


Information and Communication Technology for Education in India and South Asia



Essay III

Capacity Building for ICT in Education

infoDev

PRICEWATERHOUSECOOPERS 

Executive Summary

This essay on **capacity building** covers a number of aspects from training of teachers to support for content development. It highlights the critical issue that, without adequate capacity building, even well-designed policies and the most sophisticated technologies would not be able to achieve the desired results. Allocation of resources for use of ICT in human development areas in South Asia (also developing and least developed countries) has to balance the needs between providing basic infrastructure such as computers, connectivity, and physical infrastructure on one hand with the mass-based learning networks, content support, and development initiatives on the other. All the programs and policies related to ICT in education must address both these dimensions since inadequate infrastructure would undermine the feasibility of mass-based soft infrastructure such as creation of knowledge networks and content creation. On the other hand, creation of more infrastructure without availability of such soft resources for ICT-enabled learning would turn out to be white elephants and would realize no benefits for the lack of maintenance in the longer run. The essay explores the current availability of infrastructure and support mechanisms and also profiles some of the key initiatives taken by different focus countries to ensure adequate capacity building for effective integration of ICTs in education.

Capacity Building for ICT in Education

While there are many stakeholders involved in ensuring effective integration of ICT in the education system, teachers have a particularly important role to play. According to Carlson and Gadio (2002), teachers are the key to whether technology is used appropriately and effectively. Appropriate use of ICT can catalyze the paradigmatic shift from teacher-centered pedagogy to a more effective learner-centered pedagogy. Capacity building of teachers as well as administrators and managers can play a major role in enabling this shift. The focus of teacher training institute however should not be limited to training teachers on how to use ICT rather it should provide the teachers with the skills and expertise required to use ICT to teach a curriculum which is better suited to prepare students for the 21st century.

Policy directions in South Asia have a major focus on creating and expanding the ICT infrastructure, while this helps the countries lay a foundation for integrating ICT, according to Monahan (2004) it results in an “incredible influx of financial support for equipment but only a meager trickle for network support or staff training.” Without a sound capacity building framework, the financial resources spent on building the infrastructure will go to waste.

Important parameters that determine the success of ICT adoption in Education sector are the appropriateness of technologies, the suitability and quality of instructional materials and educational services made available, learning effectiveness and appropriation of new ways of work, and the cost-benefit ratio. It is, therefore, important that policy-makers are sensitized on the importance of incorporating these aspects within the plans for ICT in education at all levels.

Further, the need for capacity building of educational institutes principally arise due to high initial cost associated with setting up the infrastructure, lack of trained faculty and lethargy on part of

management and faculty to upgrade themselves, initial resistance to change by the teachers, lack of bandwidth and other technical support functions across geography, and above all the lack of awareness with regard to utility of ICT for education.

To maximize the effect of ICT on knowledge and growth it is required to create maximum connectivity, adequate network capacity and minimum required infrastructure at each node. Further, the diffusion of this process depends on the capacity of the human element to absorb and exploit the benefits of the technology. The policy framework and institutional mechanism coupled with the capacity to absorb and invest costs associated with both technology and human capacity building influences the role of ICT to support knowledge and growth.

Sustained educational capacity building through ICT means in today's advanced globalization process and communication infrastructure to integrate sustained "local" capacity into a "global" educational environment. Key components of "sustainability" within this globalized framework are not only "access" to global communication flows, but the creation of "active nodes": communication hubs as integral elements of global educational networks.

The following sections examine the key aspects of capacity building for ICT in education in India and South Asia on following critical components:

- Instruction-related aspects
- Institution-related aspects
- Investment-related aspects

Capacity Building at the Instruction-Level

Capacity building of teachers and other education resource persons has two dimensions attached to it in the South Asian context, namely, the pedagogical capacity building and the capacity building in using educational technology.

Capacity Building of Teachers and Others:

Capacity building of the people/manpower/teachers/instructors should not merely mean to enable the ability to use ICTs or "ICT Literacy." Though this is an essential prerequisite, it is rather trivial for a policy to be limited to this. The real meaning and power of ICTs for "capacity building" would be to enable the ability of the administrators, teacher and the student to use ICTs in their own processes of administration and teaching-learning in a manner they deem fit arising from their engagement with ICTs, facilitated by school administrators, teacher-educators, and teachers, respectively. Moreover, this would logically be components respectively within "school administration," or "teacher education" or "school education" itself.

The key components of the capacity building of the teachers include a clear understanding and appreciation of the pre-service and in-service training institutions, their vision, coverage, the methodologies, and the extent to which their interventions are effective. The important point is that

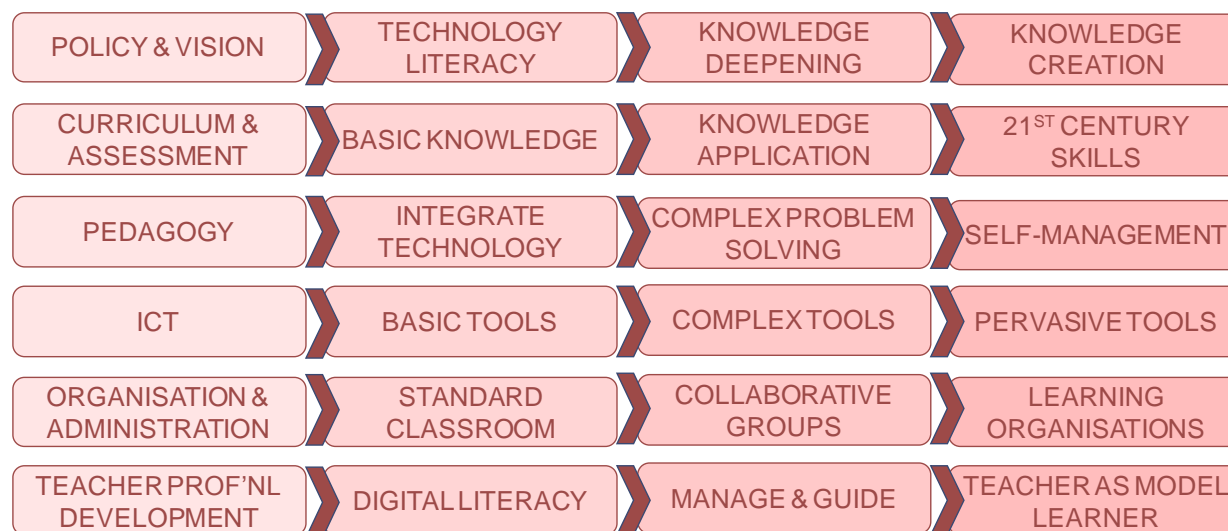
once we start analyzing from these perspectives deriving from domain understanding and domain priorities, then possibilities such as collaborative networks among teachers, “decentralized curriculum preparation” itself as a teacher professional development process, distance-mode “on-demand academic support” for teachers, asynchronous relationships possibilities across institutions and people, leveraging the capacities of ICTs, and so on, become apparent.

However, another equally important use of ICT would be its use for the capacity building of teachers. The capacity building is not restricted to improving the ICT skills of the teachers but more importantly the intention is to exploit the potential of ICT to build the professional competence of teachers, to develop their proficiency in classroom management practices, to enhance the quality of instructions, and others.

Most of the countries in the South Asia region have realized the need for training teachers in ICT and have launched various professional development initiatives. However, many of these training activities to date focus mainly on computer literacy instead of enabling teachers to integrate ICT in their day-to-day teaching activities and master the use of ICT as an effective tool to improve teaching and learning. For the South Asian region, apart from the UNESCO and other International agencies, there have been various Government initiatives and NGO activities in generating awareness and providing quality Training for ICT in education, for example: in **India**, various schemes and programs have been launched both at Government and non-governmental levels for almost two decades now for developing ICT skills in teachers to deploy technologies that enhance the quality of teaching and learning experience. Different universities in India have designed specific courses for this purpose. Organizations like the NCERT, UGC, NCTE, AIR, FTII, and so on have been launching schemes to enhance ICT skills of teachers, content developers, and so on. Private sector initiatives have also played significant role in ICT training for teachers. Prominent among them are Intel’s “Teach to the Future” nationwide initiative and Microsoft’s Project *Shiksha* in Maharashtra state.

In January 2008, UNESCO launched an ICT Competency Standards for Teachers (ICT-CST):

UNESCO ICT Competency Standards Framework for Teachers



Source: UNESCO 2008

As pictorially detailed earlier, the ICT-CST reflects a three-stage model of ICT integration in education based on the idea that education reform supports national economic and social development in one of the three ways, namely:

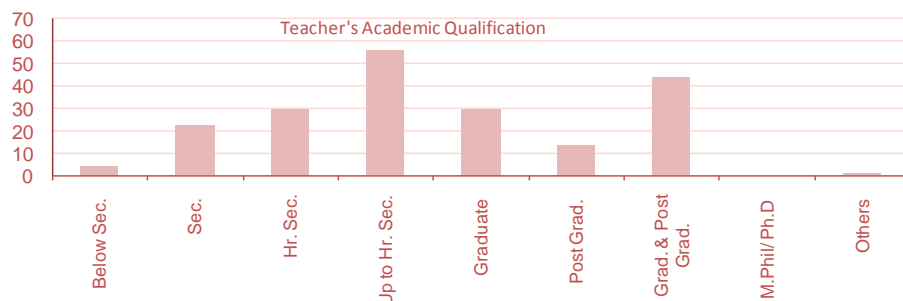
- by developing technology literate citizens and workers through the incorporation of technology skills in the curriculum (the technology literacy approach);
- by developing citizens and workers who can apply knowledge to solving complex, real-world problems and thus add value to society and the economy (the knowledge deepening approach);
- by developing citizens and workers who can innovate and produce new knowledge (the knowledge creation approach).

At various stages of development, different countries would espouse one of these three approaches to educational change, and this will be reflected in their policy goals and visions. Moreover, each approach impacts on five other components of the education system, namely, curriculum and assessment, pedagogy, ICT (technology use), school organization and administration, and Teacher Professional Development (TPD).

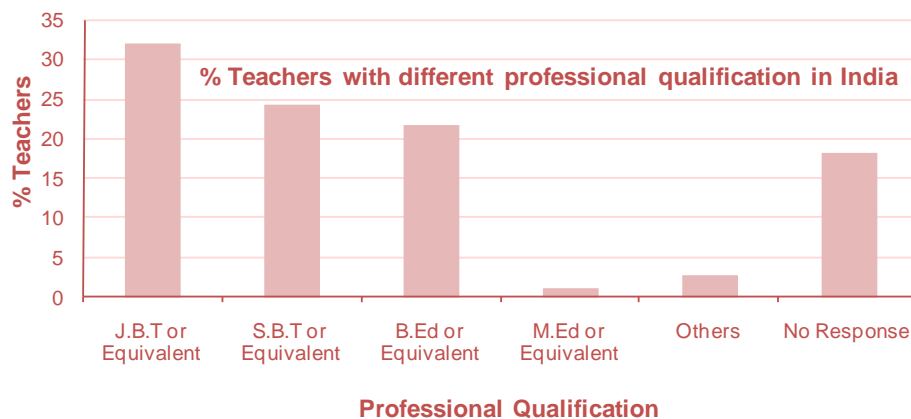
India has a total of over 5.2 million teachers¹ in the school education (including higher primary) system and 2,021 teachers' training institutions in the country catering to the elementary stream. The goal of Universal Elementary Education (UEE) is being attempted through the SSA, a flagship program of the Government of India.

¹ District Information System for Education (DISE) data for 609 districts for the year 2006-07.

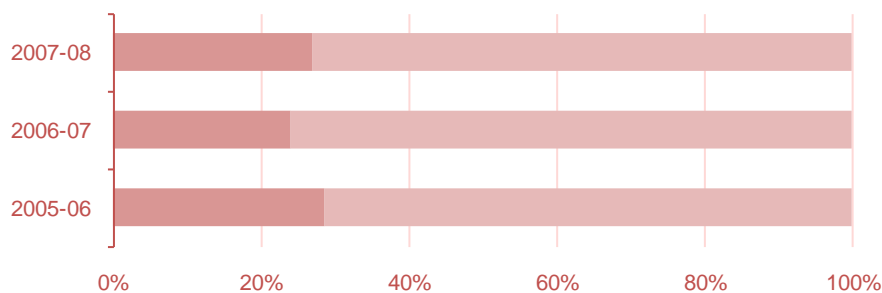
Pedagogical capacity building for teachers is carried out at three levels—academic and professional qualification, pre-service training and in-service trainings provided to them. The capacity of Asian education system to attract the best teachers in terms of academic qualification is limited. As described in the following chart the academic qualifications of the teachers in Indian schools is observed to be largely at the higher secondary level.



The primary teachers and secondary teachers are also required to take up different teacher's training courses, to be qualified for employment in respective schools. There are different teacher's training institutes offering Basic Training Certificate (BTC), Junior Basic Training (JBT), Diploma in Education (D.Ed), Primary teachers training (PTT), Bachelor in Education (B.Ed) and several other teachers' training certifications. There are little over 30 percent teachers having a JBT qualification and little fewer than 25 percent teachers with SBT. Only 20 percent teachers have a Bachelor degree equivalent training in teaching, that is, Bachelor of Education. Teachers with a higher professional qualification such as Master in Education or PhD were almost nil.



% teachers receiving in-service training in previous academic year



Teachers' are also required to undergo in-service training to hone the skills and update themselves with the new areas of teaching and learning. This is an important aspect of the ICT capacity building of teachers because at this point teachers can be

acquainted with the new developments in educational technology. In some of the States in India, in-service teachers' training is also further supplemented with structured training programmes on ICT related aspects, and conducted through private training companies like HARTRON (in Haryana) and INTEL (in Gujarat, Himachal Pradesh, Kerala and Tamil Nadu). In India, according to DISE flash statistics published in 2009, less than 40 percent teachers had received in-service training during previous academic year from 2005–06 to 2007–08.

Intel Teach to the Future Training Programme

Intel Teach to the Future is a worldwide education programme created for teachers to help them effectively integrate technology in the classroom to enhance student learning. The programme started in Karnataka on 25 June 2001 and trained one teacher from each of the Mahiti Sindhu schools as Master Trainers for a period of 13 days. These Master trainers were then supposed to train other teachers in their schools. So far, 8,000 teachers and head teachers from 1,000 Mahiti Sindhu schools and 400 teachers and head teachers from 76 higher primary schools have been trained under this programme.

Source: <http://www97.intel.com/education/teach/>

Indira Gandhi National Open University—Primary Education Diploma Course for Teachers

In 2002 IGNOU, a national government affiliated higher education institution started a two-year diploma course in primary education, and 9,000 teachers are currently enrolled in the course in Jharkhand. Teachers are not only given print material, but academic support is provided through prerecorded programmes on radio and TV six days a week. IGNOU makes the educational content for the programme itself. As AIR Ranchi does not reach all of Jharkhand, programmes are also broadcast from one AIR station in neighboring Bihar. On Sundays there is a one-hour interactive question and answer session held over the telephone and teachers call in with their queries regarding the course. IGNOU also conducts workshops and school based modules to aid the teachers.

Source: <http://www.ignou.ac.in/>

In **Bhutan**, preservice teacher education is provided at the Colleges of Education (CoE) in Samtse and Paro, the former established in 1968 and the latter in 1975. There are two pre-service programs offered, a Bachelor of Education (B.Ed) and a Post Graduate Certificate in Education (PGCE). Since the year 2000, in-service teachers have had the opportunity to upgrade themselves to Bachelors of Education (B.Ed) specializing in primary education via a distance education programme. In 2002, a Masters of Education programme was also started at the Paro College of Education using the same mode. Out of a total of 6,650 teachers, 86 percent are trained in the teaching profession.

In **Pakistan**, there are 203 teacher training institutes and 300 Teachers Resource Centres established under the Education Sector Reform Programme.² Recently published white paper on Education in Pakistan also notes that *“one can safely aver that only a minority of the teachers in the public sector schools is of a good quality. Their continued availability is not necessarily the result of a*

² Ali, Javed Hasan, White Paper on Education in Pakistan, National Education Policy Review Team, 2007.

deliberate effort of the system. It is probably, simply the law of averages. Poor quality of teacher in the system in such large numbers is owed to the mutations in governance, an obsolete preservice training structure and a less than adequate in-service training regime.” These institutions train merely 40,000 teachers every year.

Table 1 Percentage of Trained Teachers across the various Countries in the South Asian region

World Development In indicator (ICT) 2007	World	South Asia	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
Primary education, teachers (% trained)	..	..	..	56	92.01	..	65.87	61.36	84.58	..
Secondary education, teachers (% trained)	..	..	..	39.11	91.94	..	..	..	..	..
Pupil-teacher ratio, primary	30.59	40.08	42.8	44.75	29.18	40.2	14.52	40.02	39.95	23.81
Pupil-teacher ratio, secondary	23.92	32.77	31.6	25.24	22.83	32.7	..	..	41.86	19.52

Source: <http://go.worldbank.org/ITABCOGIV1>

Other nations in the South Asian region such as Bangladesh, Maldives, and Nepal have not achieved impressive targets in teachers training shown in the aforementioned table on World Indicators 2007. These indicators include both pre-service and in-service in absence of the proper exact indicators. Data availability on academic qualification, teacher’s professional training, pre-service training and in-service training is another issue which requires attention.

In **Nepal** while there have been some early initiatives of human capacity building in ICTs in education, such as use of ICTs for communication by several NGOs and initiatives on non-formal community education programmes through community radios, there has been little activity in training. Nevertheless Nepal is trying to devise a course of action for teacher training and the following initiatives can be cited, which are already under implementation:

- Primary and secondary teacher training conducted by private agencies affiliated to MOE National Center for Educational Development, an apex body of teacher training in Nepal
- Certain Universities in Nepal (e.g., TU, KU, PU, NSU) are conducting University run certification courses for primary teachers to teacher educators
- Courses on use of computers for effective pedagogy is being included in University curriculum for teachers

In **Sri Lanka**, several examples can be cited on the use of ICT in various sectors of the economy, though not much initiative has been taken with regard to instructional purposes. Nevertheless, one scheme on the Training of Teachers in Information Technology can be mentioned; the project is coordinated by the Ministry of Education and supported by UNESCO and the National Open School of India. It seeks to bring together students, teachers, ICT professionals, research and development institutions and private sector organizations to upgrade the knowledge and skills of teachers and facilitators and to integrate educational technologies in their work. It also aims at tapping the potential of new ICTs (including distance education methods) to provide easy accessibility and better teacher education leading to professional development.

Maldives is the only country in the region which has succeeded in achieving almost 100 percent literacy. The Government is taking several proactive measures to improve the access and quality of education. As a consequence technology is considered as an essential component for improved learning in school education and ICT is seen as being able to play a major role in improving the quality of teaching. The UNDP Digitally Empowered Development in Island Communities project includes a substantial training component that is focused on the communities involved, so that the communities are to make use of the facilities and the technologies. However, there is no evidence of ICT training for staff in education per se and a roadmap needs to be developed to provide professional development and capacity building for the teachers, half of whom are currently untrained.

Bhutan has a severe shortage of properly trained ICT specialists in the country. Given the fact, the Division of Information Technology (DIT) has developed guidelines for ICT training institutes and ICT training courses at school and tertiary levels. Institutes have to fulfill minimum requirements to ensure quality instruction. Moreover, a number of standard courses are being developed for building a human capacity with the appropriate knowledge and skills for specific needs of the society.

In **Bangladesh**, there are numerous private sector computer and ICT training institutes, many of which are franchises of similar institutes in India. These institutes provide training in basic and advanced computing skills. There is a huge market demand for trained personnel but the government institutions lag far behind in its ability to meet the demand. The amount of allocated public funds available does not match the actual costs of training. And the investment opportunity for private sector in ICT projects is not attractive enough for any further investments.

As a commitment to ICT capacity building, the Ministry of Communication and Information Technology (MCIT), Government of **Afghanistan**, the core body mandated to promote and implement ICT projects in the country has set up 15 ICT training centers throughout the country which will be expanded to 34 by end of 2009 to provide ICT training to local governments and the public.

In **Pakistan**, there had been various initiatives in the recent times to empower teachers and students with ICT in education, for example the Intel Education Initiative in Pakistan and Teacher's

Training Institute, Pakistan Air Force (PAF), collaborated to promote the integration of ICT in education. PAF has 25 K-12 institutions nationwide, with approximately 5,000 teachers working at these schools and colleges. PAF is one of the major school systems of Pakistan, which has its own Teacher Training Institute. The institute focuses on building teachers' professional capacity in terms of effective classroom teaching practices and student-centered learning.

Another project on online e-learning training system called the e-Teacher Project was launched in Pakistan in 2003. Instead of a conventional classroom-based approach, this project encourages teachers to acquire ICT skills during their free periods by using the courses available through the e-Teacher Project. The course offered is most comprehensive, with units on Web ethics and security, as well as how to integrate various ICTs into classroom teaching, multimedia, databases, and so on.

Changes to current in-service and pre-service teacher education programs are crucial to cater to the needs of 21st Century teachers who will be required to use technology in their teaching in a sustainable and effective manner that supports constructivist learning. In today's "flat" world, the Government and schools need to think locally as well as globally when it comes to preparing their children to be active, engaged citizens of tomorrow's global economy. Curriculum planners and teacher trainers need to look to international standards for designing teacher training programmes of quality.

Further, it should be understood that capacity building is not a one time exercise and needs to be ongoing especially in Government schools where teachers are overloaded, schools short staffed, and transfers happen often.

Capacity Building for Educational Content Development:

Educational content is a key element of ICT use in education. It is basically the information that is offered to the intended beneficiary through telecenters, multimedia, or Web. The intended information may be textual, aural or visual, or a combination of them, and the importance of relevant content development can be easily assessed by the fact that any Web site or a community centre can draw interested groups only if information provided is useful to them, is passed to them in an interesting way, and is made user friendly.

The most critical factors for the development of Digital Content to ensure its impact are:

- **Content Relevance:** Unless the intended beneficiaries do not find any potential benefit from the content, no initiative on ICT in education can ever be successful and self-sustainable.
- **Content Availability:** The content that is generally available on the Internet is largely in English and is location independent. But in the South Asian countries (specifically in India), there is a varied literacy level and local language. Thus the availability of the right content targeting the general population but comprising different groups of end users is a huge challenge.

- **Content Research:** In the entire content delivery system the role of people who are involved right from development of content to presentation is very important. For instance, the mode of delivery of content depends on information that is required to be conveyed and the content needs to be developed accordingly. Thus, suitable training process needs to be evolved for the people who are entrusted with development so that better research practices are evolved for developing the content.

In South Asia, Content Development is definitely led by Government initiatives. The private sector content development industry is still at a nascent stage in this region, and they primarily focus on content development for the formal education sector.

In India, the UGC e-content scheme aims at developing high-quality e-content, as well as expertise for generating such content over the long term. The scheme provides financial assistance and technical support to teachers and other experts based in colleges and universities for the development of e-content. The e-content development and associated Web-based learning described here does not seek to replace traditional teaching and learning, but is expected to supplement them.

The goal of the UGC scheme is to encourage individual teachers, groups of teachers in colleges and universities and experts in the IT industry in visualization and multimedia production to develop educational content, in electronic format, suitable for use in various teaching and learning programmes. This scheme is open to teachers in all subjects and disciplines.

Another Programme in **India**, the CoIL-Net programme³ by Department of Information Technology, Ministry of Communications and Information technology, is presently developing language-specific IT-based content (in Hindi), solutions and applications for the Hindi-speaking states of MP, Chhattisgarh, UP, Uttaranchal, Bihar, Jharkhand, and Rajasthan. The programme aims at the following for content development:

- Develop Cultural Heritage Digital Library in Hindi
- Promote preparation and publication of IT Learning Material in Hindi
- Carry out content development, research, and its production through various existing mechanisms and methodologies
- Promote content digitization for promoting access and sharing of public sector information in Hindi
- Develop methodologies for content delivery, aggregation, and management
- Develop search engines, wizards, agents, and smart tags for rich media content management
- Human resource development to carry forward the task of IT Localization

³ <http://tdil.mit.gov.in/coilnet.htm>

In **Sri Lanka**, the e-Sri Lanka Initiative (launched in 2004) by the ICT Agency of Sri Lanka seeks to leverage on ICT to achieve both social and economic development of the Country. The e-Society Programme which is a key component of the e-Sri Lanka Initiative, works extensively on content creation and delivery. It has laid the foundation for many successful e-content projects in the country.

The ADB's Regional Technical Assistance (RETA) study in **Nepal**, built on the Teacher Education Project (TEP) and aimed to ascertain whether use of digital video recording and laptops as tools would enhance the training provided to teachers under the TEP and bring about better learning outcomes among the trainee teachers. The findings from the study served to inform the TEP and the Nepal National Centre for Educational Development (the central teacher education authority, under the Ministry of Education and Sports) about ways to optimize the use of existing, but underutilized, equipment provided to major primary teacher training institutes around the country. Furthermore, it may provide other countries with practical tips for implementing video recording and playback in the classroom, and suggestions for how the use of video can be expanded beyond its traditional use for self-assessment and critique in microteaching.

Capacity Building at the Institutional-Level

In addition to capacity building with respect to developing enabling infrastructure and equipping manpower/teachers and instructors, there is a definite need for interventions at the institutional level, especially through enabling of appropriate partnerships and collaborations. The most critical aspects of such partnerships and collations are the complementing capacities between the partners.

Further, it should be appreciated in such context that the Government which plays the very vital role in the implementation of Capacity Building for ICT in Education, is constrained in finances, and therefore financing the reduction of the digital divide remains a major challenge. For the development of ICT in education sector, the role of Government spending in alignment with the development goals of the country is critical. Although the private sector has contributed significantly to the investments for building ICT infrastructure, operating ICT networks and delivering ICT services over the last decade and provided considerable financial resources, public sector funding plays an important role in creating a roadmap for development, enabling policy environment, channeling resources towards less commercially attractive regions as well as towards the poor, and supporting innovative financing mechanisms for ICTs for development.

Several examples in many parts of the world have proven that such methods are applicable with success. Local and collective financing of ICT projects, show large advantages in terms of ownership, initiatives, and so on. Microcredit exists since some years and it can have a significant contribution to successful implementation of ICT for development.

Institutional capacity building also aims at developing adequate awareness on key ICT developments and opportunities within the local context, and thereby enables development of appropriate policies by the Government.

Capacity Building at the Investment-Level

At a first view, different technologies compete with each other and it is not yet visible, which one will finally be the best solution for a specific application. But a close look shows already that they will occupy different segments of the educational delivery and may finally be used in parallel.

There is hope that the developing countries need not go through a "copper-age" but that they will directly start with wireless and satellite-based applications. Such prudence in decision making is enabled through the sharing and exchange of information on successful implementation and experiences of failures in implementing ICT for capacity building in education.

The most important capacity needs at the investment level is the knowledge and awareness on the selection of the most appropriate technologies or the mix of appropriate technologies. For instance, Satellite radio exists for many years and is easy in use and accessible anywhere. Information and education programs are provided in the local languages and contribute significantly to the development of people. Satellite radio offers huge opportunities in the future. On the other hand, wireless mobile phones in the recent times are easily available and enable multifold advantage on enhanced educational transactions, as compared to the traditional ICT systems. Therefore it is well appreciated that there is a clear need for informed decision-making, which means, that the decision makers in the system needs to be made aware of the various ICTs available for use, and its' appropriateness with respect to the various local conditions and needs.

As highlighted earlier, development requires the possibility of the developing countries to learn from the industrialized ones and to use the knowledge to adapt technology to their local needs and to follow subsequently their own development path. This learning and adapting is only possible if the knowledge is actually accessible and can be further processed. There were claims for open software because this is the prerequisite to enable people from developing countries to learn how the systems work and to develop them further according to their needs. This contributes to the creation of specific knowledge in developing countries and increases their competitiveness.

Further, large-scale applicability of the aforementioned technologies depends on the costs of acquisition and operation. Availability of the wide range of ICTs is a critical factor for successful penetration of ICT for education.

A cross-country analysis of the Government spending pattern of the South Asian region reveals that the average public spending of the countries in this region is approximately 12 percent of Total Government Expenditure and 4.5 percent of GDP in favor of education. Whereas public spending on education as a percentage of total Government expenditure has remained very low in Pakistan, 1.8 percent of GDP is well below the prescribed international levels, which is the lowest in South Asia. Pakistan, today remains among the 8 to 10 ranked countries of the world that spend less than 2 percent of their GDP on education.

Key Issues and Concerns

Access to ICT depends on three basic prerequisites: infrastructure, financial resource to meet the costs and legal framework. Capacity building of the key resources ensures the availability and effectiveness of the ICT-enabled educational intervention. There are geographic, cultural, and economic regional complementarities in the South Asian region, which can provide excellent opportunities for minimizing regional digital divide. Most of the implementation costs are met by public funds from the national Governments and international funding agencies. However, there are various large- and small-scale innovative models with community and private participation.

Some of the key issues and concerns are discussed as follows:

1. Increase in the use of ICT in education has not occurred at the same pace as that of the increase in overall ICT infrastructure and, the overall increase in ICT availability has not yet reached a stage of providing access to most people in South Asia.

South Asian countries have seen a surge of ICTs such as telephone lines, mobile telephone, Internet and availability of computers over the last decade. However, the scaling up of ICT in education has not occurred at the same rate. There are several reasons for this divide in application of technology. First, support infrastructure like electricity access, telecommunication, and so on, and capabilities such as content development have not taken off as rapidly as the technology itself. Second, penetration of these technologies is still limited to a few people mostly economically higher classes. Mobile phone is an exception where South Asia enjoys one of the cheapest telephony in the world. For example, though the region has one of the biggest rises in the Internet users in recent years its penetration is still quite low and access to poor is limited. Thus, though the region has improved a lot in terms of its ICT availability and capabilities, it has not reached the comfortable levels in its application to the social development uses such as health and education.

2. Absence of integration and interaction across the South Asian region, restricts sharing of information resources and mandates duplication of efforts, resulting in ineffective utilization of ICT

There are relatively few available platforms for sharing best practices and resources at a regional level in South Asia. In India, there are various institutions that provide one or the other type of education technology-enabled program. For example, the University Grants Commission has a network of over 17 Educational Media Research Centers and Audio Visual Research Centers. There are more than 250 universities offering education technology as an optional subject to the students. The National Open University and Indira Gandhi Open University (IGNOU) have the capabilities of providing education through alternative modes. Thus, each nation has a number of institutions which do not interact with each other within the nations and their counterpart in the region. Thus, interconnected networks of these institutions with the country can provide a great opportunity for the regional networks on education which can use and share resources such as education content, media and other resources.

National Institute of Open Schooling of India (NIOS) and The Open University of Sri Lanka (OUSL)**National Open School**

The National Open School (NOS) India was established in 1989 to support India's National Policy on Education. The school caters to the needs of school children as well as children from socially marginalized communities in both urban and rural locations. While the school's early focus was on academic programs at the secondary school level, it currently offers courses in vocational and other life-skills areas. It also has extended its range from elementary to pre-university programs. Some 400,000 children are enrolled, and they come from challenged communities, socially disadvantaged groups, and isolated populations. The school uses ICTs for course development, administration, testing, and to deliver some content by audio and local radio. Its plans for the future include even more extensive use of the newer technologies through tele- and community-learning centers.

The Open University of Sri Lanka

The Open University of Sri Lanka (OUSL) is unique within the national university system in being the only University to offer programmes of study leading to certificate, diploma, degree, postgraduate diploma and postgraduate degree through the Distance Mode. The University was set up by the Government of Sri Lanka under the Universities Act No. 16 of 1978, for the purpose of providing higher educational opportunities to working adults. The OUSL also runs Educational Technology (ET) division which was established in 1983 with support from Japan. The ET division acts as a service provider for all the faculties to produce instructional audio-visual materials.

3. Absence of trained teachers of high quality and caliber poses a greater challenge

What happens in the classroom affects the success of education system the most. Teachers are "live" infrastructure and the quality of teachers defines the quality of instructions that in turn defines the education outcomes. The entire South Asian region has severe deficit of trained teachers and also robust training infrastructure and its linkages with broader pedagogical reforms. At the same time introduction and gaining importance of ICT in education poses new demands on part of ICT capacity building of teachers. Teachers' capacity building is required in areas like basic pedagogy and ICT.

4. Restrictive access to ICT facilities results in a lack of ICT enablement

Many experiments in the region and elsewhere have proved that the access to the basic ICT facility can itself become a major motivation for the children to learn new things. Many schools that have computers provide only partial access to the children during lab hours or to learn computer as a subject only. One of the best known experiments in this context is "the hole-in-the-wall" project (see box) where simply providing the access to computer led to learning in children.

Thus, rather than treating computer as a high valued assets, the school should find out ways to promote use of computer in every facet of schooling and seek way to provide more and more access to the children. Community participation can achieve significant results here. Many projects

relating to use of ICT are either community driven or run by organizations other than governments. For example, project shiksha driven by Microsoft in India.

Access to ICT is the key—Story of “The hole-in-the-wall” project in India

Dr. Sugata Mitra, Chief Scientist at NIIT, is credited with developing the concept of hole-in-the-wall. As early as 1982, he had been toying with the idea of unsupervised learning and computers. Finally, in 1999, he decided to test his ideas in the field. On 26th January, Dr. Mitra's team carved a "hole-in-the-wall" that separated the NIIT premises from the adjoining slum in Kalkaji, New Delhi. Through this hole, a freely accessible computer was put up for use. This computer proved to be an instant hit among the slum dwellers, especially the children. With no prior experience, the children learnt to use the computer on their own. This prompted Dr. Mitra to [propose](#) the following hypothesis:

“The acquisition of basic computing skills by any set of children can be achieved through incidental learning provided the learners are given access to a suitable computing facility, with entertaining and motivating content and some minimal (human) guidance.”

Encouraged by the success of the Kalkaji experiment, freely accessible computers were set up in Shivpuri (a town in Madhya Pradesh) and in Madantusi (a village in Uttar Pradesh). These experiments came to be known as hole-in-the-wall experiments. The findings from Shivpuri and Madantusi confirmed the results of Kalkaji experiments. It appeared that the children in these two places picked up computer skills on their own. Dr. Mitra defined this as a new way of learning.

(Source: <http://www.hole-in-the-wall.com/Beginnings.html>)

5. Absence of authentic and adequate data restricts appropriate policy formulation and undermines impact

Despite increase in availability of technology and interconnected infrastructure and many focused initiatives, availability of data on wide-ranging education indicators is still an issue in South Asia. Availability of data on education is uneven in the South Asian region. Also, in countries like India, Pakistan and Bangladesh where some national-level initiatives have taken place these initiatives are limited to gathering data on basic indicators such as enrollment, dropouts, and access. There is an urgent need to gather information on wide-ranging attributes related to infrastructure, capacity building and in particular use of education technology. Although there are various international agencies such as UNESCO, which have taken initiatives in assembling data on education indicators with International Standard Classification for Education Data, there is a need to institutionalize collection and maintenance such national-level and ground-level data, based on such uniform standards across the country. Also, the linkage of such data to the policy formulation is the key to achieve the long-term objectives of improving education outcomes and its relation to the growth of knowledge in the region.

6. Narrow focused targeted interventions limit the overall gain from ICT and miss the broader vision and goals of the sector

There are many successful initiatives and many models that have worked in education technology in South Asia both driven by Government and non-government organizations. The Governments have tried to address the basic issues such as access to education or spreading the reach of education to all and improving facilities at ground level through targeted programs. There are many initiatives being taken by the Governments and non-government organization, which do not take note of the other programs. The need for an ICT in education policy has emerged only recently in the region. The region has seen large programs that are driven by agenda of improving access and availability of infrastructure, such as classrooms and computers, and teacher's training; however, to leverage on the availability of infrastructure and capacity there is need to think in broader context. For example, a large program targeted at improving educational outcomes by providing ICT-enabled teaching and learning opportunities cannot ignore capacity building issues for teachers at the same. The national ICT policies can not only target on what happens in the schools. It should start thinking from its effect in the teacher's curriculum, availability of devices, availability of content, capacity building of the teachers, capacity building of the parents, and availability of infrastructure together. Also, ICT in education has now gone beyond its stand alone benefits such as improving access or monitoring. Modern day technology provides inspiration for models that are outcome driven.

7. Continued need for a minimal level of physical and complementary infrastructure

ICT has helped removing many barriers in education such as physical presence of the educator and the learner at the same place and at the same time. Also, with the availability of improved mobile and wireless technology, requirements for fixed physical communication infrastructure can be ignored in the developing country context. However, to achieve the goals of "education for all" there is a dying need to provide minimum level of physical infrastructure and also upgrade existing school buildings and rooms in developing country.

8. Low utilization of ICTs potential

It is essential to ensure supply of adequate hardware to schools, availability of adequate uninterrupted power supply and qualified ICT-conversant teachers. Like many developing countries, South Asian countries have also taken these first steps toward ICT in education during last decade. However, there is a need to shift focus among policy planners, budget allocations and program design to ensure that ICT in education does not stop merely at providing these facilities. In turn it turns out to be an ironical paradox where computers are being used to monitor how many computers are installed in how many schools! The actual fruits of ICT in education can only be realized by designing and supporting a parallel pool of education technology-enabled content and ability to use it as a tool in actual teaching and learning. ICT in administration should grow beyond basic monitoring of progress to a scientific monitoring and evaluation system which could provide a wide range of inputs for education policy and indicators for monitoring outcome achievements.

Key Learnings

On analyzing the status of various countries across different types of ICT interventions, the following key learning are highlighted, which could potentially streamline the systems and align operations to meet the desired ends in implementing capacity building initiatives for ICT integration in education. Further it is appreciated that the best defined processes cannot make up for inadequacies in human talent. Irrespective of ICT, an issue that needs to be addressed urgently is teacher training. This training needs to include pre-service, induction, and in-service training. Given the size and nature of the teaching workforce, this is a daunting task and needs to be taken up in a phased manner with a project timeline spanning 2 to 3 years.

Development of technology savvy teachers

There is widespread need to impart excitement and relevance to the teaching-learning process so that the young men and women can contribute to, as well as benefit from, the socioeconomic progress. Rapid proliferation of ICT needs to be exploited for assisting a teacher to assimilate the art, science and technology of teaching. Simultaneously, creative teachers have to be recognized with morale-boosting rewards and awards so that they become a role model.

The focus should be on design of multimedia modules, borderless training strategy and providing preservice and in-service ICT training for teachers with the help of ICT-based resource packages designed by teachers for teachers under professional guidance and supervision. The objective of such training program should be to provide hands-on ICT learning opportunity for teachers to become more comfortable with technology, incorporating the Internet, Webpage design, and project-based approaches to support training.

Improve real-time instructional support available to teachers who use technology:

With a small number of teachers catering to vast population it is not a wise idea to displace them from their work places. It not only allows the work places to suffer but also troubles the teachers who are low paid employees. This is precisely the reason why our full-time teachers training programmes are a failure. The teachers' training at their work places can be effectively carried out through ICT networks .It will also enable us to take instantaneous feedback from field locations with out any hassle.

High-quality, comprehensive instructional support is critical in assisting teachers to integrate technology into their instruction. Such support may include the availability of just-in-time individualized training and professional development activities, with content that focuses on supporting teachers to integrate the technology available to them into their instruction. Technology coordinators also play a critical role in fostering the effective use of technology in schools through their knowledge of both technical and instructional issues. Strategies include:

- Countries within the region, states and districts within the country, and content associations and organizations, and private sector organizations should develop online

resources to provide just-in-time support to teachers. Specific examples include education-focused portal sites for teachers, which offer online communities for professional development or mentoring, tools for classroom management and administrative tasks, and tools to facilitate increased communication with parents and community members;

- Educational technology organizations should consider developing national standards and certification programmes for technology support professionals and programmes;
- Provincial Government, districts, and schools should develop comprehensive technology support programmes, directed by qualified technology coordinators at each school building;
- Countries within the region, states, districts and schools should investigate on emerging approaches to providing technical and instructional support over the Internet by building, using, or purchasing teacher-specific resources online.

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Introduce ICT Proficiency in Certification and Selection of Teachers

Proficiency in ICT applications should be considered as one of the important criteria for teacher's qualification and their selection. Therefore, necessary steps should be taken at the Government and Sector-levels to notify such regime and ensure introduction of relevant courses by the TTIs:

- Facilitate liberal and easy loan facility for purchase of broadband Internet and PC by teachers and students in collaboration of Banks and so on.
- Facilitate concessional broadband connection and PC to the teachers and students in collaboration with industry.
- Provide income tax exemption on amounts spent on Internet connection and purchase of PC to students and teachers.

Enable appropriate Partnerships and Collaborations (including NGOs and Industry)

There are several private initiatives for enabling people in India, especially those in rural areas, disabled and marginalized sections of the society, and so on. to reap the benefits of the ICT revolution through out the country. Akshya in Kerala, ASHA in Himachal Pradesh, SARI, e-SEVA, Gyandoot in Madhya Pradesh, Lok Mitra/Jan Mitra in Rajasthan, Bhoomi, Drishtee, TARAhat, Gramdoot, and so on are some of the successful examples.

The aforementioned NGOs and other similarly placed entities could encourage adopting certain number of schools in their area for providing access to ICT in schools including educational content development for students and teachers training and handholding services for making this initiative successful. Active involvement of corporate sector in such initiatives could be catalyzed by the Government, which could include donation of obsolete computers, expert services for development of content, initial orientation programmes/training of teachers and students as per requirement. Government of India may provide token financial support to these NGOs to encourage them to supplement government efforts in accomplishing the desired results.

- Make "Free of Charge eLearning Services Provisioning" as a mandatory condition for private sector to become part of the Public-Private Partnership. In fact, this has to be sold as a concept to share the social obligation by the corporate sector.
- Allow the Public-Private Partnership to modulate services charges in a manner that they extend e-learning services to the schools free of cost including operation and maintenance support.

It is very critical to develop appropriate partnerships and collaborations between the stakeholders with complementing capacities, to build ICT capacity within the education system, yet influencing the larger economy, the community and education in a synchronous manner. The nature of partnerships envisaged for successful implementation of Capacity Building for ICTs in Education, include:

- ICT industry partnerships that provide immediate local and worldwide technology solutions and stimulate local economic growth;
- Community partnerships that provide an environment where underserved populations can use ICT to support workforce development and thereby impact current and medium term workforce needs;
- Education partnerships where we provide a broad range of support to improve teaching and learning effectiveness to build the skills those workforces need in the future.

Emphasize Learning over Content Delivery

The current system of evaluation of student learning does not allow creativity, innovation, and research, which are important tools for lifelong learning. Learning mechanisms that promote mastery or deep learning, facilitate personalized learning based on learning styles, and meta cognition can be adopted if teacher training curriculums accept new age technology tools to assess and evaluate student achievement on the basis of learning and not rote memorization. Train teachers to encourage cooperative and team learning environments enabled by appropriate ICTs.

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