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## CURRENT STATUS AND CHALLENGES IN IMPLEMENTING INFORMATION AND COMMUNICATION TECHNOLOGY INITIATIVES IN EDUCATION IN INDIA

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### ABSTRACT

*India is well known for its large pool of technical manpower, a fair proportion of which finds employment in developed countries, especially in the West. As a happy sequel to the story, India has in the last decade witnessed a big boom in the knowledge led service sector. In order to sustain this trend, and to ensure that India does not throw away this key advantage, it is imperative that we continue to produce a critical mass of highly skilled manpower at an accelerated pace. At any given time, education has been a key factor for its ability to change and to induce change and progress in the society. One of the striking features of the development of higher education in India over the last few decades has been the extent to which private institutions have entered the scene and attempted to respond to the massive demand for education at the post-secondary level. This is particularly true in the fields of engineering, medicine, and management, and much less at the broader level of university education. The strong emergence of the private sector is reflected in the funding pattern: the government's share in overall education expenditure has declined and private expenditure on education has increased. A large number of initiatives using ICT at all levels of education are ongoing in India, some at a pilot stage while others are operating full scale in a large geography. This paper reviews the progress of Education, its administration, and the progress of different ICT initiatives and the challenges of implementation.*

### KEYWORDS

Education, Information and communication technology.

### INTRODUCTION

India is well known for its large pool of technical manpower, a fair proportion of which finds employment in developed countries, especially in the West. As a happy sequel to the story, India has in the last decade witnessed a big boom in the knowledge led service sector. In order to sustain this trend, and to ensure that India does not throw away this key advantage, it is imperative that we continue to produce a critical mass of highly skilled manpower at an accelerated pace.

### OBJECTIVE OF THE STUDY

The main purpose or objective of study of this paper is as follows:

1. To highlight the initiatives in Information and Communication technology in the field of Education.
2. To summarize the challenges faced in implementing information and communication technology and recommendation to overcome the challenges.

### RESEARCH METHODOLOGY

This paper is based on a review of key literature and a descriptive analysis of secondary data, from government sources like The Ministry of Communications & Information Technology, Department of Telecommunications, Office of the Administrator, USOF, Department of School Education & Literacy, SARVA SHIKSHA ABHIYAN, EDUSAT Distance Learning Programme, Implementation Document, National Institute of Open Schooling, Ignou, The people's University and from reports from private organization.

### INDIA AND KNOWLEDGE ECONOMY

An enabling academic and economic setting is a key factor determining the fate of our nation in the wake of the knowledge service sector boom. At any given time, higher education has been a key factor for its ability to change and to induce change and progress in the society. Not surprising that in today's globalized economy; it is the globalization of knowledge that will enable us to deal with the present and future challenges that is confronting us in every sphere of life, whether it is in environment, health or food security. Since independence, higher education has always been identified as a critical component of India's growth story. When Pandit Jawaharlal Nehru established the Indian Institutes of Technology, he understood the need for educated and skilled human resources only too well.

### ADMINISTRATION OF EDUCATION

The education system in India is administered by the Ministry of Human Resource Development at the center and the different Departments of Education at the state level. Education is a concurrent subject, which implies that Indian states and the federal government both have jurisdiction over the sector; although the Government of India provides the overall policy framework, financial support and guidelines to ensure a national standard of education, implementation is primarily done at the state level.

### CONTRIBUTION OF PRIVATE SECTOR IN EDUCATION

One of the striking features of the development of higher education in India over the last few decades has been the extent to which private institutions have entered the scene and attempted to respond to the massive demand for education at the post-secondary level. This is particularly true in the fields of engineering, medicine, and management, and much less at the broader level of university education. The strong emergence of the private sector is reflected in the funding pattern: the government's share in overall education expenditure has declined and private expenditure on education has increased. Till the late 1990s, the expansion of higher education largely took place through affiliated colleges. By then, many promoters of private unaided colleges began to realize that the regulatory mechanisms of the affiliating university and state governments were inhibiting their growth and did not allow them to fully exploit their

market potential. The promoters were not able to make money from their educational enterprises. Such institutions explored the possibilities of emerging out of the control of the state governments and the affiliating universities. Some of the institutions took the deemed to be university route to get the degree granting powers. Commercial private higher education emerges from market forces and tied to economic and global forces. They thrive on the principles of commercialism, primarily focus on vocational courses and highly pragmatic. Their commercial thrust is training jobs; indeed, part of the curriculum is industrial training. Not only training for jobs but also place their students in well-paid jobs.

In a report prepared by Ernst & Young titled "Making the Indian higher education system future ready" presented in the FICCI Higher education summit 2009 makes the case that we must replicate the private sector higher education success story, given now that the private sector accounts for a large and growing proportion of the higher education segment (63.21% in 2006, with a predominance in professional education such as engineering and Pharmacy).

## CONTRIBUTION OF INFORMATION & COMMUNICATION TECHNOLOGY IN EDUCATION

Usage of ICT can help improve India's higher education system in three ways:

### a) Greater equity:

1. Easy access to students from various socio-economic groups, leading to greater inclusion.
2. Good quality institutions are not restricted to a few pockets but are made accessible to students located all over the country.
3. Content from all over the world can be made available to students with access to internet.

### b) Better Access:

1. Cheaper costs of education.
2. Increased flexibility, providing anytime anywhere access to students
3. Reduction in capacity constraints making large enrolments possible in courses run by reputed institutes.
4. Technology can be leveraged to provide access to courses in new and emerging fields to greater number of students.

### c) Improved Quality:

1. Usage of supplementary teaching aids
2. Better and more efficient processes and management systems
3. Access to up-to-date content
4. Increased knowledge sharing among course creators and scientists
5. Creation of comprehensive centralized digital repositories for reference material

## NATIONAL KNOWLEDGE COMMISSION

The importance of using ICT for improving education has been emphasized for over a decade in India; right from 1992 the National Policy on Education emphasized using educational technology to improve the quality of education. Consequently major government schemes have a component of funding allocated for using ICTs and focused initiatives. A glance at the Eleventh Five-Year Plan also reflects the importance of ICT in the education scenario of India. To harness the capacity of ICT in delivering educational services, a national ICT initiative, the National Knowledge Network has been launched with the mandate of providing a blue print for reform of the educational sector in the context of the emerging knowledge society. The NKC recommendations outline a roadmap for strengthening the education system from school education to general higher and professional education, as well as skill development in India, with a focus on how to leverage available technologies to improve access and quality of education.

Based on the recommendation of the NKC, with the collaborative effort of the Ministry of Human Resource Development (MHRD), Department of IT and Department of Telecom that will make its presence felt in 378 Universities and 18,064 colleges. The network will focus on digitization and networking of the educational institutions, making available bandwidth to facilitate collaborative research and knowledge sharing. Further, the National Mission on Education through ICTs launched by the MHRD aims to leverage ICTs to provide high-quality, personalized, and interactive knowledge modules over the Internet/intranet to all learners in higher education institutions, any time anywhere.

A coherent policy level framework for the use of ICTs in school education in India was recently initiated through a stakeholder dialogue on formulating a draft national policy for ICT in education, led by the Ministry of Human Resource Development, Global e-Schools Initiative (GeSCI), and Centre for Science, Development and Media Studies (CSDMS). Based on feedback received a draft "National Policy on ICT in School Education" has now been published for comments and revision. In terms of ICT literacy for students, this draft policy document proposes implementing a programme for ICT literacy for all secondary schools, suggesting that all states develop an ICT literacy curriculum to instill basic as well as advanced ICT skills among secondary school students. At the higher secondary stage, the draft policy states that ICT-related elective courses will be offered in schools which will be taught by a postgraduate teacher with appropriate qualifications. To foster an environment of ICT-enabled teaching-learning, the draft policy states that competent teachers will be encouraged and given the resources to adopt ICT-enabled practices in teaching-learning. For this purpose, the transformation of classrooms into SMART classrooms (classrooms equipped with a wide range of ICT facilities including computers, projectors et cetera, used to teach the curriculum) will be catalyzed. As for ICT infrastructure, the draft policy states that each school will be equipped with at least one computer lab and a minimum of a 10:1 student computer ratio will be maintained. Policies regarding other ICT facilities and enabling infrastructure and their delivery mechanism have also been articulated in the draft policy document. There is also a focus on capacity building of teachers as well as state/district education department personnel and on using ICT for open and distance learning (ODL).

## 1. CURRENT STATUS OF ICT INITIATIVES IN INDIA – GOVERNMENT INITIATIVES

A large number of initiatives using ICT at all levels of education are ongoing in India, some at a pilot stage while others are operating full scale in a large geography. While individual states in India have significant ICT-related interventions in their education systems, major initiatives operating at a national level in educational institutions are profiled here. Some of the major initiatives taken by the government are:

### 1.1. NATIONAL KNOWLEDGE NETWORK

A high-speed digital broadband network, the National Knowledge Network, is envisaged for interconnecting the country's major research and educational institutions, colleges, and universities. A structured empowered committee will be in charge of coordinating the activities of creation and implementation of the content, application, and establishment of the network. The Mission has two major components: content generation and providing connectivity, including last mile connectivity for students and institutions. On the content generation front, a wiki style collaborative platform under the supervision of content advisory committees is envisaged.

### 1.2. INDIRA GANDHI NATIONAL OPEN UNIVERSITY

The IGNOU is a higher education institution; as an open education provider, it has been at the vanguard of developing and maintaining standards in open learning in India and is a significant milestone in any discussion on the use of technology for education. The University was established in 1985 by an Act of Parliament with the dual responsibilities of (i) enhancing access and equity to higher education through distance mode and (ii) promoting, coordinating, and determining standards in open learning and distance education systems.

### 1.3. GYAN DARSHAN

Launched in 2000, Gyan Darshan is a bouquet of channels that broadcasts educational programs for school kids, university students, and adults. Courses are contributed by IGNOU, UGC CEC, IITs.

### 1.4. GYAN VANI

It is a bouquet of FM radio channels which broadcast programs contributed by institutions such as IGNOU and IITs.



**1.5. UGC COUNTRYWIDE CLASSROOM**

Under the country wide classroom initiative, education programs are telecast on Gyan Darshan and Doordarshan's National Channel (DD1) every day. Till date, more than 10,000 programs have been telecast on subjects such as Arts and Social Sciences.

**1.6. E-GYANKOSH**

It is a knowledge repository launched by IGNOU in 2005 which aims at storing and preserving digital learning resources. Almost 95% of IGNOU's printed material has been digitised and uploaded on the repository.

**1.7. NATIONAL PROGRAMME FOR TECHNOLOGY ENHANCED LEARNING**

Approved in 2001, National Programme for Technology Enhanced Learning (NPTEL) is a joint initiative of IITs and IISc. As a part of its first phase, digital course content for 129 engineering/science courses has been developed and uploaded on you tube.

**1.8. E-JOURNAL CONSORTIA**

AICTE – Indian National Digital Library in Engineering & Technology (AICTE – INDEST) is a consortium set up by the Ministry of Human Resource to enhance greater access and generate annual savings in access of bibliographic databases.

UGC has also launched its Digital Library Consortium to provide access to peer reviewed journals and bibliographic databases covering subjects such as arts, humanities, and sciences.

**1.9. NETWORKING OF HIGHER EDUCATION INSTITUTIONS:**

Education and Research Network (ERNET) promoted by the Department of Information Technology, Government of India, provides communication infrastructure and services to academic research institutions in India. It is undertaking networking projects such as AICTE-Net, ICAR-Net and UGC-Infonet to provide internet and intranet facilities.

**1.10. ICT@SCHOOLS SCHEME**

The ICT @ Schools scheme was launched in 2004 with a view to provide opportunities to students to develop their ICT skills as well as use ICTs to aid the teaching learning process. Under this scheme, support is provided for procurement of computers, peripherals, software, connectivity, and so on. The scheme is currently being implemented in all states and union territories of India in government and government-aided secondary and higher secondary schools.

**1.11. EDUSAT—EDUCATION SATELLITE**

Indian Space Research Organization (ISRO) launched EDUSAT (Education Satellite), the first Indian satellite built exclusively for serving the educational sector. It was launched primarily to serve the need for an interactive satellite to enhance the distance education system in the country. Many projects have been initiated to impart education through the satellite. The Virtual Classroom Technology on EDUSAT for Rural Schools (VICTERS) program is one such initiative. The program is an "IT @ School" project of the Kerala State Government envisioned to harness the EDUSAT satellite for training teachers, providing high-speed net connectivity to schools, and for implementing learning management solutions. The Rajiv Gandhi Project for EDUSAT Supported Elementary Education (RGPEEE) is another initiative aimed at harnessing the benefits of EDUSAT; it is a collaborative project of Indira Gandhi National Open University (IGNOU), Ministry of Human Resource Development (MHRD), and ISRO. The project promotes the use of EDUSAT in enabling teachers to incorporate ICT in elementary education. It is operational in Madhya Pradesh, Chhattisgarh, Uttar Pradesh, and Bihar.

**1.12. SARVA SHIKSHA ABHIYAN**

SSA is a flagship programme of the Government of India in partnership with the state governments to support the states in creating, developing, and strengthening the formal primary and upper primary school systems. SSA is a time bound mission, with the objectives of ensuring Universalization of Education and bridging gender and social gaps. The SSA encourages states to use ICT and the satellite EDUSAT (Education Satellite) to provide distance education within states to supplement school education. Distance education has been naturally chosen as a catalyst for expediting SSA.

**1.13. NAVODAYA VIDYALAYA SAMITI**

Navodaya Vidyalaya Samiti (NVS) is an autonomous organization under the Ministry of Human Resource Development, Department of Secondary & Higher Education Government of India. Its significance lies in providing quality education to the rural population who has been deprived of quality modern education typically available in urban areas. It is an attempt to realize the goal of setting up residential schools to bring out the best of rural talent envisaged in the National Policy on Education 1986. Each of these residential schools is known as Jawahar Navodaya Vidyalayas (JNV). NVS has integrated a number of ICT facilities in each of the 576 schools spread across the rural areas of the country.

**1.14. KENDRIYA VIDYALAYA SANGATHAN**

Like NVS, Kendriya Vidyalaya Sangathan (KVS) is also an autonomous organization of the Ministry of Human Resource Development; however, its aim is to cater to the educational needs of the children of transferable Central Government Employees including Defense Personnel and Para-Military forces by providing common programme of education. KVS is tasked with the responsibility of establishing and maintaining Kendriya Vidyalayas (Central Schools). At present, there are 978 KVs in India with one school each in Kathmandu, Moscow, and Tehran. Over the last 4 years KVS has made extensive efforts to promote ICTs in its schools.

**1.15. NATIONAL INSTITUTE OF OPEN SCHOOLING:**

The NIOS is partly funded by the government and is responsible for providing education to all those who are not able to attend the formal school system. In addition to providing the regular range of school subjects, the NIOS also provides vocational and community-oriented courses. The NIOS has the authority to conduct and certify examinations for secondary levels, and its certification is recognized by all universities in India. NIOS is planning to utilize EDUSAT for live interactive sessions in a phased manner. In the first phase, the NIOS studio will be connected to 11 regional centers, which would be expanded to 100 study centers in the second phase. This is an effort to facilitate direct face-to-face interaction between the learners and the teaching community. NIOS has also introduced an Online Admission facility through the NIOS On-Line (Ni-On) Project to facilitate the learners in registering themselves for the courses. NIOS has collaborated with Cisco to offer Cisco Networking Academy Programs in 10 accredited vocational institutes. The program focuses on teaching students how to design, build, and maintain computer networks. Cisco will provide PC hardware and other IT essentials, Web-based course materials, 24-hour technical support, and nominate a representative to aid in the implementation of the program. NIOS plans to scale this program in 100 accredited vocational institutes.

**1.16. SAKSHAT PORTAL**

The Sakshat Portal launched by the MHRD in 2006 is a single window portal for all education-related needs of students, teachers, and lifelong learners. It provides a range of services from informational services like details of scholarships, tests, educational resources, as well as interactive services like a discussion forum, one-on-one sessions with teachers, career counseling, and video conferencing facility.

**1.17. MEDIA LAB ASIA**

Media Lab Asia (MLAsia) has been set up by the Department of Information Technology, Government of India, as a not-for-profit Research & Development organization. Its administrative headquarters is in Mumbai; however, the project will be scaled to other parts of Asia as well. MLAsia works with academic and R&D institutions, industries, NGOs, and the Government to develop relevant technology and culturally appropriate solutions for the common man. Many projects undertaken in the areas of ICT for village livelihood generation, healthcare education, empowerment of the disabled and rural connectivity are now undergoing test deployment and are being made ready for national/large-scale deployment.

**1.18. NATIONAL MISSION ON EDUCATION**

Recently, National Mission on Education through ICT was launched by the government to harness ICT's potential to make a difference. The National Mission on Education through ICT is an Rs. 500 crore, centrally sponsored scheme submitted by the Ministry of HRD and approved by the Cabinet Committee on Economic Affairs (CCEA). The Mission envisions to cater to the learning needs of 500 million Indians. Some of the key objectives of the Mission include:

- Availability of e-knowledge content free of cost to Indians.
- Development of knowledge modules to take care of personalized needs of learners.
- Providing support for the creation of virtual technological universities.

- Building connectivity and knowledge network among and within institutions of higher learning in the country.
  - Standardization and quality assurance of contents to make them world class.
  - Spreading digital literacy for teacher empowerment.
  - Certification of competencies of the human resources acquired either through formal or non-formal means
- The Mission has planned a variety of initiatives aimed at developing and standardizing digital content for Indian higher education segment.

Scaling up Sakshat portal

- The Mission intends to scale up the existing Sakshat portal to take care of the needs of entire learning community.
- It will also act as a human resource database aiding education related decision making.

Generation of new digital content

- It also plans to generate new online course content for UG, PG and Doctoral education.
- Efforts are already underway to prepare course content for 130 courses (Includes UG and PG courses).

Virtual Technical University (VTU)

- The Mission envisages creation of a VTU to enable training of UG/PG students along with new teachers.
- It will focus on science, technology, management and other related areas.

Quality assurance

- It is also planning to set up national resource centers for standardization and quality assurance of e-content for College and University segment and Engineering and Technology segment.

### 1.19. UNIVERSAL SERVICE OBLIGATION FUND

Universal Service Obligation Fund (USOF) was established in India in 2002 under the Ministry of Communications and Information Technology, Department of Telecommunications. The fund is exclusively utilized for providing access to telegraph services, mobile services, and broadband connectivity to people in the remote and rural areas at affordable and reasonable prices. Funds are raised through a Universal Service Levy (USL), which is a percentage of the revenue earned by certain telecom service providers and through grants and loans provided by the central government. Since its inception USOF has initiated many projects to provide telecom infrastructure in rural areas. USOF provides and maintains public access facilities such as Village Public Telephones (VPT) and Rural Community Phones (RCP) in village and rural areas. In terms of empowering individuals in rural areas, USOF has provided Rural Household Direct Exchange Lines (RDELs) to the rural population. Around 7,800 mobile infrastructure sites spread across 500 districts and 28 states are being rolled out. An agreement has been signed with BSNL where USOF will provide subsidy towards broadband connectivity from about 28,000 rural exchanges spread across the country.

## 2. CURRENT STATUS OF ICT INITIATIVES IN INDIA – PRIVATE SECTOR AND NGO INITIATIVES

ICTs are also being used extensively for education in India through the pioneering efforts of some private players and NGOs, some of these are outlined in the following:

### 2.1. PROJECT "SHIKSHA," MICROSOFT

Teacher training under Project Shiksha aims at enabling teachers to use technology in the classroom; they are trained on using visual presentation of theories and concepts in the curriculum. The teachers are trained after school hours to ensure that the project does not interfere with the daily school routine. The training lasts for a period of 10 days by working 3–4 hours per day.

### 2.2. EDUCOMP SOLUTIONS LIMITED

One of the largest education services companies in India. Educomp offers a range of education services and products from multimedia content and SMART classes, to programs in vocational education and training, for both private as well as government schools. It has partnered with State and Central Government agencies, Ministries of IT and HRD, and Governments of other countries in order to bridge the digital divide. Educomp has partnered with fourteen State Governments, namely Government of Assam, Karnataka, Orissa, Tripura, Gujarat, Uttar Pradesh, West Bengal, Tamil Nadu, Haryana, Jharkhand, Rajasthan, Punjab, Chhattisgarh, and Andhra Pradesh, covering over 14,000 government schools and benefiting 7.7 million students studying in government schools in India.

### 2.3. INTEL EDUCATION INITIATIVES:

Intel's initiatives are aimed at using "ICT as part of the curriculum." As a first step, Intel organized Principal Leadership Forums for 750 KV Principals. Through these forums Intel gave them an insight into understanding how technology integration in the classroom can positively impact student learning. For the KVs that have been classified as "SMART" schools by the MHRD, Intel provided guidance to the principals and teachers on how to use the ICT facilities for various institutional processes (both school systems and the teaching/learning process).

### 2.4. ORACLE EDUCATION INITIATIVES:

Oracle introduced think.com. At Think.com, students can create their own Web pages, work on projects, and interact with children in other parts of the world. Oracle also provides a series of refresher and training courses available through face-to-face as well as online programmes. Following a successful Think.com pilot project in 25 KVs in October 2004, KVS decided to rollout Oracle's Think.com initiative to more than 900 of its schools. Oracle initially trained master trainers selected by KVS who then trained schools administrators and other teachers and students in the schools.

### 2.5. HUGHESNET

Has a network of 50 classrooms in 34 cities equipped with the technology to receive satellite signals from studios located in educational institutes. Examples of institutes using HughesNet infrastructure include IIMs, IITs and XLRI.

### 2.6. RELIANCE WORLD

Part of Reliance ADAG, Reliance World is a chain of cyber cafes that has tied up with testing companies to offer testing centers (e.g. TOEFL).

### 2.7. NATIONAL INSTITUTE OF INFORMATION TECHNOLOGY

National Institute of Information Technology (NIIT) is a global IT solutions company, which offers training programs to students and professionals. It aims to use ICT to transform the teaching-learning process into a more interactive and efficient process. NIIT's training programs are based on the concept that "You don't have to be an engineer to excel in the IT industry."

### 2.8. DIGITAL EMPOWERMENT FOUNDATION

Digital Empowerment Foundation (DEF) is a not-for-profit organization dedicated to bridging the digital divide by providing consultancy services to the government and corporate in providing ICT facilities to rural areas. It therefore serves as platform for stakeholders including the government, private companies, and NGOs to bring forth their knowledge and expertise to the rural population who live on the edge of information and economic benefit through innovative interventions of ICT tools and digital media. Human resource at DEF includes 72 ICT experts and professionals dedicated to fulfill the objectives of the foundation.

### 2.9. CENTRE FOR SCIENCE, DEVELOPMENT AND MEDIA STUDIES

CSDMS) is a Non-Governmental Organization that has been involved in the field of development research. It is committed to developing solutions for underprivileged societies through the use of ICT (both advanced technology as well as more traditional ones such as print) and Geographic Information systems (GIS). The various activities under CSDMS involve research in the field of ICT and GIS, undertaking developing projects in Geo-ICT, creating a platform for knowledge sharing, organizing globally renowned conferences, and capacity building through training programs.

## 3. CONSTRAINTS & CHALLENGES IN IMPLEMENTING ICT'S IN EDUCATION

India faces a number of unresolved issues and challenges in the field of education and for the adoption of ICT particularly in the education sector. Some of these issues are discussed in the following:

**3.1. ADMINISTRATION IN EDUCATION**

A National Knowledge Commission (NKC) was accordingly set up to prepare a blue print to tap in to the enormous reservoir of knowledge base to confidently face the challenges of 21st century. Some other important recommendations of NKC on expansion include change in the system of regulation for higher education, increase in public spending and diversifying sources of financing and establishment of 50 national universities. The Commission perceiving confusion and overlap in mandates of multiplicity of regulatory agencies has recommended establishment of an Independent Regulatory Authority for Higher Education (IRAHE) which should be at an arm's length from all stake holders including Government of India. IRAHE conceptualized by NKC is to be set up by an Act of Parliament and would be the only agency authorized to accord degree granting powers. "The purpose of creating an IRAHE is to separate these functions. The proposed IRAHE shall be responsible for setting the criteria and deciding on entry. It would, in addition, licence agencies to take care of accreditation. The role of the UGC will be limited to disbursing public funds. Issues of access will be governed by state legislation on reservations and other forms of affirmative action. And, professional associations may, in some institutions set requirements to determine eligibility for conducting a profession."

The Ministry of Human Resource Development, Government of India set up another Committee, post- NKC, under the chairmanship of eminent physicist and a former Chairman of UGC, Prof. Yashpal, to guide the efforts at reforms process. This Committee known as the Committee to Advise on Renovation and Rejuvenation of Higher Education submitted its report very recently (June 2009) and advised a different structure and role for the regulatory authority than the one suggested by NKC. Prof Yashpal Committee maintained that a holistic view of knowledge requires a regulatory system which treats the entire range of educational institutions in a holistic manner. The Committee recommended a single, all-encompassing higher education authority since it considered all higher education including engineering, medicine, agriculture, law and distant education as an integrated whole. This Committee noted that there were 13 professional Councils created under various Acts of Parliament to promote and regulate specialized areas of education and underlined the need to bring them under a national apex body for bringing greater coordination and integration in the planning and development of higher education system including research as already envisaged in the National Policy of Education (1986) and the Plan of Action (1992). The Committee accordingly proposed to create an apex body to subsume academic functions of all professional bodies to be called The National Commission for Higher Education and Research.

**3.2. EDUCATION**

Literacy levels in India are low, even those deemed to be literate are perhaps not competent enough to receive IT education. Educational standards would need to be raised before the citizens can become digitally literate.

**3.3. FEAR OF TECHNOLOGY**

To increase digital literacy levels among students and teachers, steps will need to be taken to overcome their technophobia. Teachers are typically wary of technology; this is the case for not only teachers in the rural areas but for those in urban areas as well. Unless teachers realize that training will help them rather than pose a threat to their jobs they will continue to remain hesitant. The first step therefore is to get the teachers on board. Raising awareness, about use of ICT in education and improving their teaching efficiency could help in developing positive attitude toward the use of ICT in education among teachers.

**3.4. MONITORING AND EVALUATION**

The penetration of hardware (computers) is fairly high in most schools as it is easy to install, however the level of usage is debatable; this is because there is no auditing or monitoring system to see whether students are actually using these computers.

**3.5. PROCUREMENT OF CONTENT**

There are also no clear guidelines available for procuring quality content. Identifying quality content is a common constraint for schools looking to use ICT-enabled teaching learning practices.

**3.6. OVERLAP OF ADMINISTRATION**

Curriculum decisions, infrastructure decisions, content decisions, policy making, and policy implementation are all taken up by different bodies at different levels. Some harmonization/coordination is required.

Other constraints faced by India include linguistic diversity and income disparity. The digital divide in the country is so acute that it becomes difficult for the policy-makers to frame universal policies to be implemented.

**4. RECOMEDATIONS**

ICT has changed the way learning is imparted in educational institutions. The key stake holders of ICT include students, teachers, administrators, regulatory authority, and content developers. This paper recommends following initiatives to overcome the challenges given above:

**4.1. EXPAND VIRTUAL INFRASTRUCTURE**

Establishment and expansion of virtual universities will effectively help spread the access to education to the rural population. Virtual class rooms can consist of interactive modules on the internet. These can help standardizing the content and distribution irrespective of the teacher availability.

**4.2. EXPAND TELECENTRES TO SPREAD EDUCATION**

There are several telecenters offering different services. The Indian government has also approved the establishment of 100,000 common service centers in rural India focusing on various sectors like e-governance, healthcare and other services. Establishment of telecenters exclusively to spread education will help in increasing the literacy in rural areas.

**4.3. USE MOBILE CENTRES TO SPREAD DIGITAL LITERACY**

Vans and cars can be used in providing a mobile platform to provide education in areas where it is difficult to establish physical infrastructure. Mobile van or cars can carry computers with preloaded training modules to spread the digital literacy.

**4.4. TRAIN WORKERS TO SUPPORT ICT IMPLEMENTATION PROGRAMMES.**

Use of ICT across various platforms requires the availability of skilled manpower to install, maintain and repair computer systems and networks. It is important to train people involved in maintaining various classrooms under open and distance learning systems. Therefore it is important to provide adequate training to the manpower managing these centres.

**4.5. EXPAND THE BROADBAND NETWORK**

In areas which do not have physical infrastructure to support ICT, use of broadband can be considered as a viable alternative. The government may look at expanding the reach of broadband network.

**4.6. DEVELOP STANDARDIZED OFFLINE CONTENT**

Since the internet and broadband connectivity is very low in India developing standardized offline content for education will significantly help in spread of education and help in reducing the digital divide.

**4.7. ARRANGE TRAINING BY INDUSTRY EXPERTS FOR SKILL ENHANCEMENT**

Vocational institutes like ITI can identify certain skill sets to be imparted and then collaborate with industry experts to roll out a programme with relevance to the industry so that apart from spread of education the employability can be increased.

**4.8. EXPAND SKILL BASED CENTRES**

The government is establishing 50,000 skill development centers (SDC) across areas. These centers can be expanded by participation of the Industry with the industry providing the content and logistics support.

**4.9. DEVELOP OF LOW COST HARDWARE AND SOFTWARE**

In order to spread the use of ICT and increase literacy it is necessary to develop low cost hardware and software solutions. Government can take up initiative like the "aakash" tablet to produce low coast computers and network. Use of open source software can also be encouraged so that software licensing issues are taken care off.

## 5. CONCLUSION

India is a vast geography with varying levels of development in different parts of the country; therefore, experiences of using ICTs for education across the country also reflect this diversity. At all levels, from infrastructure availability to availability of trained faculty, there is tremendous variation between urban and rural areas, developed and less developed states, and access for economically and socially weaker sections vis-à-vis the more wealthy in the country. While some interventions have been immensely successful in one area, the same interventions in another part of the country have not succeeded. The most significant insight through this study has been that a whole spectrum of solutions using ICTs in the education space is required in India. This can range from initiatives using community radio for non-formal education through general community mobilization and awareness creation in rural areas to the state-of-the-art technology-enabled learning spaces and other advanced e learning practices in select schools.

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In this age of Commerce, Economics, Computer, I.T. & Management and cut throat competition, a group of intellectuals felt the need to have some platform, where young and budding managers and academicians could express their views and discuss the problems among their peers. This journal was conceived with this noble intention in view. This journal has been introduced to give an opportunity for expressing refined and innovative ideas in this field. It is our humble endeavour to provide a springboard to the upcoming specialists and give a chance to know about the latest in the sphere of research and knowledge. We have taken a small step and we hope that with the active co-operation of like-minded scholars, we shall be able to serve the society with our humble efforts.

### *Our Other Journals*

