CHAPTER 7

SOUTH ASIA

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INTRODUCTION

The use of information and communication technology (ICT) at the school level is more important today than even before. In addition to the traditional knowledge transfer, ICT enables the creation of "new learners," empowered with tools to be independent and lifelong learners. The use of computers and the Internet provides better opportunities for learners to enrich their knowledge with the latest information, in less time and in better ways. At the same time, "the digital environment has created new challenges — learners who can potentially learn from vastly greater access to resources, but who can also be sidetracked, slowed down, overwhelmed, or tempted to simply copy and paste information without thinking" (Ba et al. 2002). Therefore, it is important to plan and integrate ICT in the school curriculum systematically through teacher training and the deployment of relevant infrastructure. "If technology is to achieve genuinely transforming improvements in schooling for all students, it must be at the centre of school reforms and improvement efforts" (U.S. Dept. of Education 2000).

Today, the emphasis is no longer on learning ICT; rather it is on using ICT for learning. However, although the world is changing very fast in all spheres due to advances in technology, the world of schools is not changing at the same speed, particularly in South Asia, where efforts to bring ICT to the classroom are sporadic. This chapter reviews and documents the school networking initiatives that are in use in South Asia.

REGIONAL OVERVIEW

South Asia, often called the Indian subcontinent, comprises seven countries: India, Pakistan, Bangladesh, Nepal, Bhutan, and the island states of Sri Lanka and Maldives. About one-fifth of the world's population live in this region, which is defined geographically by the Himalayan Mountains in the north, the Karakoram and Hindu Kush Mountains in the northwest, deserts in the west, and dense forest and hills along the Myanmar boarder in the east. The region is also witness to some of the world's most bitter ethnic and regional conflicts. Though culturally akin to each other, historically, each of the seven countries in the region has its own set of problems and uniqueness, often overshadowed by the large landmass of India.

At the one extreme, Maldives boasts almost 100 per cent adult literacy, while other countries, such as Bangladesh, Bhutan, Nepal and Pakistan, have yet to reach 50 per cent. Economically South Asia is a host to some of the world's poorest countries such as Nepal (GDP per capita USD1310), Bangladesh (GDP per capita USD1610), Bhutan (GDP per capita USD1833) and Pakistan (GDP per capita USD1890). On the 2003 UNDP Human Development Index (2003), only two are within the 100 top countries: Maldives (86) and Sri Lanka (99). Table 7.1 provides an overview of some of the basic facts about these countries.

In general South Asian countries have similar problems: low literacy, poor economic conditions, high population density and poor health conditions. Though all the countries are committed to Education for All by 2015, in reality they may not achieve it (with the exception of Maldives and Sri Lanka which already have a high rate of literacy). Because of poor economic conditions, most of the time the final outlay for education in these countries is far below expectations, but there also remains unspent balances at the end of the financial year. In order to provide impetus to development, from time to time the use of "ICT at low cost" or "low cost ICT" has been considered as one of the strategies for collaboration and resource-sharing.

COMMUNICATION INFRASTRUCTURE

It has now been realised that the strength of communication infrastructure of a nation drives the knowledge economy. Thus, South Asian countries are trying to develop

Table 7.1: *Basic data on South Asian countries*

Country	Population								Human Development Index	
	Total in millions in 2001	Annual growth rate in % (1975-2001)	GDP per capita USD (2001)	Gross enrolment ratio (%) 2000–2001	Net primary enrolment ratio (%) 1999–2001	Children reaching grade 5 (%) 1999–2000	Youth literacy % of 15–24 (2001)	Adult literacy of above (2001)	Rank	Value
Bangladesh	140.9	2.4	1610	54	89	n.a.	49.1	40.6	139	0.502
Bhutan	2.1	2.3	1833	33	n.a.	90	n.a.	47.0	136	0.511
India	1033.4	2.0	2840	56	n.a.	68	73.3	58.0	127	0.590
Maldives	0.3	3.0	4798	79	99	31	99.1	97.0	86	0.751
Nepal	24.1	2.3	1310	64	72	n.a.	61.6	42.9	143	0.499
Pakistan	146.3	2.8	1890	36	66	n.a.	57.8	44.0	144	0.499
Sri Lanka	18.8	1.3	3180	63	97	n.a.	96.9	91.9	99	0.729

Source: UNDP. 2003. *Human Development Report 2003*

appropriate policy frameworks and an institutional climate to guide the growth of ICT in their respective countries, and all seven countries today have ICT policies in place (see Table 7.2).

In general, the teledensity (fixed line) is extremely poor. The total telephone subscribers per 100 inhabitants in South Asia (2002) is 4.5 up from 0.6 in 1992 (ITU 2003). However, with the emergence of the mobile telephone, it is expected that the situation will improve substantially, as "one in five people around the world now has a mobile phone, up from one in 337 in 1991" (ITU 2003).

The reality of the digital divide is clear from the fact that computer and Internet access in these countries is very low. Though India had more than 16.5 million Internet users in 2003, that number is low in relation to the population. However, as Table 7.2 shows, India holds 45th place on the Network Readiness Index, far ahead of all the other countries in South Asia.

The extent of ICT infrastructure access for the public in general has to be kept in mind while analysing school networking in South Asia.

Table 7.2: *Communications facilities in South Asian countries*

Country	ICT policy	Computers per 100 inhabitants	Fixed line telephone per 1000 inhabitants	Mobile telephones per 1000 inhabitants	Internet users per 1000 inhabitants	Latest data on Internet users (2003)*	Network Readiness Index rank**
Bangladesh	Yes	0.2	4	4	1.4	204,000	93
Bhutan	Yes	1.0	26	-	7.4	10,000	-
India	Yes	0.6	38	6	6.8	16,580,000	45
Maldives	Yes	2.2	99†	69	36.5	15,000	-
Nepal	Yes	0.4	13	1	2.6	60,000	-
Pakistan	Yes	0.4	23	6	3.4	500,000	76
Sri Lanka	Yes	0.9	44	36	8	200,000	66

Sources: UNDP. 2003. *Human Development Report 2003*

* www.internetworldstats.com/stats.htm

** WEF. *The Global Information Technology Report 2003-2004*

†108.5 as on June 2003, Reported in the *Asian Forum on ICT Policies and strategies, 2003 October 2003*, Kula Lumpur, UNDP-APDIP

SCHOOL NETWORKING

There has been a paradigm shift in the teaching-learning scenario from the industrial age to the knowledge age. The traditional learning environment has changed dramatically (see Table 7.3), forcing all the stakeholders in the school education to change and adapt to the new environment.

Many of these changes can be fostered through the application of ICT which has always attracted the attention of educational planners and policy-makers. Perraton and Creed (2001) in a thematic study of ICT application in basic education, outline the rationale (including four given by Commonwealth Secretariat, 1991) for the use of computers in schools. These are:

- **Rationale 1**: To build a resource of people who are highly skilled in the use of information technology, where governments see information technology as a means of strengthening the economy and want to develop a workforce with vocational skills

Table 7.3: *Paradigm shift in learning environments*

Traditional learning environment	**New learning environment**
Teacher-centred instruction	Student-centred learning
Teacher as director	Teacher as facilitator, guide, consultant
Teacher as knowledge source	Teacher as co-learner
Classroom focused	Community focused
Single-sense stimulation	Multisensory stimulation
Single-path progression	Multiple-path progression
Single media, static presentation	Multimedia, dynamic interaction
Drill and practice	Discovery and innovation
Isolated work, competitive	Collaborative work
Information delivery	Information exchange
Passive learning	Active/explanatory/inquiry-based learning
Factual, knowledge-based learning	Critical thinking and informed decision-making
Reactive response	Proactive/planned action
Isolated, artificial context	Authentic, real-world context
Classroom-bound communication	Worldwide unbound communication
Computer as a subject of study	Computer as tool for all learning
Conform to norm	Creative diversity
Test assessed by norms	Performance assessed by experts, mentors, peers and self

Source: Based on Trilling and Hood (1999) and Olliges and Mahfood (2003)

for computer-related activities, and computer education programmes have been set up to develop a cadre of people with specialist skills.

- **Rationale 2**: To equip all students for a future in which technological awareness and basic computer skills will increasingly be important for greater numbers of citizens. Countries have adopted this approach as they see that, whether or not the country is likely to be a producer of computer hardware or software, its citizens need to be in a strong position to take advantage of technological developments as they arise.
- **Rationale 3:** To use the technology to enhance the existing curriculum and to improve the way in which it is developed. Computer-assisted learning programmes, in which the computer takes over some of the activity of the teacher, fall within this rationale.
- **Rationale 4**: To promote change in education by moving towards a more relevant curriculum and a new definition of the teacher's role. Some computer projects have been designed to shift the curriculum in the direction of practical learning of information-handling and communication skills rather than concentration on memory.
- **Rationale 5:** To allow learners to seek information from a database, especially through the Internet, and use computer technology to communicate with other schools, colleges and learning communities. This rationale opens up new learner-initiated opportunities.

In a recent review of research on ICT in elementary and secondary schools, Ungerleider and Burn (2002) concluded:

- Student attitudes towards computers and computer-related technologies improve as a consequence of exposure to them.
- The use of ICTs for group work can be beneficial if teachers are able to take into account the complex interplay of the age of the students, the kind of task, and the amount of interdependence allowed.
- The use of ICTs for mathematics instruction has a significantly positive effect on teaching high level concepts to students in grade 8 or above.

These conclusions put the role of teachers and integration of ICT in the curriculum as important issues. In fact, "the effective integration of ICTs into the educational system is a complex, multifaceted process that involves not just technology — indeed, given enough initial capital, getting the technology is the easiest part! — but also curriculum and pedagogy, institutional readiness, teacher competencies, and long-term financing among others" (Tinio 2003).

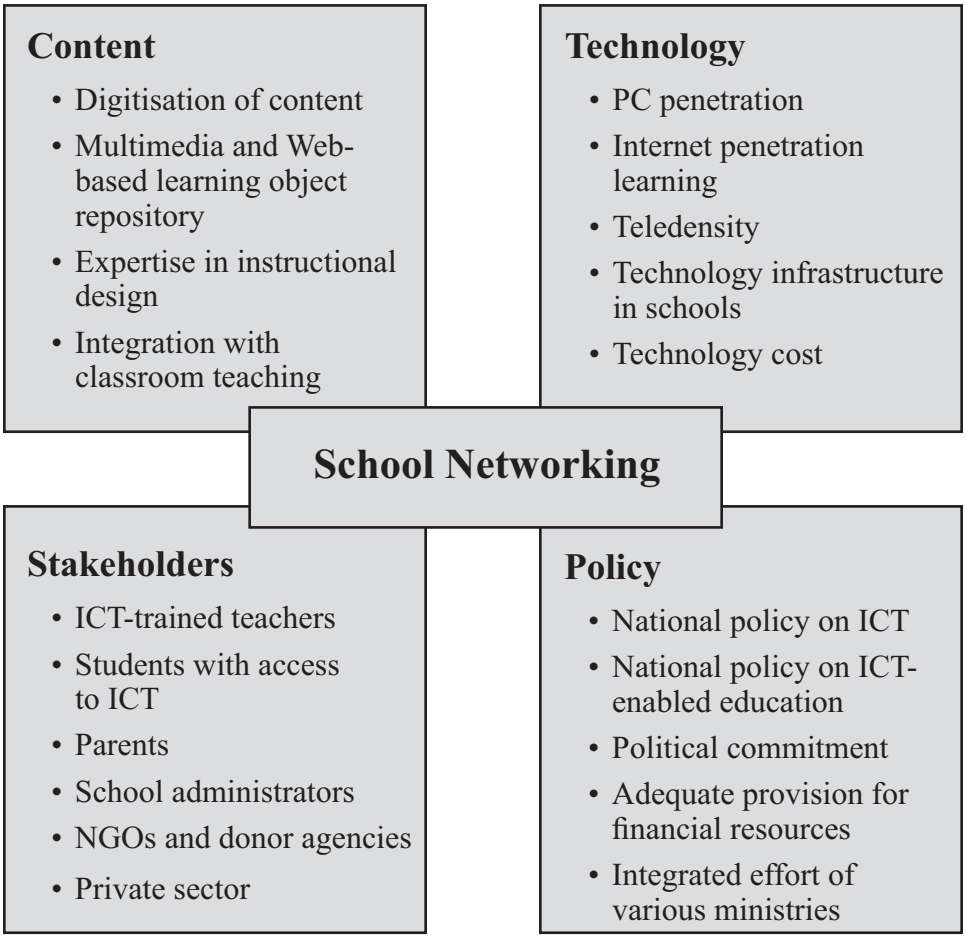
In recent years, the unprecedented growth and development of the Internet and the World Wide Web (WWW) have had a tremendous impact on the thinking of school networking. The Web-based technology provides increased opportunities for learning, including:

- Integration of multiple media into a single application
- Ability to control, manipulate and contribute to the learning environment through interaction
- Location and time independent delivery of course materials
- Capability to serve a large number of learners at a potentially low cost
- A simple standard interface (Goldberg et al., 1996; Blurton 1999)

In order to analyse the school networking efforts in South Asia, a framework for the factors affecting school networking and the driving forces behind their emergence, growth and development has been developed (see Figure 7.1). The four driving forces are content, technology, stakeholders and policy, and each has its own set of factors influencing the process.

- **Technology**: In order to have successful school networking at national, regional and local levels, it is important to have access to technology, especially computers, networks and the Internet. The access should be affordable for schools.
- **Policy**: It is established that having a national policy for a specific sector propels the development, and therefore ICT policy and political commitment to take ICT to schools are important factors for ensuring adequate resources and co-ordination among various players.
- **Content**: Any network becomes successful through the repository of content it has developed through a centralised or distributed co-operative effort. Availability of digital information for school education developed according to the principle of instructional design will go a long way to sustaining school networking efforts.
- **Stakeholders**: They should be the major driving force behind school networks, especially ICT-trained teachers, who can play the role of change agents in inculcating

Figure 7.1: *Drivers of school networking*



digital literacy among pupils and parents. Non-governmental organisations (NGOs) and the private sector can also propel the growth of school networking initiative through fundraising as well as supplying technology-mediated content.

COUNTRY SPECIFIC ANALYSES

Bangladesh

Bangladesh is cradled by India on three sides and opens to the Bay of Bengal on the fourth side.

Mainframe computer technology and multiuser terminals have been in use in Bangladesh since 1964, while PCs were introduced in 1983. The ICT Policy (2002) outlines plans to build an ICT-driven nation comprised of a knowledge-based society (see *www.unescobkk.org/education/ict*). The policy emphasises the key issue of human resource development in the area of ICT, and recommends:

- Building facilities for ICT education and computer-aided education at all levels of education
- Using the potential of ICT for delivery of distance education
- Providing the Internet to the educational institutions and library

However, the National Education Policy of Bangladesh does not include ICT education in its plan for 2010, though a small number of city-based schools do have limited computer access. Computer science education was launched as an optional subject for the secondary level students in 1994, and more than 150 schools are now teaching the subject. A systematic effort to network schools has yet to emerge, but the Bangladesh Computer Council is currently implementing a project to introduce ICT education in more than 1000 secondary schools (Chowdhary 2002).

Wireless goes to school in Bangladesh

The Bangladesh Rural Advancement Committee (BRAC), a non-governmental organisation in Bangladesh, is trying to put computers in 650 rural schools under its management. Since the beginning of the project in 1999, it has so far managed to install computers in 60 schools. Normally a computer is placed in the school library under the supervision of the librarian, who works as an intermediary to help children learn how to use it. Through this project, primary school children are introduced to computers using multimedia CDs. In one of the schools managed by BRAC, at Roverpally, 41 kilometres north of the capital Dhaka, five students share a computer for 45 minutes a week. The computer is connected to the Internet through a wireless link to the BRAC headquarters in Dhaka, which is cheaper and more reliable than using the existing telephone network. One of the girl students, Shahsena (11 years) says, "I can learn mathematics with the computer. If I have a problem with my English, the computer can solve it. The computer can do lots of things." Though the students are yet to make full use of the Internet, this facility gives the local community access as they can send e-mails to their relatives abroad.

Source: Hermida, A. "Wireless Web Reaches Village Pupils." BBC Online News, http://news.bbc.co.uk/hi/technology/2261492.stm.

Bhutan

Sandwiched between two Asian powers — China and India, Bhutan is a relatively small country in the Himalayas. For centuries it has been isolated from the world, and it was only in June 1999 that the Internet and television were introduced in the country.

With a small but well-educated population, a static political climate, all digital telephone network and local call access to Internet from anywhere in the country, Bhutan has decided to leapfrog into the mainstream of ICT development and applications in different walks of public services, including education. *Bhutan 2020* envisions that ICT should make it possible "to access the information super highway that will provide us with the same information and data as those residing in the technologically most advanced nation" (Bhutan Planning Commission 1999). In March 2001, Bhutan adopted the IT master plan prepared by the Division of Information Technology (DIT), which envisages:

- Using information technology as an integral tool to enhance good governance
- Developing ICT and ICT-enabled industries to generate employment and income
- Applying ICT to improve the livelihood of all Bhutanese (Bhutan 2001).

In addition to the DIT master plan, the Ministry of Education has formulated its own plan for computerising all schools in the next 10 years (UNDP 2002).

There are 361 educational institutions in Bhutan, most of them community and primary schools. Computer education is prominent only in the private schools. Interestingly, an independent sector study reveals that 82 per cent of Internet usage is e-mail correspondence in the education sector alone (Pradhan 2003).

The National Institute of Education (NIE) in Samte is responsible for training teachers in the country. UNICEF has recently provided hardware equipment to install a network at NIE. With the successful implementation of the network, the focus now is on developing software for an education management system.

India

India has the largest landmass in the region and overshadows her neighbours in South Asia in all respects — size, economy, population, ICT growth, illiteracy, etc.

The Computer Literacy and Studies in School (CLASS) project, which started in 1984, was the first systematic attempt to use computers in school education, and by 1989, about 2,000 schools had computers (Agrawal 1996). However, this project failed miserably due to problems of maintenance, electricity and lack of useful content.

Since the CLASS project, computer science as a subject has been introduced in many secondary schools, but the use of computers as a learning tool is far from satisfactory. The situation in private schools and in and around cities is quite different, as most use computers and the Internet.

In recent years, there has been tremendous change in the availability and access of computers in schools due to the landmark policy of the National Task Force on Information Technology and Software Development (popularly known as the IT Task Force) in 1998. As a follow-up, the National Council of Educational Research and Training (NCERT), responsible for secondary school education, released the National Curriculum Framework for School Education in 2002. It emphasises the role of ICT in schools:

> The revolution in new technology ushers in a fundamental challenge, converting the information society into a knowledge society…the new technology has a tremendous potential to revolutionise education and transform schools dramatically…ICT is bound to influence and transform the existing curricula, bringing in a new generation of learning material and encouraging the networking of schools (NCERT 2000).

There have been number of efforts towards networking schools either by physical deployment of computers or by providing training for teachers and students. Many of these efforts have been made by NGOs and philanthropic organisations, in collaboration with state governments.

Table 7.4 shows some statistics on availability of computers in Indian states. Three states, Goa, Karnataka and Madhya Pradesh, have taken special steps to bring ICT into the schools; their projects are discussed below.

Goa Schools Computers Project

The Goa Schools Computer Project (GSCP – see *www.gscp.org*) is a community-based project that is attempting to improve the levels of computer literacy and access to computers in the schools of Goa. In collaboration with the Department of Education, the Knowledge Initiative Trust manages the project which envisages helping all secondary schools in setting up a computer laboratory with at least eight Internet-ready computers. The GSCP uses the Linux operating system and works on the concept of "thick server-thin client" (a robust network server with dump terminals) to provide low-cost computer access. Started in 1995, this path-breaking initiative has proved to be highly successful in making available at least one computer to all the schools of Goa.

Computer Assisted Learning Centre (CALC)

The Computer Assisted Learning Centre (CALC – see *www.azimpremjifoundation.org*) was started as a pilot project in 34 schools in Bangalore (the Silicon Valley of India) and adjoining rural areas by the Azim Premji Foundation in collaboration with the Government of Karnataka in 2001. It has so far covered 90 schools in 14 districts, and there were plans to cover 135 more schools by 2003. Each school is provided with six to eight computers, and children from standard 3 to 8 have designated periods in their timetable to attend the CALC. The emphasis is not to learn computers, but to learn curriculum-related topics through interactive multimedia.

Table 7.4: *Distribution of computers in schools in some Indian states*

States	Approximate no. of schools	No. of schools with computers	Percentage
Andhra Pradesh	8897	1000	11.23
Goa	430	430	100.00
Karnataka	9713	600	6.17
Kerla	2585	600	23.2
Maharashtra	13,906	-	< 5.0
Tamilnadu	7357	6001	8.15

Source: Computers for India, www.digitalequalizer.org

Headstart

The Rajiv Gandhi Shiksha Mission (Rajiv Gandhi Literacy Mission) of the Government of Madhya Pradesh has initiated a computer-enabled education programme called Headstart (see *www.bhojvirtualuniversity.com/abt_headstart.htm*). Under Headstart, a unit of three computers is provided in the nodal school of a school cluster called Jan Shiksha Kendra (JSK). More than 16 CD-based lessons on mathematics, environmental studies, Hindi and English have already been developed as a culturally familiar interactive learning tool. So far 648 JSKs have been covered under the scheme, and more than 4000 teachers have been trained by the M.P. Bhoj (Open) University. The plan is to cover all the 6500 JSKs by the end of 2004 (Sharma et al. 2001).

Schoolnet India

Schoolnet India Limited, a wholly-owned subsidiary of Infrastructure Leasing and Financial Services Limited (IL&FS), has developed a framework for technology-enabled learning, called Networked Learning that is delivered through the Web and serves as an aid to teachers in their pedagogic delivery (see *www.schoolnetindia.com*). Through networked learning, Schoolnet India provides the teacher with a powerful teaching resource, and the student with an interesting and motivating learning medium.

The Schoolnet India portal is a one-point access to networked learning that has links to educational sites, access to lesson plans, teaching materials mapped and broken down into modules and lessons each with their own learning outcomes, assessment strategy, resources and activities.

Schoolnet India provides necessary training to teachers so they can adapt to a new way of teaching. The teacher development programme is divided into three phases:

- The foundation course introduces teachers to technology.
- The intermediate courses expose teachers to advanced technologies and their application in specific subject areas.

EDUSAT: India's dedicated educational satellite

"Educational broadcasting suffers when there is a demand of other sectors like entertainment."

Dr K. Kasturirangan, Chairman,
Indian Space Research Organisation (ISRO), 23 July 2003

The Government of India has planned for a dedicated satellite for all sectors of education system in the year ahead. It is planned to be launched by the end of 2004 with the support of the indigenous Geo Synchronous Launch Vehicle (GSLV) – GSAT3. With capability to provide six Ku-band transponders for regional transmission, six transponders in the C-Band, and one Ku-band national beam, the satellite will have capabilities of television and radio broadcasting, videoconferencing, audio and video return links, and computer-based data transfer. It will have 72 channels to meet the demands of "educating the nation" through area specific channels in formal educational and lifelong learning.

Source: Report of the National Consultation on EDUSAT. 2003. New Delhi: NIEPA.

- The advanced course take teachers through a project work, in which they become content creators.

The networked learning concept is being implemented through the K–10 programme in 770 schools, including 330 government schools covering 300,000 students.

Maldives

In the southwest of the Indian subcontinent is Maldives, an island nation with 1192 islands scattered across the Indian Ocean. Only 200 of the islands are inhabited, while 87 others are developed exclusively as tourist resorts. About one-quarter of the country's population lives in the capital city of Maldives.

The Government of Maldives gives high importance to information technology and has incorporated it in the educational curriculum. The training programmes in the schools are mainly run in collaboration with the local information training industry. Special rates for Internet access are also provided to the education sector (Maldives 2002).

Currently, only 75 schools out of 281 have computers. The Ministry of Education has started a Basic Compute Literacy Project aimed at providing computer literacy for all students who complete primary education, envisaging one multimedia computer for every 60 students (Shareef and Kinshuk 2003). As primary school education is compulsory in Maldives, this project aims at universal computer literacy.

Multipurpose Community Telecentres

Recognising the geographical size and distribution of the islands with displacement of population, the Government of Maldives has initiated a plan to create Multipurpose Community Telecentres (MCT) at island locations where a variety of ICT services such as telephones, fax, voice mail, Internet, TV and radio can be made available for information and recreation to people at affordable costs. It is expected that the MCTs will be the answer to the diseconomies of scale and other logistical constraints (see *www.apdip.net/asain-forum*).

Nepal

Nepal is a landlocked and mountainous country that lies between China and India in the Himalayas. The Information Technology Policy (2000) of Nepal has a vision to put "Nepal on the global map" by 2005 (see *www.saarcnet.org/newsaarcnet/govtpolicies/nepal/ITPOLICY.html*). Its objectives are to make information technology accessible to the general public, build a knowledge-based society and establish knowledge-based industries. In order to achieve these objectives and implement the policy, the action plan includes human resource development strategies as follows:

- Computer education for all by 2010
- Computer education provided at school level
- Internet facility made available free of cost to universities and public schools for four hours a day
- Computer education provided for in-service teacher education programmes

Immediately after formulating this policy, the Department of Education provided computer training to teachers of 19 selected public secondary schools in the country (Dhakal 2001).

Computer penetration in the education system in general is low in the country. In 2000, the ITU Survey of Nepal's Internet users estimated that international organisations based in Nepal are one of the major consumers of Internet services (20 per cent). Home users account for 20 per cent, NGOs 15 per cent, educational institutions 10 per cent, government 5 per cent and business organisations 30 per cent (ITU 2000). In the secondary school level, computer is taught as an optional subject, available in most of the private schools in the Kathmandu valley (Silwal 2002). Though the Government of Nepal has started providing free e-mail facilities to public schools, most of them are not yet equipped with ICT facilities.

Shrestha and Pandey (2003) have identified the major factors hindering access to ICT services in Nepal as inadequate rural telecommunication facilities and electricity infrastructure; a large percentage of the population below the poverty line (38 per cent); widespread illiteracy; and the cost of computers, software and Internet service providers (ISP) subscriptions. Currently there are 12 ISPs operational in the country.

Pakistan

Pakistan has India, Afghanistan, Iran and China for neighbours. It is nearly four times the size of the UK and it is the second largest economy in the South Asia.

Pakistan adopted a national information technology policy in August 2003, which envisions "to harness the potential of information technology as a key contributor to development of Pakistan, and the broad-based involvement of the key stakeholders is a must for its sustainable development" (see *www.unescobkk.org/education/ict/v2/info.asp?id=11113*). Its goals include:

- Extensive use of information technology applications in education and other sectors with widespread use of Internet
- Development of an extensive pool of trained information technology manpower
- Establishment of efficient, cost-effective and equitable access to national and international networks

The policy promotes the use of computer-assisted learning as one of major strategies in developing human resources. There are 80 private sector ISPs in Pakistan in addition to the public sector operators for data communication. Internet access is available in all major cities (Masood 2003).

The federal and provincial governments of Pakistan have been involved in computer literacy projects since 1993. During 1993–1995, more than 150 schools were covered under a computer literacy project. In 2002, the federal government declared plans to provide at least one qualified computer teacher to every public secondary higher secondary schools (see *www.dawn.com/cgi-bin/dina.pl?file=top9.htm&data=20020428*). Under this massive project, the government will distribute 200,000 computers to secondary schools.

There are also few non-governmental initiatives bringing the benefits of computers to schools in Pakistan.

Pakistan Association for Computer Education in Schools (PACES)

PACES (see *www.dawn.com/events/it-supplement/itsup5.htm*) is the leading promoter of computer use in the school curriculum in Pakistan. It all started in 1985 as a small project

to train 37 teachers from 16 schools of Karachi. Similar training events continued in 1986 and 1987 to cover teachers from Lahore, Islamabad and Rawalpindi. Since then PACES, through its computer literacy project, has donated computers to 50 schools.

School Links

The British Council (BC), Pakistan, has initiated a project to link schools in Pakistan and the UK (see *www.britishcouncil.org.pk/education/paksclnk.htm*). Under this project, the BC provides Pentium 4 computers to schools in Pakistan to help students and teachers share information, ideas and experiences with their counterparts in the UK. It is also envisaged that these computers will contribute towards capacity-building of schools in Pakistan through quick and cheaper information flow, inculcation of information technology skills and development of Web sites of schools.

Sri Lanka

Sri Lanka, a small island nation in the Indian Ocean, was the first country in South Asia to liberalise its economy in 1977. Facing formidable challenges in the last two decades related to peace and development, Sri Lanka has done tremendously well as far as its education and health sectors are concerned. In 2003 it had a Human Development Index value of 0.729 and ranked 99 among the countries in the world, and second in South Asia.

Although Internet and e-mail facilities have been available in a few selected academic institutions since 1984, Internet access only became available on a commercial basis in 1995 when Lanka Internet Service started its operation (Gunawardene and Waltgama 2003). However, computer education at the school level started in 1983. With the assistance of the Asian Development Bank (ADB), Computer Resource Centres (CRCs) were established to provide computer literacy and vacation courses to students. Today, there are 73 such CRCs spread across the country.

In February 2001, the Ministry of Education prepared the National Policy on IT in School Education (NAPITSE), which was approved by the Sri Lankan cabinet in October 2001 (see *www.unescobkk.org/education/ict/v2/info.asp?id=11117*). The NAPITSE has a three-phase strategic plan to implement the policy from 2002–2007. It focuses on using information technology in teaching and learning, as well as in the management of the education system. The goals are to create lifelong learners who are information literate.

Secondary Education Modernisation Project

The Ministry of Education is the central co-ordinating agency for computer education in schools. It is currently implementing the ADB-founded Secondary Education Modernisation Project (SEMP – see *www.adb.org/documents/news/2000/nr2000091.asp*).

SEMP focuses on improving quality, access, efficiency and management of 2300 secondary schools in the country. The project comprises three components:

- The modernisation of secondary schools through modern teaching methods and evaluation to improve quality, and the development of computer literacy to narrow the digital divide
- The expansion of educational opportunities for poor students by increasing the number of full-time schools in the rural areas

- The improvement of the delivery of educational services including modernising the national examination system and training of relevant agencies

It is expected that there will be improvements in academic subjects and skills including language, mathematics, science and computer literacy and that the project will provide relevant training to 40,000 teachers and 6000 administrators at the central and local level.

TEACHER TRAINING OPPORTUNITIES

Preparing teachers for tomorrow is a challenging task that many South Asian countries recognise. In answer to that challenge, many have included strategies to train school teachers in the use of ICT for teaching. This requires teachers to be digitally literate, which means:

- Using troubleshooting strategies for computers
- Understanding the different usages of computers
- Knowing how to use common tools like word processors, e-mail and Web searching
- Being able to use instant messaging and other communication tools to communicate with peers and others
- Using the Web to find, evaluate and use relevant information, and creating such Web-based information

Teacher training programmes on ICT are available in Bhutan, Sri Lanka and India, and are mostly embedded within computer deployment projects.

- In Bhutan, the United Nations Development Programme (UNDP) is paving the way towards digital literacy by conducting orientation training for high school students, unemployed youths and school teachers through cyber cafés (Pek 2001).
- The Sri Lankan Ministry of Education with the support of UNESCO is currently implementing a project to train teachers in information technology to meet the emerging needs of the new learning environment. This project has rightly identified that having information technology skills is different from having skills to use information technology to teach various disciplines/subjects. At the end of the project in 2004, it is expected to cover 2428 schools in 25 districts of Sri Lanka (see *www.unesco.org/bangkok/education/ict/unesco-projects/JFIT/srilanka.htm*).
- The Intel Teach the Future Programme currently being implemented in India helps classroom teachers learn how to best use technology to improve teaching and learning. This worldwide programme was launched in February 2002 in India and covers 35 cities. So far it has trained 253,502 teachers (see *www.educationinindia.net*).
- World Links (see *www.world-links.org*), a global learning network that links thousands of students and teachers worldwide, started its India Programme in January 2002 as a professional development initiative for preparing teachers who would use computers in classrooms. In Phase I, it covered 32 rural and underserved schools in Delhi and Karnataka. In conjunction with its local partner, Schoolnet India, it plans to reach 125 more schools in Delhi, Karnataka, Kerala, Andhra Pradesh, Punjab, Gujarat and Tamil Nadu in the second phase. In 2002, World Links covered 200 teachers and had plans to provide training to 1500 teachers in 2003. It has developed five 6-day training programmes of 40 hours each to train teachers. The five programmes are Introduction to the Internet for Teaching and Learning; Introduction to Tele-collaborative Projects; Curriculum and Technology Integration; The Diffusion of ICT Innovation; and Planning for School-based Telecentres.

- Jiva Institute, a NGO initiative in India offers a complete training package and certification programme — Jiva Education Technology Specialist (JETS) to improve the competence of teachers to integrate computers, multimedia and Internet in school curriculum (see *www.jiva.org/education/index.asp*). The programme includes three textbooks, three workbooks and a CD-ROM as a self-learning package. The courses in Level 1 (Foundation) are Computer Basics for Teachers, Multimedia and Internet for Teachers and Teaching with computers. Level 2 (Integration) courses are Technology and Curriculum Integration, Multimedia and Curriculum Integration and Internet and Curriculum Integration.

Apart from these training opportunities, many other curriculum frameworks exist. One such curriculum framework on Web-skills training for primary school teachers was presented in the International Workshop on ICT for Professional Development of Primary Education Personnel organised by the Distance Education Programme — District Primary Education Programme (DEP-DPEP) of the Indira Gandhi National Open University (IGNOU) (Mishra 2001). IGNOU has also developed many other computer literacy training packages, which are available in print medium with audio and video support.

CONCLUSION

The school networking initiatives in the South Asia generally follow the five approaches identified by Perraton and Creed (2001) for computers in schools:

1. Direct provision of computer hardware and software to existing schools (e.g., in GCSP, India; in Nepal; and in SEMP, Sri Lanka)
2. Building new customised schools or computer suite annexes (e.g., in CALC, India, and in Pakistan)
3. Bringing resources to schools via mobile units (yet to come up in South Asia)
4. Providing access for children via a variety of community-based resource centres such as libraries, technology access community centres and non-profit organisations (e.g., in BRAC, Bangladesh; in Headstart, India; and in Maldives)
5. Mediated access, where someone with access to a computer and Internet helps children who do not have access (e.g., in Bhutan through cyber cafés)

Though there is national information technology policy in all the countries of South Asia, to date no national programmes are in place to link the schools. However, it must be noted that it would be a gigantic task for a country like India to link all the schools through any physical network. Therefore, the Web-based approach taken by the privately managed Schoolnet India is an example to follow, developing content in a "learning object" framework that can be used by any school, teacher and student, leaving access to computers and Internet.

Providing access to computers and the Internet should be a major priority for governments of the South Asian countries in the next couple of years. In fact, smaller countries like Bhutan and Nepal already have facilities for subsidised access to the Internet for schools.

From the perspective of drivers of school networking framework described earlier, the school networking initiatives in South Asia face problems in the areas of technology and content. Goa Schools Computers Project can be replicated to have cost-effective technology access through the use of open source software and refurbished computers.

But governments have to initiate integrated mechanisms to develop digital multimedia contents for the school level. The available content in the private sector is too costly for schools. On the other hand, the cost of content will also come down because of economies of scale, as the access to technology in school increases. School networking projects in South Asia, by and large, are driven by the Ministries of Education, NGOs, international donor agencies and private sectors. However, it is significant to note that teacher training has been embedded in many of the projects.

In spite of the common cultural linkages, because of poor educational facilities of the South Asian countries, there has been no special effort at the regional level to collaborate and develop school networks. It would be in the interest the region to develop a common resource pool through Web technologies to share, save foreign exchanges and increase the quality of education at the school level.

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