*Limited: students and teachers must be present during transmission  
High: students can access the material at different times  
(Source: Haddad and Jurich (2002) *Technologies for Education*, p. 29)

technologies, based on educational needs and objectives as illustrated in Table I. On the one hand, effectiveness depends upon the quality and appropriateness of applications to support educational needs, and the nature of the learning environment such as the resources available for innovative activities, educational structures and cultural contexts, and strategic management capacity to deal with technological developments relevant to educational objectives and needs.

#### *Technological Innovation to Support Educational Objectives*

Given the major economic constraints facing the poorest countries in the Asia Region, if these nations are going to succeed in achieving EFA and lifelong learning they need to turn their attention to innovative solutions that are more effective than conventional schooling. ICTs are one such innovation, being one aspect of technology which has a specific focus on promoting access and quality assurance with regard to education and schooling. As a result, many countries are exploring ways of utilizing ICTs, such as radio, telephone, (satellite) television, computers and the Internet, to better reach their diverse populations to achieve EFA.

With regard to this point, the Africa Region Human Development Working Paper Series by the World Bank (World Bank, 2002, p. VIII) notes that “with some exceptions, ICTs have been used mainly in two ways: (i) within alternative systems aimed at extending access – usually called distance education or open learning systems; these systems often use ICTs to replace teachers; (ii) within classrooms or lecture theatres to improve quality; these applications try to enhance the work of the teacher.”

Major issues of concern in these education systems regarding matters of access, equality, relevance and efficiency, are being re-examined in the light of utilizing ICTs. As the report to UNESCO of the Independent International Commission on Education for the 21st Century (UNESCO, 1996) pointed out, the expansion and potential of ICTs to benefit human kind through means such as lifelong education for all is enormous, as long as these ICTs are harnessed in such a way as not to create and broaden the digital divide between rich and poor, both within and between countries.

### Education and Schooling in Myanmar: A Brief Overview

Myanmar, with an area of 676,553 square km, is located in South-East Asia, and has common borders with Bangladesh, India, China, Laos and Thailand. Myanmar has a widely dispersed population of 51 million. Myanmar is made up of over 130 national races.

#### *Structure of the School System*

The Ministry of Education (MOE) is functionally the main sponsor of education and training, especially in the areas of basic education, teacher education and higher education. Entry for the formal school system occurs at 5 years of age. The Myanmar school system consists of five years of primary school (1 year of kindergarten and primary school levels of grades 1–4), followed by secondary education (middle school or lower secondary levels of grades 5–8, and high school/upper secondary levels of grades 9–10). The higher education sub-sector consists of 156 institutions, which are administered by 13 different ministries. Under the MOE there are 64 Universities, degree colleges and other colleges, administered according to state/division. The 20 educational colleges and the two institutes of education are under the administration of the two Departments of Higher Education, one being responsible for Upper Myanmar and the other for Lower Myanmar. The structure of education in Myanmar is shown in Figure 1.

Traditionally the administrative process throughout the education sector has been centralized, but in recent times moves are currently afoot to achieve decentralization of administration and responsibility, and to promote active community participation. However, education decisions and initiatives remain largely the province of central ministerial departments.

In order to lay the foundation for an education system that is well coordinated and equitable, the Myanmar Naing-ngan Education Committee was established in 1991. This committee has overall responsibility for major policy matters, establishing budget priorities and supervision to the whole education process.

(Basic Education)											(Higher Education)								
Age	5+	6+	7+	8+	9+	10+	11+	12+	13+	14+	15+	<u>Universities and Colleges</u>							
Grade	KG	1	2	3	4	5	6	7	8	9	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Universities (Arts & Science)				
Primary School	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Universities (Law)			
Middle School	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Worker's College			
High School	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Professional Institutes</u>			
												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Economics, Computer Science			
												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Education			
												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Nursing, Pharmaceutical			
												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Forestry		
												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Engineering		
												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Medicine		

Figure 1. Structure of Education in Myanmar.  
(Source: Ministry of Education, 2003d)

In terms of the general level of education in Myanmar, 40% of the population have completed primary education, 18% middle school level education, 8% high school, and 4% university education. (Ministry of Education/UNDP/UNESCO, 1992)

#### *Education for All*

For the purposes of EFA, basic education in Myanmar is considered to cover the area of primary and middle school (lower secondary) education for 5–13-year-old children, as well as pre-primary education for 3–5 year-olds. It also includes early childhood care and education for the age group 0–3. In Myanmar, EFA is also concerned with achieving functional literacy and continuing education for out-of-school youth and adults (aged 15 years and over). The Myanmar EFA National Action Plan (NPA) has been drawn up within the framework of the Thirty-Year-Long-Term Basic Education Development Plan (Ministry of Education, 2001b). The Myanmar EFA goals are also in line with the overall goals and commitments of governments world-wide and the international community, as reflected in the Dakar Framework for Action for achieving basic education for all by 2015. They are also in keeping with the education-related goals of the Millennium Development and the World Fit for Children Declarations, adopted at the UN General Assembly Special Session for Children in 2002.

In terms of government policy, Myanmar is committed to achieving EFA, using formal education as well as non-formal education modalities.



The aim, as set out in the Myanmar NPA for EFA (Ministry of Education, 2003d), is to increase access to basic education, to meet basic learning needs, to encourage the completion of primary and middle school education and in so doing to further reduce the illiteracy rate. The literacy rate target (which is one of 18 EFA target indicators to measure learning achievement and outcomes), as set by the MOE is: 94.0% in 2002, and is projected to be 96.0 % for 2005, 98.0% for 2010, and 99.0% for 2015.

During the colonial period, in 1931 roughly half the male population and 14% of the female population of Myanmar were literate. Due to a vigorous literacy campaign implemented between 1964 and 1982, the percentage of literates was increased to 77% in 1981. In recognition of its considerable success in promoting literacy, in 1973 Myanmar won the UNESCO “Mohamed Reza Pahlevi Prize” for its outstanding work in the literacy campaign, while Japan conferred the Noma Prize on Myanmar in 1983 in recognition of the resounding success of Myanmar’s mass literacy programme.

Due to such EFA initiatives, current statistics show that enrolment in basic education has increased steadily from 89% in the 1999–2000 academic year to 92.1% in 2001–2002; and the completion rate for the primary education cycle has increased from 25% in 1991 to over 50% in 1999. (In interpreting these statistics it is important to note that the last official census in Myanmar was in 1983.)

All schools in Myanmar are public, there being no private schools except for those offering specialized education such as English, business studies, computer training and subject-based ‘private tuition’ classes. The Department of Social Welfare operates 62 pre-primary schools and over 700 day-care Centers; while the MOE opened 621 pre-primary schools under the school reforms between 1998 and 2003.

To implement effective measures for the development of border areas and areas where there are national races, a Ministry for the Development of Border areas and National Races was established in September 1992. The Ministry operates two Colleges, and as from March 2001, 564 primary, 59 middle and 33 high schools have been opened in the border areas. There are also more than 900 monastic primary schools and 100 monastic middle schools for children in townships where access to public schools is difficult. These monastic schools follow the official curriculum under the supervision of the Ministry of Religious Affairs.

#### *Importance of ICTs in Myanmar Education*

As was noted earlier, the matter of finding effective and affordably modes of educational delivery, by utilizing ICTs, is one of increasing world-wide concern, particularly for developing countries as they try to achieve a

flexible and educated workforce, and sustainable human development in today's information-based world economy. This concern is considerable in Myanmar, which has enormous indigenous ethnic diversity (there are 135 ethnic groups) and a population of whom 73.4% live in remote and rural areas. In judging the likely accuracy of these statistics it is important to note that the last population census in Myanmar was conducted in 1983, and this has been used as the basis of the population projections based on registration of birth, deaths and migration carried out by the Ministry of Immigration and Population.

The importance of ICTs is recognised in the Myanmar NPA for EFA (Ministry of Education, 2003d, p. 41) where it is noted, in the section on Access to and Quality of Basic Education which relates to increasing retention and completion rates in schools:

'In this age of knowledge, e-Education has become a necessity and children should receive orientation from as early as possible. The MOE is overseeing the contributions of benefactors in providing facilities in urban schools, and in some rural area schools. Equitable development must be ensured when equipping schools, in phases, with facilities for ICT multimedia classrooms, Internet access and resource centres.'

Since 1997, Myanmar has been successful in reforming and expanding its education system, through conducting annual seminars for both the basic and higher education sub-sectors. The country has been effectively implementing and moving towards achieving EFA and the universalization of primary education, with regard to new targets set in the EFA 2015 National Plan. This has at the same time resulted in a significant increase in upwards pressure on expanding enrolments at all levels in formal education under the MOE (Figure 2). However, as access to education has expanded, there has been a concern that this could be at the expense of quality, and so overall educational quality improvement has become an important and prominent task for the MOE, especially with regard to the provision of equal access and high quality education and schooling for those living in rural and border areas.

#### Approaches to Utilizing ICTs in Myanmar

The survey material reported on in this section has been obtained by collecting data from primary and secondary sources. The primary data research is based on individual interviews in order to identify the effectiveness of ICT usage and obtain data on related educational issues. Part of the interviews targeted the advantages, and possible reasons for, the slow acceptance of the technology-supported teaching and learning. The secondary data is based on various sources of research with regard to: cat-

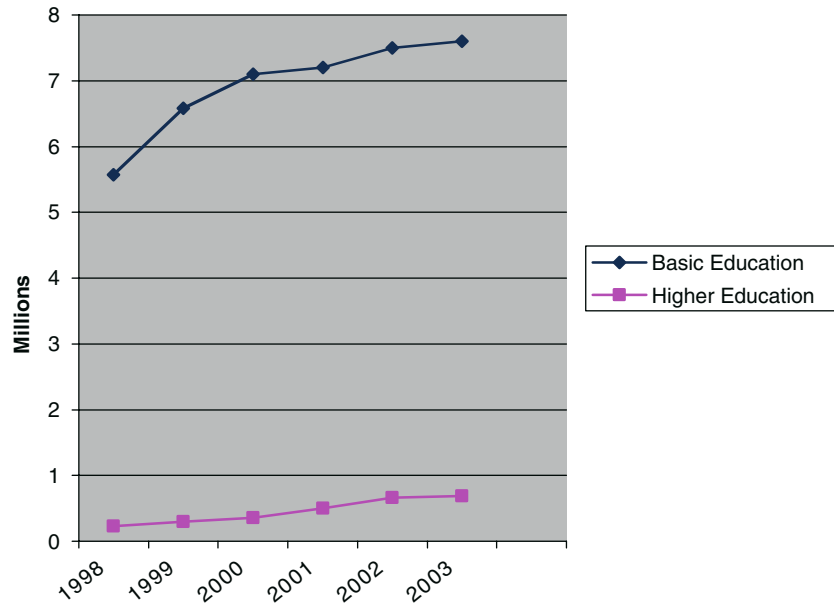


Figure 2. Enrolment in Formal Education in Myanmar.

(Source: Based on figures in Myanmar Ministry of Education, 2003d.)

Note: The student population for distance education is included in higher education.

egorizing current educational initiatives and related educational issues in terms of objective, policy, strategy and culture within the MOE; analyzing the extent to which distance education modes and ICTs integration in education in Myanmar is realized; and, investigating the importance of educational innovation for sustainable development and related educational issues. As a result, the applications of ICTs to education issues, and general factors guiding a new way of networking within the education sector, were analyzed.

The major source of secondary data came directly from: the MOE in Myanmar; the UNESCO–UNEVOC International Centre in Bonn, Germany; the International Development Centre of Japan (IDCJ); and, the Japan International Cooperation Agency (JICA). The Myanmar MOE was particularly co-operative in providing valuable data about the education sector in Myanmar, much of which are not widely and generally available.

#### *The Special-Four-Year-Plan*

In Myanmar efforts are being made to expand educational opportunities for all by exploring ways of integrating ICTs into the education system. Thus the Special-Four-Year-Plan for the Development of Education (2000–

2001 fiscal year) was framed to introduce ICTs into the education sector and to provide the necessary facilities and infrastructure to sustain the long-term use of ICTs in education. Foreign currency of US\$ 4.5 million and local currency of Kyat 2297.395 million (official exchange rate US\$1 equals 450 kyat as of 20 March, 2002) was allocated to support the 21 programmes of the Special-Four-Year-Plan. As a result of lessons learnt from long experience gained from the distance education system in Myanmar, using traditional technologies, the introduction of new technologies is helping the country achieve a broad range of different educational objectives.

By utilizing ICTs, increasing attention is being given to inter-related matters such as: ensuring that all sections of society (regardless of gender, socio-economic background, ethnicity or geographical location) have fair and equal access to relevant, high quality education; achieving quality assurance so that expanding access is not at the expense of the quality of programmes; upgrading technology support at the basic education level to help EFA become a reality; the introduction of more ICT-based programmes into higher education; improving the overall quality of existing distance education systems; providing the necessary facilities and infrastructure to sustain the use of ICTs in education; and, increasing cooperation with local communities which are vitally important as a resource for meeting educational needs.

The challenges facing the MOE in the context of the Information Age indicate that the importance of ICTs in Myanmar Education has grown significantly over the past decade. Since Myanmar is committed to implementing the six goals contained in the Dakar Framework for Action on EFA (UNESCO, 2000), as the country seeks to widen its commitment to becoming an information-based society, the question of how much further the strategic utilization of ICTs can help address the challenges being faced in education development, is likely to be raised.

#### *Increasing Accessibility in Formal Education*

Myanmar has had considerable experience in the use of technology to expand access to educational opportunities for those who cannot attend regular schools due to geographic, social, or cultural barriers.

Myanmar started expanding higher education services in 1975 through the introduction of University Correspondence Courses (UCC) and Correspondence Courses by the Institute of Education, which were initiated two years earlier in 1973. Due to changing social and economic conditions in Myanmar, it has been necessary to improve the educational activities of UCCs, and so the University of Distance Education (UDE) was established in July 1992. With its own Audio-Visual Department, the UDE has taken charge of radio and television programmes, as a result of which the broad-

casting of both radio and television lessons has become a major medium in Myanmar Education. At present the UDE, which is located in Yangon, has its own studios and systems for audio, video and data broadcasting. Lectures and printed-based materials are developed by appropriate departments at the UDE. However, due to a shortage of adequate infrastructure, the production of radio lectures is currently being carried out by utilizing the services of recording studios available under the Ministry of Trade, while television programmes are produced at the television studios of the Myanmar Education Research Bureau (MERB), under the MOE. In addition, the broadcasting of radio and TV lectures is transmitted and televised by the Myanmar Radio and Television Department (MRTV). These programmes are aimed not only at the universities and colleges, but also at middle school teacher training institutions, and (since 1981) at primary, middle and high schools under the MOE.

Research studies undertaken by the Ministry of Education (1999) have shown that the Audio-Visual Education Department (AVED), which was established at the Directorate of Education in 1953, has been particularly effective in its approach to distance education. In 1972, with the cooperation of MERB, AVED began to experiment with interactive forms of broadcasting such as having lively discussions, question and answer sessions and quizzes, although the nature of the interactive quality of these activities was rather rudimentary.

An increasing number of radio and TV lessons have been produced, and greater numbers of students are using supplementary learning materials. Over the years, there has been a 250% increase in the number of radio lessons broadcast annually, from 353 in 1992 to 984 in 2001. Likewise, during this period there has been a fivefold increase in the number of TV lessons broadcast from 21 in 1992 to 101 in 2001 (Ministry of Education, 1997, 1998b). Radio and TV lessons aimed at primary and secondary students place an emphasis on improving English language skill, these programmes being a supplement to the existing school curriculum. For Arts, Law and Economics students at universities, two-hour radio lessons are broadcast everyday, and 10 TV lessons lasting 25 minutes each are broadcast weekly. These lessons are repeated as the academic year nears its end and final examinations approach, to assist students revise their studies. Recorded audio and videocassette tapes are also produced and distributed to students through the schools, universities, District and Township Information and Public Relation Departments that are located throughout the country.

Experience with incorporating ICTs into learning systems is gradually increasing, however major issues related to cost are the major obstacle when it comes to introducing ICTs to improve the quality of education throughout the Myanmar education system. Moreover, a lack of equipment

such as radios, television sets and computers has constrained the ability of students to fully benefit from the potential use of these technologies. A research review of the distance education system in Myanmar, undertaken for this study, indicates that printed materials remain the main modality.

As a result of lessons learnt from long experience gained from the distance education system, through the use of technologies such as radio, audio cassette and television, the introduction of new technologies is increasingly supporting the different educational objectives. A major e-Education initiative has therefore been gradually developed to enhance the use of ICTs in the Myanmar education sector, by utilizing data broadcasting systems. The main characteristics and benefits of e-Education in Myanmar are

- increasing accessibility, through establishing Learning Centers in different divisions and states throughout the country;
- establishing multimedia classrooms that are equipped with a mixed media package to support learning and teaching processes; and
- upgrading the electronic data broadcasting one-way system into an interactive system based on the Very Small Aperture Terminal (VSAT) system, to transmit educational programmes.

This combination permits effective installation and implementation of these e-Education Learning Centers at basic education schools, at universities and in colleges that are usually not able to utilize ICTs and which are facing the problem of an increasingly unfavorable student–teacher ratio. In keeping with its emphasis on developing a learner-centered approach to education, the Learning Centers can enable learners to gain easier access to educational programmes, not only for the benefit of students but also for distance education students and community members as a whole.

e-Education has also experienced substantial growth in Myanmar since 2001. New Education Promotion Programmes have been launched in phases (in 1998–2000) to implement various reforms in the curriculum, in teacher education, teaching-learning approaches, and in programmes aimed at the quality improvement of education. As a result satellite transmission growth has increased considerably, and there has been a growth in Learning Centers, as shown in Table II, up to a total number of 455 in 2002–2003 and over 600 Learning Centers are expected to open in 2004 in 322 townships all over the country.

These Learning Centers are classified as type (1) and type (2) center. Computers are installed in every type (1) Learning Centers. Due to the relatively high cost and complexity of the operating network, only TV monitors and video recorders are installed in type (2) Learning Center. To enable both type (1) and type (2) Learning Centers to operate most effectively, the matter of having a reliable electricity supply is of major concern.

Table II  
Number of Learning Centers (Fiscal Years from 2000–2001 to 2003–2004).

Fiscal Year	Townships	High Schools	Education Colleges	Higher Education Institutions
2000–2001	116	144	19	40
2001–2002	74	94	–	7
2002–2003	108	148	1	2
2003–2004	129	162	–	2
Total		548	20	51

Source: Ministry of Education, 2004a.

Since reliable access to an electrical power grid is limited in Myanmar, it is intended that forthcoming Learning Centers – called type (3) – will be installed with receivers using battery back-up facilities. It has been estimated by the MOE that the total cost involved in installing a system, so that the whole system can receive broadcasting programmes, will be Kyat 1.225 million (approximately US\$ 1,500 per Learning Center.) This system has been developed with the aim of expanding rural education possibilities.

On-line education will become a more widespread and common delivery mode for education in Myanmar, in the near future. For example, part of the Diploma in Education Management (DEM) that is offered by the Yangon Institute of Economics is delivered via the Data Broadcasting System. The e-Learning and e-exam techniques are also employed in computer-related courses, and in the Diploma in Library and Information Management (DLIM) course, which is offered under the management of the Centre for Human Resource Development (at Yangon University) to upgrade the competence of library staff.

#### *Improving Quality in Formal Education*

Throughout Myanmar, ICTs have been introduced in ways which modify the structure and procedures of existing schools in a variety of ways, the well researched fact being that there has been a marked improvement in the quality of education, in particular at the basic education level. The focus of these initiatives has been on improving teaching practice and materials, and on improving the learning skill of students. Most applications have involved the use of radio and television as a means of providing effective teaching in priority subjects, such as mathematics, language skills, science and environmental studies. There have also been increasing applications for computer-based learning.

Since 1998 applications that use multimedia facilities have been launched in primary schools, middle schools and high schools. In 2002, some 3,000

Table III  
Type of Facilities and Number of Schools.

Type of Facilities	High Schools	Middle Schools	Primary Schools	Total
Equipped with multimedia classrooms	949	181	22	1152
Equipped with 3 platforms: computer, video & audio	35	282	41	358
Equipped with 2 platforms: video & audio	3	883	99	985
Equipped with 1 platform: audio	3	588	13,724	14,315
Total	990	1,934	13,886	16,810

Source: Ministry of Education, 2004b.

schools (out of a total of 39,974 schools) in Myanmar have been provided with multimedia classrooms fitted with television sets, video cassette players, audiocassette, overhead and multimedia projectors. Learning Centers have also been equipped with cassettes, headphones and with interactive language labs that enhance the teaching and learning of languages.

Programmes to transform schools into multimedia organizations were initiated in 1998, to promote skills development in ICT, as well as improvements in self-learning, creativity and language training. All state high schools have been upgraded to become genuine multimedia schools, each being equipped with three platforms involving audio, video, and computers. An increasing number of middle schools and primary schools now have access to multimedia facilities, which are being implemented phase by phase (Table III).

This approach aims at providing direct instructions to students in subjects that are frequently not taught all that well in the curriculum. Lessons are usually produced in a local language, except where they are being produced in order to teach a second language. This application incorporates a larger role for teachers during the broadcast of these radio and TV lessons.

The most effective and enduring use of ICTs is at the primary level in Myanmar, especially for literacy activity programmes, through the use of radio, which has a very long and successful history. Educational applications of radio have been systematically introduced since 1994. Programmes are recorded in the studios of the MERB and broadcast through MRTV, and largely aim at improving listening comprehension. In a country report on the 'Use of Radio and Television for Open and Distance Learning in



Myanmar' (Ministry of Education 2001c) it is noted that the lack of a reliable electricity supply is one of the major constraints to effectively using radio in Myanmar. In response to this problem MERB has found that the use of batteries with radios is a cost-effective tool to reduce disparities between urban and rural education and to raise the overall quality of teaching. On the other hand, use of radio is partly being undermined by the increasing popularity of television in education. Another reason for the declining interest in radio is that radio programmes are not 'interactive enough' for students, and so they are said to lose interest. Unfortunately, reliable and comprehensive information about the overall costs and effectiveness of the utilization of radio applications in education is not currently available.

The use of Interactive Radio Instruction (IRI) applications has not as yet been introduced into the Myanmar Education System, although research on using IRI has been undertaken for some time.

In terms of educational television, the use of television as a medium for education in Myanmar has become widespread, there being a particularly significant use of television in primary education. The research undertaken for this article has found that the use of television in the classroom to improve the quality of education is often used as a supplement to the regular curriculum and to the main teaching methods adopted. The MOE broadcasts a weekly television programme for teachers, and a daily programme for young children. The expectation is that television serves as a cost-effective tool to reduce disparities between urban and rural education and raise the quality of teaching overall.

Although systematic evaluations have not been undertaken to date on the range of projects implemented by the MOE which aim to effectively harness television in education, informal reports show that a higher percentage of students are at least partly undertaking their studies with the use of television, and these have reached higher levels of achievement in spoken English than would otherwise be the case. However, the costs involved in utilizing educational television, such as those related to hardware, production and reproduction costs, has also encouraged the MOE to look again more closely at radio as a viable and cost-effective medium to assist in improving the quality of basic education, especially in rural areas.

With regard to the higher education sector, higher education applications are increasingly being designed with computers and Internet linkages in mind. The e-learning centers, e-Education resource centers, computer training centers, language labs and multimedia lecture rooms have been installed in all universities and colleges under the MOE, with a view to helping learners achieve their maximum learning potential through increasing the quality and relevance of education programmes being delivered.

To help improve the quality of higher education, five seminars were held for academic staff between 1997 and 2000 which examined various key issues in tertiary education such as the relevance of existing courses, the introduction of cumulative assessment and a credit system to replace the existing assessment system, improving teacher quality through the utilization of ICTs in higher education, the creation of an alternative delivery modality for higher education, as well as activities to promote human resources development. Great emphasis has been placed on the necessity of upgrading activities to improve teacher quality and to enhance the flexibility and openness of the existing higher education system, especially with regard to the university distance education system.

Libraries in higher education institutions are being modernized, using ICTs to transform them into Electronic Information Resource Centers, with the long-term aim of making these services accessible to the user from his/her home. As a first step, a fiber optic LAN has been installed which connects academic departments at Yangon University with the University's Central Library, where Intranet services are available. An Internet and e-mail service has also been made available to departments in higher education institutions under the MOE, facilitating linkages with institutions within the country as well as with international education networks. A computerized system has also been introduced with regard to the management of higher education to facilitate the systematic storage, retrieval and utilization of higher education management data.

For teacher development, although most experiences have focused on increasing access to training opportunities, the learner centers have had a big impact on improving the quality of career-long teacher professional development, and further applications are likely to reflect a greater convergence of the twin goals: extending access and improving quality.

### *Community Participation*

In most developing countries, a crucial issue concerns who should cover the costs associated with the utilization of these technologies for education purposes. To what extent should it be the responsibility of the government, and how much of the costs involved should be shared by the users? In Myanmar the situation is that the government has taken the initiative to invest the up-front costs involved with launching an innovative education system utilizing ICT's but has encouraged the community to share the costs involved in operating such a system.

Traditionally, in Myanmar there has always been strong collaboration between the government, parents and the community when it comes to providing resources for education, especially in rural areas. For example, parents and communities voluntarily provide buildings and equipment for

primary schools. There are School Boards of Trustee (SBT) and well-wishers are encouraged to donate computers or ICT equipment and construct new buildings for basic education schools. However, some rural and border areas do not have the knowledge, experience or resources necessary for them to invest in new ICTs such as computers, and so the government needs to bear most of the costs involved.

Although accurate up-to-date data in short supply on the matter of community involvement, the EFA NPA (Ministry of Education, 2003d) reported that community contributions for construction, multimedia equipment, and for a trust fund for poor students were approximately Kyat 7 billion between the 1999 and 2002 academic years (1US\$ = 450 Kyat according to the official rate). This illustrates the fact that in Myanmar, the role of the community is always significant in this regard. The EFA Fact Finding survey of 1,200 schools in 7 townships reported on the percentage of primary schools receiving community support, such community support taking the form of parent-teacher association (PTA) fees, parents' donations, SBT donations, individual donations, local authority donations, NGOs donations and other donations. The report shows that community support in urban areas is significantly lower than in schools in rural areas. For example, in 2002 community donations in urban schools were 14.6% compared to 19.2% in schools in rural areas.

#### Lessons Learnt in Myanmar regarding the Application of ICTs to Education

A number of lessons emerge from the Myanmar experience which may be of value to other countries, at similar levels of development, as they grapple with the problems associated with achieving EFA in a cost effective way, and in so doing turn their attention to examining the potential that ICTs offer with regard to achieving EFA and lifelong learning.

The main lessons learnt from the Myanmar Experience are as follows:

*Relevance for both Developing and Developed Countries* : Utilizing ICTs in education is not just helpful for developed countries, but if handled properly can also be a cost effective way for developing countries (including Least Developed Countries) to improve access to, and the quality and effectiveness of, their education systems. Evidence shows that, contrary to popular belief, using the ICTs in developing countries can often be more cost-effective than are conventional schools.

*Reaching Remote Areas* : ICTs provide an opportunity to reach learners and teachers in remote and isolated areas who would normally experience great difficulty in having access to high-quality schooling, and professional development courses, since the transmission of information and knowledge unconstrained by distance. However, some groups remain excluded from these developments, such as those in areas without electricity, although attempts are being made to overcome this problem through the use of such means as re-chargeable battery and photo-electric cells.

*Teacher Development* : ICTs can be particularly effective in promoting the professional development of teachers, especially those in remote areas, in that teachers can upgrade their qualifications and skills without there being a need for them to leave their workplace and undertake travel to attend in-service courses. Teacher development through distance education is generally less costly in terms of travel and lost time on the job than are traditional modalities. Thus ICTs can both directly and indirectly improve the quality of teaching.

*Supplementing Conventional Delivery Systems* : ICTs are often most effective when they are not used on a stand alone basis, but where they supplement conventional delivery mechanisms.

*Improving the Quality of Education* : Utilizing ICTs is not just for distance education, but can also be used to enhance the richness and quality of education in conventional schools and classrooms.

*Leadership and Guidance* : In developing policies and programmes to utilize ICTs, education authorities need to give clear, concrete guidance to educators and learners as to how ICTs can be most effective in promoting EFA, lifelong learning and other key education policies. Such policies and guidance make the implementation of specific strategies in utilizing ICTs for teaching and learning easier to effectively manage and implement.

*Adoption of an Action-research Approach* : In the development and implementation of education programmes utilizing ICTs, it is important to engage in a process of continuously monitoring outcomes, rather than just evaluating at the end of the programme implementation phase, so that, in the light of such continuous evaluation, adjustments can be made during the life of the programme to ensure that effectiveness is maximized.

*Integration of Technology into a Learning System* : Experience in Myanmar has demonstrated that the affordable and effective integration of technology into an existing education system is much more complicated than

was initially anticipated. In order to maximize educational possibilities regarding the use of ICTs, it is important to ensure (i) a careful analysis of educational objectives and plans for reform, (ii) that the IT plan is strategically included in the overall educational development plan, (iii) that there is a clear understanding of the full potential and appropriateness of technologies for specific teaching/learning processes, and (iv) that effective and affordable ICT applications are created which are appropriate to meeting the specific needs of learners and to the further development of technological knowledge and managerial skills.

*Technical Familiarity in the Learning Environment* : There may be some resistance on the part of learners concerning the adoption of ICTs either because they are resistant to (or afraid of) change or else because have genuine difficulties in coping with the application of these new technologies to their existing learning environments. There may also be resistance on the part of learners to accepting new ways of communication and to changing familiar teaching-learning procedures. Particularly in rural areas, some learners (and teachers) are defensive concerning the adoption of new developments and see these as threats. These learners, unfamiliar with an ICT enhanced learning environment, often are reluctant to use technologies like radio, television and computers in the teaching-learning process. Many teachers and learners in rural areas are often not readily receptive to the introduction of new technology-centered learning process, and would prefer to continue to rely on traditional memorization-oriented learning process. Partly due to such factors, a review of the use of distance education in Myanmar shows that although the provision of distance education has involved a greater mix of teaching/learning modalities, printed materials remain the main modality.

*The Quality of ICTs Applications in Education* : In order to ensure that ICT applications are most effective, it has been demonstrated that one of the most important factors in ensuring the success of ICT applications to education, and to providing students with an education to face the challenges of the Knowledge Age, is to make sure that these ICT applications are of high quality and are relevant to the learning situation they seek to address. However, to enable this to occur there are a number of important issues that need to be accommodated, namely: the need for a supportive infrastructure to enable the effective use of these technologies; the availability of qualified personnel to implement changes; and, the production of courseware which is appropriate to local conditions. The integration of some technologies, such as computers, into traditional education systems often takes some considerable time to become widespread due to the need to procure expensive items of equipment, the importance of teacher train-

ing, and the need for communication connections to be widely and readily available.

*Managing the Innovative Process* : ICTs are shifting the responsibility to educators and governments for managing the innovative process in ways that have not happened in the past. Policy makers, for example, have to make decisions about which innovations will strengthen the teaching and learning process.

*Need for High Investment* : Although the incorporation of ICTs into learning systems is associated with increasing access to and the quality of teaching/learning, the matter of the costs associated with ICTs is a major determinant of the extent to which these facilities can be introduced.

*Developing New Types of Learning Skills* : The introduction of ICTs creates completely new ways of interaction among students, and ways of communicating between teachers and students. It has been found that students may tend to be less motivated in initiating self-study education and may face some difficulties in becoming comfortable and familiar with the technologies and Learning Centers concept. The reasons for these difficulties are critical to the acceptance, and the effective introduction, of technology-based Learning Centers within an existing system. Consequently, these factors can delay the introduction of a new technology-based Learning Centres concept and might influence the further implementation of these technology-based Learning Centers. To overcome these hindrances, and to increase the amount of time learners spend effectively at the technology-based Learning Centers, there is a need to introduce a new communication model. This model should be able to upgrade the learning skills for the learners which means a new way of learning.

*Developing a New Type of Professionalism* : Teachers need to be trained to become knowledgeable and skilful facilitators when developing a technology-based learning environment, while younger generation students are often faster than are others in learning new technologies. Distance education systems and programmes using ICTs also demand specialized skills that are rarely found within the traditional education system in Myanmar.

*Centralized Broadcasting Program for Rural & Urban Disparity* : In response to meeting the needs of those in rural areas and the diversity of needs of ethnic national groups, educational programmes need to be developed in these groups in their own mother tongue, rather than through centralized broadcasting in the dominant national language, which is the Burmese language.

*Experiences in Private Public Partnerships* : It is essential to develop a coalition among private sector parties, other Ministries and the MOE to meet the educational objectives through the ability to 'bundle' different core competencies. This offers a degree of flexibility that is able to strengthen the education delivery system. In developing an integrated Private–Public Partnership communication network, effective management processes have become a major concern for the MOE.

*Community Involvement* : The role of the community is always significant in Myanmar. Since the improvement of e-Education is not only dependent on the government but also on the participation of communities, upgrading public awareness within the country regarding ICTs and education is an important challenge for adopting e-learning successfully in Myanmar.

*The Pattern of Influence on Choosing Technology for Learning and Teaching* : Community participation in providing funding for school expenses is an integral part of the educational development in Myanmar, particularly since international donor assistance was phased out in the mid-1990s. The MOE is partially dependant on donors for funding, especially at the basic education level. These donations can support schools with regard to technologies such as radio, television, or computers to assist in classrooms. Theoretically, the key to understand the management of not-for-profit organizations is to learn who pays for the delivered services. If the recipients of the services pay only a small proportion of the total cost of the service in question, such as is the case in the school system in Myanmar, the strategic managers of schools are likely to be more concerned with satisfying the needs and desires of the funding sponsors than they are of those people who are receiving the service (who, in the case of education, are the learners). As a result, in Myanmar the school or university's decision-making can be influenced by the sponsors and only marginally influenced directly by the students. Thus, the choice of technologies should be derived from an understanding of the ability of students to use the particular chosen technology. This can also lead to incompatibility in using technologies and a lack of standardization.

*Centralization Versus Decentralization* : Due to community cost sharing, significant power and authority have been decentralized to each set of schools on a geographic basis, where each has a different technology with their own responsibilities. In contrast, the education delivery system via the satellite is a centralized one especially the development of instruction modules and courses and the distribution of these centrally developed materials across a large number of e-learning Centers.

*Developing Infrastructure* : The use of ICTs in education requires a mixture of infrastructure to support the multiplatform of the Myanmar education system, in which old and new technologies are mixed. Most of the ICTs applications for education in Myanmar rely on radio or television and that requires facilities for recording and broadcasting programmes. MOE is also trying to provide users access to receivers. However maintenance of the receivers is crucial for long-term effectiveness and therefore maintenance costs have also to be considered.

### Conclusion

This case study leads to the conclusion that ICTs can be used to reach underprivileged groups, either rural children or young adults who are not able to continue their learning opportunities in large countries like Myanmar. It is likely that learning experienced with ICTs in Myanmar is greater than at the conventional school system. The modes of strategic decision making, on the choice of technologies and the modalities to utilize to achieve different educational objectives, seems to develop out of a sequence of incremental commitments which, over time, shape the MOE to become a technologically-based learning organization. According to Wheelen & Hunger (1998, p. 18–19), which is based on the work of Henry Mintzberg (1973), the MOE might therefore follow an approach called *logical incrementalism*, which is a synthesis of the planning, adaptation, and, to a lesser extent, the entrepreneurial modes of strategic decision-making in providing educational services. As these researchers point out this approach appears to be positive when technology is evolving in the learning environment and when it is important to build consensus and achieve cooperation among different interest groups and achieve a level of adequate resources before committing the entire organization to a specific choice. In addition, continuous technology introduction forces the education sector to offer proper applications and services to learners and needs to guarantee an innovative capability with regard to the use of ICTs. These challenges require a full understanding of the true potential of various technologies and achieving the advantages associated with developing synergies between old and new technologies, in particular in developing countries. Therefore, the question is how governments, policy makers and practitioners should assess the innovative capacities of ICTs in their education systems and overcome the barriers to innovation, since these are essential for the education sector to make effective proactive strategic choices on technologies and modalities for all.



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