

# Information and Communication Technology for Education in India and South Asia



## Essay I

### *Policy Coherence in the Application of ICTs for Education*

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PRICEWATERHOUSECOOPERS 

## Executive Summary

This essay on **policy coherence**<sup>1</sup> examines the different elements that must be addressed in any policy framework that seeks to effectively integrate ICTs in education. It delineates an “ICT for Education Ecosystem,” where coherence needs to be achieved between different arms of the government, different implementation agencies and supported by financial allocations, detailed implementation plans, monitoring and evaluation strategies, as well as a community demand for ICTs. The essay provides a study of existing policies in the focus countries, both in the education and the ICT sectors, to see what are the enabling features and the gaps with respect to key aspects such as content development, curriculum design, infrastructure and capacity building, monitoring and evaluation, as well as use of ICTs in education management. In most focus countries in the region while infrastructure remains a key bottleneck, focusing on adequate strategies for content development and capacity building would maximize benefits and overcome some of the infrastructure gaps. The uneven nature of infrastructure availability in most of these countries means that large sections of the population may not be provided with basic infrastructure, including ICT infrastructure, whereas the urban centers in these countries are a market for increasingly sophisticated applications to run on the existing infrastructure. Therefore, in all these countries a range of ICT applications are available for the education sector. In some cases, ICT affords a cost-effective way of ameliorating disadvantages of location in remote areas, where adequate teaching staff and school infrastructure is difficult to establish, by providing virtual access. The essay highlights the need for organically developed integrated ICT for education policies that are firmly grounded in pedagogical practices and which use ICTs primarily as a tool to achieve the desired learning objectives.

## Policy Coherence in the Application of ICTs for Education

Education is a key requirement for social and economic prosperity. In the developing economies of South Asia, it is often seen as the only means to social mobility and financial self-sufficiency. Governments across these countries recognizing the significance of education have devoted considerable resources in terms of money and comprehensive programs for improving the access, quality, and delivery mechanisms of education.

The proliferation of ICT tools in education at all levels has been an emerging trend in the South Asian region. ICTs in developing countries are often seen as an opportunity for achieving developmental goals of the country. Sometimes due to felt need, due to observing success stories, and at other times due to the success of the IT industry as a whole in the region, ICTs are being used enthusiastically often without a real understanding of their relevance and impact.

Thus, quite often initiatives are planned without a proper policy framework to support the success of these initiatives. Furthermore, the nature of ICT adoption in education requires the planning process to combine micro-level planning at the smallest unit, say a classroom, to the highest level of

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<sup>1</sup> An early version of the essay on Policy Coherence in ICTs for Education was presented at the Workshop on Policy Coherence for ICTs for Development organized by InfoDev and the OECD in Paris on 10th–11th September 2009.

macro-planning vis-à-vis basic infrastructure policies, connectivity policy, communication policy for the nation as a whole.<sup>2</sup>

Thus policy coherence has to be achieved at many levels ranging from education policies to ICT policies, telecommunication policies, and infrastructure policies as well.

The South Asian countries in our study, broadly recognizing the importance of ICT for development, have put in place some sort of policy framework for the growth of ICTs. ICT applications in all sectors are an evolving phenomenon; however, it is interesting that education particularly is both a consumer and producer of ICT. Without a robust educational framework, the required know how for development of ICT applications would not be possible. Therefore, using ICTs to reinvigorate the education process is especially important. If benefits from ICT are graded on a spectrum then in order to achieve the highest order benefits in terms of increase in productivity through ICT service provision, use of ICTs as a tool to improve quality and delivery of our most fundamental processes would yield enormous benefits.

In the countries of study, a broad classification based on educational achievement and infrastructure would place at the top end Sri Lanka and Maldives with near 100 percent literacy, universal primary education, and the basic infrastructure in place. India, Bhutan, and Pakistan in the next tier with lower literacy rates but with broadly the systems in place for achieving higher educational attainments in the future. In the final tier would be countries like Nepal, Bangladesh, and Afghanistan each with significant political, geographical, and educational upheaval, which are struggling to institutionalize processes and achieve basic services.

### Policy Framework for ICTs for Education

In most of the focus countries, policy articulations for ICT for education are made in one of the following ways, (depicted in Figure 1):

India, Sri Lanka, and Pakistan have either developed or are in the process of developing distinct ICT in education policies. The common features in their Policy recognize the importance of ICT both as **a subject and as an instructional aid.**

India’s policy making process was initiated through a stakeholder dialogue on formulating a draft national policy for ICT in education, led by the Ministry of Human Resource Development and Global eSchools Initiative and Centre for Science, Development and Media Studies (CSDMS). Based on feedback received, a draft ICT in Education Policy has now been published for comments and

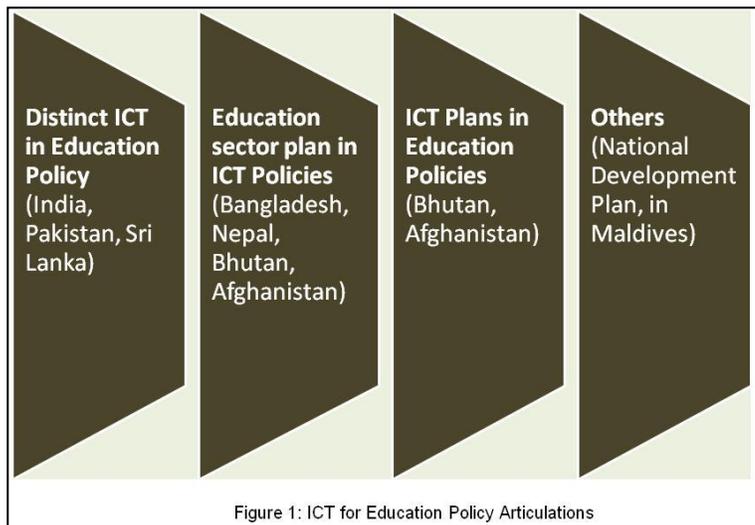


Figure 1: ICT for Education Policy Articulations

<sup>2</sup> UNDP

revision. However, much before the focused policy action, ICT has been mainstreamed in several education initiative and flagship programs of the government.

In Sri Lanka, the National Policy for ICT in Education (NAPITSE)<sup>3</sup> was formulated in 2002, where ICT would be used both in education as well as for management of education systems.

Pakistan formulated its National Information & Communication Technology Strategy for Education<sup>4</sup> through a consultative process in 2004–05. It recognizes the importance of ICT for creating access, improving quality of learning, strengthening teacher education, and improving student achievement. However, for all these countries policy/strategy documents have to be backed with detailed implementation plans. Sri Lanka has a strategic plan of action from 2002–07, but targets set out in the ambitious policy are yet to be realized. Further separate financial allocations have to be made in support of initiatives outlined. Very few countries’ policy documents have extensively outlined a Monitoring and Evaluation methodology to evaluate success of the given initiative or tools used.

In studying the various ICT for education initiatives in the different focus countries, it emerged that initiatives are successful precisely because they are able to pull together many different elements, supported by a robust yet flexible policy framework. Very broadly a graphical depiction of what may be understood as an **ICT for Education Ecosystem** is depicted in Figure 2.

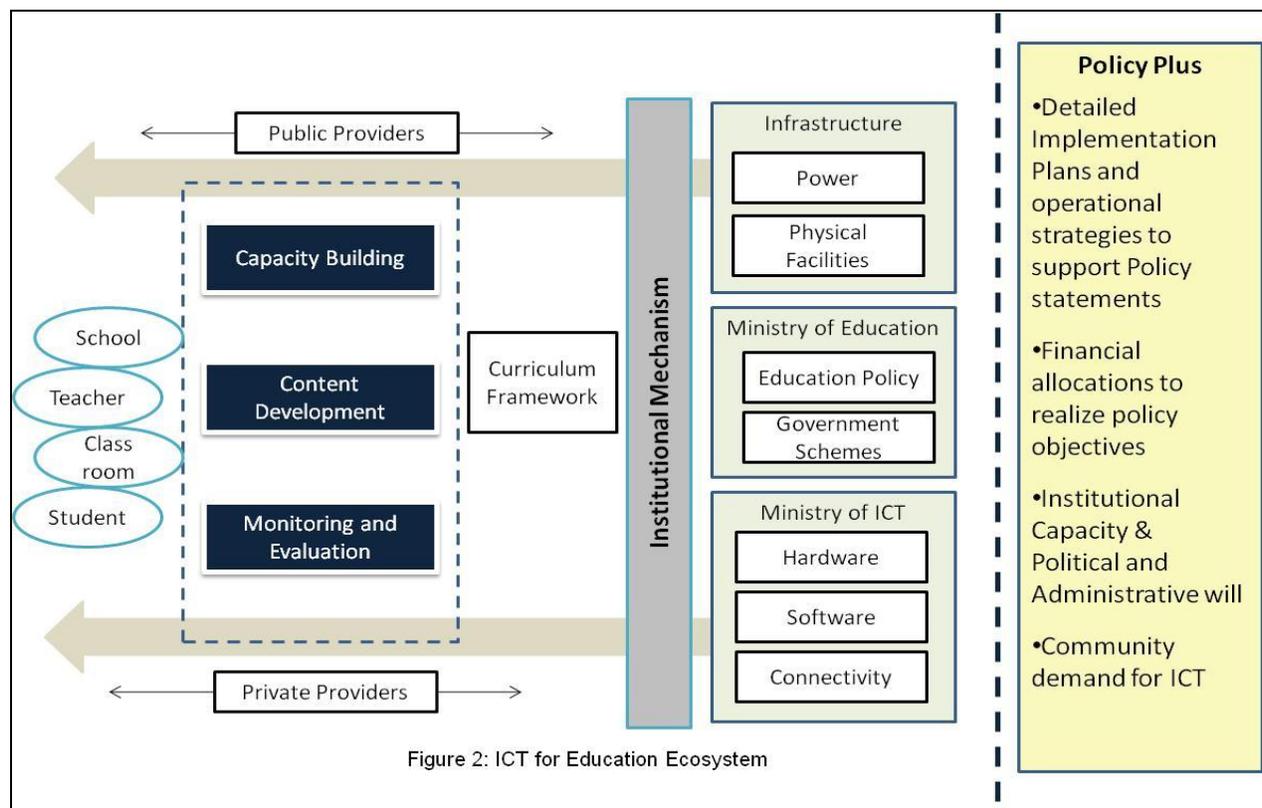


Figure 2: ICT for Education Ecosystem

<sup>3</sup> National Policy for ICT in Education, Government of Sri Lanka, 2002–07.

<sup>4</sup> National Information & Communications Technology Strategy for Education in Pakistan, Government of Pakistan, 2005.

Core infrastructure policies would provide for electrification and physical facilities; the Ministry of Education has the responsibility for articulating the larger education policy and the Ministry of ICT would have in place a broad communications policy as also policies on developing hardware, software, and connectivity.

These policies may then be translated into initiatives and schemes by both public and private providers, through different mechanisms. Initiatives specific to ICT for education would have several critical elements such as capacity building, content development, and monitoring and evaluation strategies. These put together would then be geared toward the student in his environment, ensuring that ICT initiatives actually result in improved teaching learning. In addition to these policy elements, several critical factors like detailed implementation plans to operationalize policy statements, financial allocations, institutional capacity, and also community demand for ICT are all essential to ensure that ICTs are effectively integrated in the education system.

All the aforementioned elements will be discussed in detail in the following sections.

## **Major Elements of an ICT for Education Policy**

Use of ICTs for education is a horizontal activity that requires elements from different verticals to come together to enable meaningful learning experiences for the students. The following major aspects need to be addressed in a Policy for ICT in Education

- **Curriculum**
- **Content/Digital Resources**
- **Infrastructure**
- **Capacity Building**
- **Monitoring and Evaluation Framework**
- **ICT for Education Management**
- **Policy Plus**
  - Implementation Plans
  - Financial Allocations
  - Political and Administrative will
  - Community demand for ICT

## **Content and Curriculum Development**

This is the most significant aspect of the use of ICT in education. If ICT applications are to yield meaningful results they will depend primarily on the quality of the content and curriculum that is

being transacted in the class. There is a need to ensure that ICT is not used simply to teach the old curriculum using the computer and other tools at hand, but that concepts are taught in a fundamentally new way leveraging the advantages provided by ICT. Visualization, experimentation, and learning by doing are some of the hall marks of this new method.

Introduction of ICT in the learning environment is an opportunity, therefore, for rethinking our teaching-learning paradigm at the most fundamental level. As models of learning change, what should be taught in class at what level also needs to be rethought. This is an opportunity to instill in learners the 21st century teaching learning skills.

Based on this curriculum, content needs to be designed which is relevant to the target group. Content development and curricular reform are important pillars and often with all the other aspects in place if these are ill designed, we are unable to see any utilization or performance improvement through ICT.

In the focus countries almost all policies underscore the need for appropriate curriculum and content. Curriculum is usually prescribed for ICT as a subject starting at the secondary school level and at the primary level the aim is to improve general ICT literacy and facility with working with technology. There is also a mention of using ICT as a tool for teaching other subjects. However, strategies for content development have been articulated to varying degrees in the focus countries.

### **India**

The Draft National Policy for ICT in Schools, published by the Ministry of Human Resource Development in 2009,<sup>5</sup> stresses the significance of achieving general ICT competency for all levels at school, appropriate curriculum for ICT as a subject at the higher secondary level, and the need for ICT-enabled teaching learning practices for school education. The policy outlines requirements of different levels of ICT Literacy and Competency from Basic to Advanced and proposes an implementation strategy for ensuring these levels are achieved. In addition, it articulates the need to develop modular courses in different areas of IT at the Higher Secondary level.

The policy recognizes the significance of good quality, locally relevant content in multiple local languages for all learners, given India's linguistic, cultural, and social diversity. It spells out a strategy to develop content in a phased manner by focusing first on the more difficult to teach/understand concepts and subsequently making quality digital resources available for all concepts and disciplines, moving finally toward a model of highly interactive digital resources such as virtual laboratories. National and state level Web-based digital repositories are envisaged that will host content for students and teachers in a range of formats from question banks to FAQs to activities, notes, and so on. Appropriate licensing norms to facilitate open and free access to resources will be highlighted and knowledge of issues like copyrights, restrictions on reuse of content, and so on will be given to all users.

Further to encourage development of quality content educational standards and instructional design models would be widely distributed to ensure quality in the digital content being produced by different agencies.

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<sup>5</sup> National Policy on Information & Communication Technology (ICT) in School Education, Ministry of Human Resource Development (MHRD), Government of India, 2009.

School libraries will be revamped to function as gateways for access to quality digital content for students and teachers and will thereby play a crucial role in catalyzing usage of digital resources in all classes. These libraries would have adequate Internet connectivity and would move toward digital cataloging and automation.

Content development is entrusted to various agencies both in the public and private domain. In India, several agencies like the Central Institute of Education Technology (CIET), National Council of Educational Research & Training (NCERT), Indira Gandhi National Open University (IGNOU), State Institutes of Educational Technology (SIETs), and Doordarshan (National Broadcasting) have dedicated resources for developing and disseminating digital content at various levels for a variety of objectives from informal educational messages to structured course modules. Private companies like EduComp, Everon, NIIT, Aptech, IL & FS, Intel, and Zee Interactive systems are some of the firms working extensively to develop and deliver quality digital content for education. These companies in addition to selling their products to individuals and schools have entered into MoUs with various state governments to design and deliver content in well-defined initiatives focusing on government schools in the states.

### **Sri Lanka**

In Sri Lanka, the National Policy for Information Technology in School Education (NAPITSE, 2002) was formulated with a clear goal to “envisage and foresee the future global challenges in IT education and lay the foundation for appropriate human resource development to meet such challenges.” In addition, it seeks to improve information literacy of all its citizens, create lifelong learning opportunities through the school system, and enable the use of ICT as a tool in teaching learning at all levels of general school education. Specifically, the NAPITSE articulates the need to:

- Introduce, sustain, and enhance IT involvement into general education in schools and create opportunities for IT-based learning and teaching.
- Introduce IT into pre-service and in-service teacher development and training programmes and create opportunities for system-wide professional development of teachers.
- The NAPITSE also mentions the need to set up a Multimedia Education Software & Web Development Centre.

Recognizing the lack of relevant content in local languages as an impediment to adoption of ICT by a large number of people, the Government of Sri Lanka through its Information and Communications Technology Agency (ICTA) has launched Shilpa Sayura Project to create digital content related to the school curriculum in Sinhalese to help students. Shilpa Sayura enables students to interact with ICT to study eight subjects digitally at telecentres and develop their knowledge to prepare for national examinations. The National ICT Literacy Project aims to increase the e-literacy level of the population by providing them training through a network of rural service delivery centers called “nensalas.”

### **Pakistan**

The National ICT Strategy for Education (NICTE, 2005) stresses upon the use of ICT both as a subject and as a critical instructional aid. It talks about improving student learning using ICT

through locally relevant content created by training teachers adequately to develop their own teaching learning materials. It also suggests distribution of *CD-ROM*-based software (including items from and links to relevant Web sites and education *portals*) to schools, professional development centers, and teacher training institutions to help preservice and in-service teachers expand their content knowledge.

The Policy also articulates the need for overall curricular reform in light of tools and pedagogical techniques made available through ICT, so as to enrich education at every level. It stresses the need to use ICT to provide access to quality content (internationally or nationally produced) available online to supplement existing textbooks and materials. This content by being flexible, interactive, and multimodal (radio/TV, etc.) would improve learning in students.

The Policy suggests that Ministries, education departments, and district education offices can establish Limited Area Search Engines—online database collections of appropriate content for use by students. International open educational resources and models for curriculum and content development may be used after adapting them to national requirements based on guidelines.

### **Bhutan**

Bhutan Information and Communication Technologies Policy and Strategy (BIPS) 2004 talks about creating appropriate curriculum for ICT as a subject based on market needs, as well as curriculum for general ICT Literacy and competency for all school students.

The 26th Education Policy Guidelines & Instructions (EPGI-2007) state the aim of the Government to make teachers and students who complete basic education (i.e., class X) IT literate. To that end since April 2007, Bhutan Telecom has made all dial-up Internet packages free. Therefore, all schools which have computer and Internet facilities are urged to introduce relevant IT programmes for students and encourage the use of computers and Internet for learning especially after school hours and during the weekends, when the facilities are often underutilized and students have ample time to practise and learn. Along this line, CAPSD has developed a standard IT literacy framework, which schools are urged to use to initiate and carry out IT literacy programmes.

A strategic component of local content development is the Dzongkha localization project currently being executed by DIT. Under this project, a beta version of Dzongkha Linux was released in 2006. It has the capacity to undertake common desktop computing tasks such as word-processing, spreadsheets, and PowerPoint presentations in Dzongkha. It symbolizes beginning of a commitment toward open-source software development. Diminishing of language barrier is another feat. The Department of Information Technology, the National Library, and the Institute of Language and Cultural Studies are collaborating to establish the National Digital Library of Bhutan (NDLB), which aims to present aspects of Bhutanese life, traditions and culture, and provides resources for scholars.

The other focus countries namely **Afghanistan, Maldives, Bangladesh, and Nepal** while stressing the importance of locally relevant content do not have a separately articulated strategy for content development, instead they are focused on creating qualified IT professionals to boost their local ICT industry, which will in turn create local capacity for content development. In addition, some ongoing initiatives are focused on creating locally relevant content in local languages.

**Afghanistan**

The ICT Policy of Afghanistan highlights the need to promote effective ICTs training courses at secondary and tertiary level. It focuses on the need to create curricula for ICT and related subjects at secondary and tertiary levels as well as development of material for teacher training and training of trainers. In general, content development capacity in Afghanistan is still being developed with a focus on training faculty, IT professionals, and supporting the general ICT Industry. International content may be accessed using connectivity through distance education centers, partnerships are also encouraged for content development; for example, the Ministry of Education with assistance from Asia foundation has undertaken digitalization of science subjects of grade 10–12 in the form of DVDs.

**Maldives**

In Maldives, the Seventh National Development Plan by the Ministry of Planning and National Development is dedicated entirely to expanding current ICT levels. It highlights the need for providing access to computers for all students especially at the secondary level and to develop a national curriculum for primary and secondary education focusing on ICT skills and usage including Internet skills.

**Bangladesh**

Likewise, the National ICT Policy 2009 of Bangladesh stresses the need to produce more trained ICT professionals through improvement of curriculum of ICT as a subject. The Policy has several strategic focus areas for use of ICT in Education & Research from the primary to tertiary levels. Content development is highlighted as important and the policy talks about the need to create central repository for e-Learning content for teacher training and for all students and providing incentives for e-Learning content development.

**Nepal**

The Nepal IT Policy 2000 highlights the need to have “computer education for all by 2010.” It proposes a phased introduction of IT as a subject at the secondary level. In Nepal, Open Learning Exchange (OLE) is a nonprofit organization that is dedicated to assisting the Government of Nepal in meeting its Education for All goals by developing freely accessible, open-source ICT-based educational teaching-learning materials. OLE has set up a digital library (E-Pustakalaya), which includes all required curriculum textbooks in local language.

**Capacity Building**

Human Resource Development is an important aspect of capacity building for effectively integrated ICT in education. Teachers, administrators, and managers in the education system all need to be adequately equipped to enable them to maximize the potential of ICT in improving teaching learning practices.

All focus countries have some sort of articulation for teacher training in ICT. Teacher training institutes are being equipped to provide pre-service and in-service training in ICT.

In **India**, the Draft National Policy for ICT in School Education underscores the need to reform pre-service training curricula in teacher training to include relevant ICT courses. Furthermore, ICT competencies will form a part of the eligibility criteria for teacher appointments. Appropriate ICT infrastructure would also be made available at all teacher training institutions. The Policy recognizes that periodic in-service training comprising induction and refresher courses will be the key to the widespread infusion of ICT-enabled practices in the school system. The training will consist of initial sensitization through ICT operational skills and ICT-enabled subject training skills, after which the teachers will be expected to become part of online professional groups and associations to keep themselves abreast of latest developments, share and develop relevant content, and to engage with a larger community of experts.

Recognizing the significance of bringing onboard school leaders and administrators to ensure optimum adoption and utilization of ICT-enabled teaching learning, it is proposed that all school heads will be given orientation in ICT and ICT-enabled education training programs. Schools will be encouraged to increasingly automate their processes in administration, management, and monitoring of school systems so that school leaders will be provided adequate capacity building training. School leaders through these trainings will thus be able to contribute in the successful development and implementation of a School Education Management Information System (SEMIS).

Quite often, government personnel working in education departments at various levels—national, state, and districts—do not have adequate knowledge of ICT. The Draft National Policy states that training will be provided to government personnel in order to encourage them to use ICT in their day-to-day activities. Specific training would also be provided on any MIS system for schools and general maintenance and upkeep of the ICT infrastructure managed by them.

In **Pakistan**, the NICTE 2005, places great emphasis on using ICT to strengthen teacher's professional development and educational management. The strategy highlights the need to maximize opportunities for professional development through different ICT media such as IRI, television, ODL, and online resources. This will ensure that teachers have access to ongoing professional development including follow-up support. The strategy will be particularly useful in areas which are geographically remote and where face-to-face interactions for professional development are difficult and not cost effective. Teachers will learn ICT skills as well as how to teach ICT as a subject and integrate it within the curriculum, such that ICT training is not merely about skill development to enable using different equipment but to actually integrate ICT to enable developing new instructional methodologies (e.g., project oriented, *problem-based learning*, and collaborative learning). The Policy recognizes that while skill training in ICT is essential, the focus should never be only on teaching ICT as a separate subject. It is more important for teachers to know how to teach with ICT than how to use ICT, and such instruction should be integrated within the basic courses at teacher training colleges.

The strategy highlights the importance of suggesting appropriate technology based on assessed needs of teachers so that the correct technology is made available to them based on their needs. The Policy also suggests exploring internationally available standards, such as those provided by International Society for Technology in Education (ISTE) for ICT education for teachers and to adapt them to local conditions.

The Policy further highlights the need to provide adequate resources to teachers through various platforms to enable them to develop their own teaching materials. A National Education Portal is envisaged to develop a community of teachers who are able to communicate with each other, learn from each other's experiences and have access to subject matter specialists to improve their own understanding. Training of administrators and education managers should be part of a planned programme to make school environments conducive to maximum use of innovative ICT.

In **Sri Lanka**, the NAPITSE articulates the need to provide training and education to all teachers in government schools to make them competent in using ICT for teaching purposes. It also reiterates the need to introduce IT into pre-service and in-service teacher development and training programmes and create opportunities for system-wide professional development of teachers. The Policy envisages training for government officers managing education systems and encourages use of school-based ICT resources by out-of-school population to provide general ICT literacy for the community. The Intel Teach program is aimed at enabling teachers to better exploit the full education potential of the technology age. The response from the education administrators, principals, and teachers was exceptionally encouraging. The program has made tremendous headway in Sri Lanka. More than 7,500 teachers have already been trained under this program in the Island.

The National ICT Policy 2009 in **Bangladesh** identifies the shortage of trained and qualified teachers and therefore proposes to leverage ICT tools for imparting effective teachers' training programmes and mitigating the shortage of good quality teachers. The Policy underscores the need to incentivize acquiring ICT skills for teachers, strengthening all primary and secondary teacher training colleges through connectivity, multimedia content, and so on. It also talks about the need for more trained ICT professionals through improved curriculum for ICT as a subject. The National Academy for Computer Training and Research (NACTR) is an autonomous educational and computer training institution charged with the responsibility to prepare, conduct, and evaluate computer training syllabus for the personnel engaged in the government, semi government, autonomous, and non-government institution of Bangladesh. An "ICT Professional and Skill Enhancement Programme" will also be initiated, which would assess the skills of ICT professionals and meet gaps with targeted training programmes to overcome the short-term skills shortage in the ICT industry.

The **Nepal** IT Policy also highlights the need to provide computer training as part of preservice and in-service training for teachers. It states that the knowledge of computer shall be made compulsory to all newly recruited teachers in phases so as to introduce computer education in schools; and computer education shall also be provided to all in-service teachers in phases through distant education.

In **Maldives**, nearly 80 percent of teacher training costs are transport related. In response to this constraint, Teacher Resource Centers have been set up in 20 atolls in Maldives, which are equipped with state-of-the-art technology to provide an interactive learning experience for students through a "smart board" and to improve the quality of teacher training. Through the Educational Development Centre Teacher Resource Web site, teachers can sit in front of a computer in a resource centre in their atoll, search for materials for their next lessons, download syllabi, and share their own ideas with colleagues in other islands. Through the virtual learning environment

developed for the Educational Development Centre by Cambridge International Examinations, up to 400 teachers could simultaneously receive training by participating in an online course and interacting with one another.

*Box 2: Summary*

- Training of Teachers, School Leaders, & Education Department Personnel
- Role of ICT for professional development of teachers in pre service and in service training recognized by most countries
- Strengthening of Teacher Training Institutes with multimedia resources highlighted in most focus countries
- Training and orientation for school leaders recognized as important by some countries (India and Pakistan)
- Training for education department personnel in general ICT in day to day activities, as also distinct SEMIS tools has been emphasized in (India, Nepal, Sri Lanka, and Bangladesh)

Key constraints in effective use of ICT for professional development:

- Teacher attitudes toward ICT
- Lack of relevant content
- Lack of access to internet and computers after school
- Lack of adequate funding and resources
- Lack of training focusing on pedagogical innovation and learner centric strategies

At the Policy level there is an emphasis on creating a larger pool of ICT professional, through certification, accreditation processes.

The BIPS 2004 highlights the need to ensure appropriate ICT awareness and skills from computer literacy to high-level technical skills to boost the ICT industry. Further, the 26th Education Policy Guidelines reiterate the need to ensure that all teachers and students are IT literate.

**Afghanistan** identifies the lack of technical ICT professionals and appropriate training materials as a major constraint for using ICT for teacher Training and Professional Development. The Afghanistan Higher Education Portal developed in collaboration with the Global Learning Portal (GLP) and the Afghanistan Ministry of Higher Education (MoHE) in an effort to empower teachers, learners, and communities to improve education access and quality. The Portal will provide faculty of education members in Afghanistan with technical assistance, learning resources, and networking tools to support professional development.

There are several initiatives for training senior school leaders and administrators in ICT. Administrative departments will also increasingly use ICT to better manage public spending and planning for education; all the personnel in these departments also need to be trained in using effective school management information system and other planning tools to provide better governance.

## Infrastructure

Infrastructure is the key enabling framework for deploying ICT in education. We have to look at the spectrum of infrastructure requirements from proper buildings/rooms, electricity and power supply, to sophisticated hardware, system software, and most importantly connectivity. The trends on all these parameters show a mixed bag of results in terms of government success in ensuring effective infrastructure availability. Although in countries like Maldives and Sri Lanka relatively high standard of education and ICT infrastructure is available, their application and content development pace is slower than say India, which has patchy infrastructure availability but a fast developing ICT industry able to develop many new applications and content for education. In Bhutan and Nepal, there are geographical and climactic problems in the way of providing basic infrastructure.

Afghanistan and Pakistan in addition to geography face unstable political terrains as an impediment to adequate infrastructure development. Bangladesh also has a poor track record of infrastructure availability.

Policy articulations for improving infrastructure availability have been made in almost all the focus countries. These articulations have been made at various places through the respective IT Policies, Education Policies, ICT in Education Policies, and other infrastructure policies.

The several components of infrastructure are connectivity, hardware, and software and enablers like electricity, classrooms buildings, and so on.

According to the **India** draft National Policy for ICT in Education, ICT requirement for each school will be determined based on its size and norms articulated by the State Government. The Draft Policy envisages that all states will establish state of the art, appropriate, cost-effective, and adequate ICT and other enabling infrastructure in all secondary schools to begin with. This infrastructure would include computer labs with adequate hardware and software, AV rooms with digital still and video cameras, music and audio devices, digital microscopes and telescopes, digital probes for investigation of various physical parameters, adequate hardware for EDUSAT terminals, and so on.

Each school will have a LAN in place and a dedicated broadband connectivity of at least 2 Mbps. In addition to Internet connectivity in the computer labs, connectivity will be provided to terminals in the Library, Teachers' Common rooms, and office of School Administrators. An Edusat network will be planned at each state with interactive terminals and Receive Only Terminals (ROTs). At least 1,000 such terminals could be planned at each state.

A judicious mix of software will be introduced at the secondary stage comprising a range of software from the standard office suite to Graphics and animation, desktop publishing, Web designing, databases, and programming tools. To enable cost-effective software usage and development free ware, free and open-source software applications will be preferred.

The Policy also emphasizes that the enabling infrastructure required to efficiently maintain the ICT facility will be defined, established, and maintained. This includes adequate and regular power supply, physical facilities like large room, adequate ventilation, and other supporting infrastructure.

The NICT **Pakistan** while highlighting the need for adequate ICT infrastructure in each of the six elements of the strategy does not outline a distinct strategy for creating this ICT infrastructure at each level, instead the strategy document is seen as a set of guidelines for federal, provincial, and school level administrators to develop their own capacity and tailor this strategy for integrating ICT in education systems at their level. It was also understood during the course of this study through discussions with key stakeholders that the NICT has remained since its inception as a general set of guidelines and has not been translated into any specific schemes at the Federal or at the Provincial level.

The National Policy on IT in Pakistan has also emphasized the importance of IT vis a vis education, some of the relevant provisions made in the Policy with respect to education are:

- Launch a scheme for providing low-priced computers and Internet connectivity to universities, colleges, and schools through a public-private sector initiative.
- Network all universities, engineering and medical colleges, and institutions of higher learning in the country for improved quality of education.
- Set up electronic libraries to ensure economical and equitable access to world information.
- Encourage educational facilities to computerize their registration, examinations, accounting, and other activities.
- Encourage educational facilities to adopt computer assisted learning and other IT tools to aid in the teaching process.
- Establish virtual classroom education programs, using online, Internet and/or video facilities, to provide distance learning to a large number of individuals.
- Establish a national educational intranet (linked to the Internet) to enable sharing, among educational institutions, of electronic libraries of teaching and research materials and faculty

The e-**Sri Lanka** program, which commenced in early 2003, aimed at extending the benefits of ICT to impoverished regions by implementing a number of initiatives. e-Sri Lanka focused on providing infrastructure and installation of hardware, whereas the NAPITSE 2005 of Sri Lanka focuses on creating adequate human resources and develop quality content to ensure that the maximum benefit of ICT integration into education is realized.

The government of **Bangladesh** in its ICT Policy 2009 proposes to do the following in order to provide ICT access to all schools:

- Install computers, Internet connectivity, and appropriate multimedia educational content for every primary, secondary, and higher secondary school, accessible to each student; include solar energy panels if necessary
- Create a Model School as an Information Access Center with ICT facilities in each union, so that all other adjacent school students can use that facility.
- To bridge the digital divide the policy aims to provide Internet connectivity for all villages in the country and seeks to ensure subsidized pricing for Internet connectivity to primary and

secondary educational institutions as well as technical and vocational education training programs.

The BIPS 2004 outlines the need to develop a plan for a countrywide connectivity to ICT infrastructure, including schools, geog centers, and villages. According to the 10th Five-Year Plan, all higher and middle secondary schools have a computer laboratory each with a minimum of 10 computers. Similarly, some lower secondary and community primary schools have also been supplied with 2 to 5 computers. The Plan states that RGOB has committed, through the Prime Minister's Executive Order in 2006, to support the ongoing development and enhancement of ICT in education.<sup>6</sup> There is a plan to provide computers to schools as they get electricity supply. By 2010, the government is committed to ensure an affordable, fast, secure, sustainable, and appropriate ICT infrastructure throughout Bhutan.

In the **Maldives**, ICT infrastructure is relatively well developed with near 100 percent mobile network coverage, nearly 90 percent of Internet users using broadband Internet connections, and a relatively high penetration of personal computers compared to the rest of the region. The Seventh National Development Plan by the Ministry of Planning and National Development articulates the need to provide access to computers for all students. The government hopes to ensure that each secondary school has a computer lab for learning purposes and that each secondary school has sufficient capacity to maintain and operate the computer lab effectively. Already the government has been able to provide 60 percent of secondary schools a computer lab and most schools have a technician and a computer teacher.

**Nepal IT Policy 2000** states that Internet facility shall be made available free of cost to universities and public schools for 4 hours a day within the next 5 years to provide computer education in a systematic way. The policy also states that the distant learning system shall be introduced through the Internet and intranet as well through radio and television. Networking systems like school-net, research-net, commerce-net, and multilingual computing shall be developed. With its difficult geographical terrain and nascent ICT and telecom sectors, it has low ICT penetration figures compared to the rest of the region.

**Afghanistan** too has extremely low ICT penetration for various geographical and political reasons. Based on the Ministry of Education strategic plan review, by 2014–15, the Ministry aims to develop 100 percent ICT Infrastructure in the centre and throughout the provincial educational directorates and 50 percent coverage of the district education units and educational institutes around the country. A phased plan for development of ICT infrastructure has been articulated starting at the national level for the Ministry of Education and eventually going down to the district education unites and education institutes.

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<sup>6</sup> 26th Education Policy Guidelines & Instructions (EPGI-2007), Government of Bhutan.

*Box 3: Summary*

- Distinct articulation for making available basic ICT infrastructure for schools and other educational establishments articulated in the IT policies as well as educational policies of most countries
- Most of the focus countries have plans to provide connectivity to schools and other educational institutions
- Enabling infrastructure like electricity and physical facilities still a major constraint in almost all focus countries (except Maldives and Sri Lanka)

## Key constraints in developing adequate ICT infrastructure:

- Significant difference in access to connectivity and electricity between rural and urban areas
- Lack of resources for maintenance and upkeep
- High cost of connectivity
- Lack of institutional frameworks and robust implementation capacity

**ICT for Education Management**

Use of ICT in planning for better service delivery in the field of education is a significant aspect. Starting from school administrative processes to communication between schools and management of education systems by respective departments can all be greatly facilitated by SEMISs. Standard procedures like admissions, transfer and posting of teachers, salary payments, attendance, and so on can be greatly simplified using IT applications. GIS applications for school planning are also being used along with Student Tracking initiatives.

In **India**, the Draft National Policy for ICT in Education envisages the use of ICT in School Management at all levels. Starting with introduction of local school wide area network to enable automation of various administrative process from student/teacher tracking, to maintenance of records, and resource planning, leading to a School Management Information System, which will then feed into the proposed statewide Web-based SEMIS. At the state department level, states will adopt an e-governance and automated school administration programme for schools, build capacities for its implementation and deploy school-based Management Information Systems. These MIS will be integrated with the proposed national level Web-based SEMIS.

The National Education Strategic Plan (NESP) of **Afghanistan** envisages an ICT strategic plan as part of developing the overall capacity of the Ministry of Education. An Education Management System (EMIS) is being developed with assistance from donors. The lack of information and reliable data is a major impediment in improving the planning and management capacity of the education system. The Ministry also envisages that all management and administration civil service

employees should have the opportunity to be “digitally literate” by the end of this planning cycle. Afghanistan also has some GIS-based data to enable school planning.

The government of **Pakistan** in the NICT 2005 envisages the need to ensure proper planning, management, support and monitoring, and evaluation of ICT initiatives by organizing ongoing efforts to ensure capacity building at the federal and provincial Levels and creating an external body, which advises the Ministry of Education on ICT in education. Specifically, the NICT suggests establishing a Technical Implementation Unit (TIU) for ICT in education. The TIU will develop the technical planning, monitoring, and evaluation capacity of policy-makers, planners, and administrators at national, provincial, district, and school levels. It will also liaise with teacher training institutes, oversee the implementation of the NCIT strategy, and support the overall monitoring of education through the national Education Management Information System (EMIS).

The NAPITSE **Sri Lanka** along with a focus on use of IT in Education (teaching and learning) also highlights the need to use ICT in management of the Education system. As part of the support activities for effective integration of ICT in education, the policy outlines the need to design, develop, and maintain a Web site for the Ministry of Education & Higher Education to assist the school system in e-learning and information management. It also talks about training education department officials to better deal with IT in their day-to-day work.

In **Nepal**, an Educational Management Information System has been continually evolving and is used to derive the Flash Reports that chart progress against agreed educational indicators for the Education for All programmes.

**Bangladesh** Bureau of Educational Information and Statistics (BANBEIS): This organization is responsible for collection, compilation, and dissemination of educational information and statistics at various levels and types of education. This organization is the main organ of the Ministry of Education responsible for collection and publication of educational data and statistics. It functions as the EMIS of the Ministry. It is also the National Coordinator of RINSACA (Regional Informatics for South and Central Asia).

#### *Box 4: Summary*

- Use of ICT in Education Management articulated distinctly in the policies of some focus countries (India, Afghanistan, and Sri Lanka)
- Emphasis on developing SEMIS in several focus countries (India, Afghanistan, Nepal, and Bangladesh)
- GIS mapping for planning is emphasized in (Afghanistan and Bangladesh)

#### Key constraints in using ICT in School Management:

- Lack of adequate infrastructure and connectivity at the school level
- Low motivation to use ICT in Education Management by teaching and administrative staff as well as department personnel. Fear of eroding of discretion and authority
- Weak institutional capacity to utilize SEMIS software

In Bhutan and Maldives, there is no distinct articulation of the use of ICT in School Management.

### Monitoring and Evaluation

Monitoring and evaluation of ICT initiatives should be incorporated into any strategy for integrating ICT in education.

#### India

The Draft policy envisages that monitoring tools built into the SEMIS along with other information such as DISE data will be used to monitor progress of initiatives and programs. The State governments will design its own monitoring mechanism and undertake a monitoring mechanism, mapped at each level, that is, local, district, and state level to feed into the national Web-based MIS for the progression of ICT in the schools and to suggest mid-course corrections. Independent third-party evaluations are suggested, whereby states will appoint their own agencies to evaluate various parameters such as the ICT programme, infrastructure, digital resources, capacity building, and the overall management of the programme.

#### Pakistan

The NICT envisages the setting up of a Technical Implementation Unit (TIU) for ICT in education as mentioned before. This body would work in an advisory capacity to MoE to develop the technical, planning, monitoring, and evaluation capacity of policy-makers, planners, and administrators at national, provincial, district, and school levels. The TIU will also liaise with teacher training institutes, oversee the implementation of the NICT Strategy, and support the overall monitoring of education through the national EMIS.

In most of the other focus countries no distinct Monitoring and Evaluation strategy has been articulated for ICT in education initiatives.

### Policy Plus

However, policy coherence does not only imply articulating well-integrated strategies; there are several measures that need to be taken to ensure effectiveness of the policy. Some of these are:

**Detailed Implementation Plans:** In almost all the focus area countries while the Policy clearly highlights the need to integrate ICT into education, there are very few clear implementation plans for operationalizing the policy. In both India and Pakistan, the implementation strategies are briefly

#### Box 5: Summary

- Monitoring and evaluation strategies very weakly articulated in most countries (except India and Pakistan)
- Existing monitoring and evaluation strategies in education initiatives are mostly focused on program evaluation and EMIS type tools, instead of being based on evaluation of learning levels (India, Pakistan, and Nepal)

Key constraints in developing monitoring and evaluation strategy:

- No standards based on which an evaluation of impact of ICT initiatives in education can be done.
- Weak institutional structures and fragmentation of responsibility

indicated in the Policy documents. However in Pakistan, the NICTE since its inception in 2005 has not been the driving force behind any major initiative for inducting ICTs in the education sector. Most specific schemes on ICTs in the School Education space have been initiated under the aegis of specific IT and Education Policies at the provincial level. For example, the Punjab provincial government has recently completed an ambitious initiative of installing computer labs in more than 4,000 government schools under the leadership of the Chief Minister, and the Education department and the Punjab Information technology Board. In Sri Lanka, the National Policy on ICT in Schools (NAPITSE) was to be implemented through an action plan: “National Policy on Information Technology in School Education, Action Plan, Operational Strategies.” However, there is very little information available on the success of the implementation of the action plan.

**Financial Allocation:** Financial allocations should back the distinct policy statements made by governments. Funding from different sources, including Government, Private, and Public-Private Partnerships should be explored. Policy statements in almost all the focus countries lack detailed financial allocations or frameworks for funding specific initiatives (Except Bhutan, BIPS 2004)

**Institutional Capacity and Political and Administrative will:** This is the most critical constraint in the South Asian region where there is little institutional and administrative capacity to translate good policies from paper to real initiatives on the ground. For example, according to the Bangladesh ICT Policy 2002, of the 103 Policy directives in 16 areas only 8 were fully or largely accomplished by 2008 when the review was conducted.

**Community Demand for ICT:** General ICT awareness and community participation were seen as critical in effectively integrating ICTs in education. With a robust demand for ICT services in general in the larger community, there is better adoption and utilization of technology in the school environment. Very few Policy documents in the South Asian countries recognize this critical linkage (Except Bhutan, BIPS 2004. Bangladesh, National ICT Policy 2009).

## Key Learnings

- ❖ The imperative for a policy for ICT for education in this region has largely come from recognition of the need to develop adequate human resources for becoming competitive in the Global ICT market (Bangladesh, Nepal, Sri Lanka, and Pakistan).
- ❖ There is a greater focus on the incorporation of ICT as a subject in the curriculum than on using ICT as an instructional aid to improve overall education quality. This has meant that the focus of ICT at the school level has quite often been IT Education based on a defined curriculum at the secondary and senior secondary level.
- ❖ Only in Sri Lanka, Pakistan, and India (Draft) there is a specific ICT in education policy. These policies focus both on ICT as a subject as well as use of ICT as an instructional aid. Of these, Sri Lanka NAPITSE has been in operation since 2000, and India’s Draft National ICT in School Education Policy is still under formulation, with the first draft having been published in 2009. Pakistan’s NICTE was formulated in 2005; however, as discussed it is not supported by detailed implementation plans and has not been the driving force behind any major ICT initiative in the education space in the country.

- ❖ In Bangladesh, Bhutan, Nepal, and Afghanistan, the national ICT Policies have a section on Education, where they highlight the need for qualified manpower and work back to familiarizing the general population with ICT through the education system. Even in the countries with a distinct ICT for education policy, major schemes at the local level have often been initiated through the ICT policy framework, within the ambit of different IT departments.
- ❖ The Maldives does not have a distinct ICT Policy as on completion of research on this project, but with the basic IT infrastructure already in place (relatively higher Internet penetration, mobile network, TV, and Radio penetration) as well as good educational indicators (near 100 percent literacy and high GERs at primary as well as secondary levels), it is in a good position to realize benefits from a dedicated ICT for education policy that focuses on quality content and delivery.
- ❖ Infrastructure remains a key bottleneck in most of the focus countries, especially Afghanistan, Nepal, Bhutan, and Bangladesh, and parts of India.
- ❖ India and Pakistan have a certain amount of critical infrastructure in place and would have to focus on developing content and applications and leveraging the potential of ICT as a tool to strengthen the teaching learning process.
- ❖ The Maldives and Sri Lanka have been relatively successful in putting the key infrastructure in place (with the exception the high cost of Internet in Maldives), they would now need to focus on using ICT tools and content to improve the overall quality of education and create access for those who have been excluded from their existing systems
- ❖ By and large, the lack of administrative capacity to translate policies into actionable plans and then to have specific initiatives with financial allocation and institutional structures has been a bottleneck in all the focus countries.

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