

## **Transformational Value of ICTs in Teacher Education: Learnings from India**

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### **ABSTRACT**

In an era where the world of education and learning are changing rapidly, bringing new realities and challenges to Teacher Education Institutions ( TEI's), through innovations in use of Information and Communication Technologies (ICT) has important implications. Today Teacher Education in India is being overhauled and redesigned to include the changes taking place across the world. New opportunities and possibilities especially those in electronic and other related applications for skill development outside formal learning arrangements stimulate the reform of the existing educational provisions. The past decade has seen efforts made at different levels not merely to spread the use of computer and related technologies but also to integrate the same in the core functioning of institutions i.e. teaching- learning. In this direction, the GOI has initiated several programmes starting with the Computer Assisted Learning and Teaching (CALT) in late 1980's. Under this teacher educators were provided initial training in the use of computers. Other schemes include financial support to acquire hardware, setting up of computer labs and other resource supports. All these developments posed new questions on the regulatory capacities of the organizations, infrastructure development, the way teacher educators view learner and learning, available technology and ICTs and provisions of teaching and learning.

This paper focuses on the success stories of Indian Teacher Education Institutions in ICT application, integration and use for and in the teacher training programmes, on issues and challenges associated with use of ICT in enhancing teacher quality and enabling and enhancing the ICT use in the associated schools. It also attempts to put forward the new opportunities and benefits to the system. This paper also attempts to look at the efforts put in by Government of India, the corporate interventions and the institutional efforts in Integrating ICT in teacher education with an aim to bring a transformation in teaching learning and improving teacher quality. To some extent attempt has also been made to look at the challenges the institutions and the Governments may come across in implementing and integrating the ICT at various stages of teacher preparation and the perceived threats.

### **Introduction**

As Indian industry moves towards more professionally managed culture, the education sector too is taking strides. With the diversity in our educational set up and to meet the diverse needs of our rural populations scattered over a large geographical area in about 6,00,000 villages most of which are very small and remote we need to adopt curricula

that suits the needs of different socio-cultural groups, and to maintain the national and social cohesion of the country. This can be achieved when we build the capacity to train large number of teachers and use Technology as a lever to generate this change and cater to the training requirements of teachers. IT enabled education and training would not only be cost effective but also make education effective and efficient while offering mass customization of learning, and continuous support.

### **Transformational Value of ICTs : Indian Experiences**

There is a large gap between the ICT culture expected and practiced. Sensing the deficiency of the lack of ICT educated human resources, the National Council for Teacher Education (NCTE) as a capacity building exercise in the first phase has started ICT literacy camps for teacher educators through out India. The targeted TEI's in the first phase were covered in the 100 countrywide camps and hands on interactive experience was provided through a series of self learning CDs developed by the NCTE. In this mode NCTE covered a large number of TEI's and could motivate the teacher educators to use computers in various activities. Other initiatives of the regulatory bodies, include initiative of NCERT in conducting Computer Literacy Programmes under the CLASS project , organizing computer programmes for teachers from the vocational and technical education streams by the Indian Society for Technical Education (ISTE), organizing Management Information System series for Higher education teachers by the UGC ,etc. Apart for these statutory and Government organizations, various corporate sectors like INTEL, WIPRO and Azim Premji foundation etc. are actively involved in technology enabled teacher development. Some of the initiatives in providing Teacher Training through use of Technology and ICTs either within the institute or in distance or at the practice teaching schools are enumerated below:

### **The Collaborative Post Graduate Programme in Education (CPG)**

CPG ; first of its kind, pan-Indian intervention in elementary education at the post-graduate stage is launched at a time when the country has taken on the challenge of universalizing elementary education with a commitment to ensure quality education for all.. It presents a novel and creative model of an interdisciplinary dual mode post-graduate programme in elementary education aimed at the professional training requirements of a wide range of functionaries in the area of elementary education: teachers, teacher educators, researchers, supervisors and resource staff.

It is an excellent illustration of the rigorous process of curriculum planning incorporating experiences and perspectives from multiple disciplines, programme designing for reflective study, collaboration with multiple institutions, integration of contact and self-paced learning, self-study pedagogy through structured assignments and integration of field experiences (practice) with academic knowledge (theory).

Through collaboration the programme tries to mainstream field experiences and dispersed expertise into the knowledge base of elementary education. Contact teaching is so planned as to suit students engaged in library work , peer group collaborative work ,

establish the group of learners into a learning community, capable of sustaining a discussion through email and other exchanges.

The distance component is planned as a continuing interaction between faculty and the peer student group. It is sustained through print – material and assignments, and e-mail (extending to web/ online based interaction) .The course materials comprise: Selected readings – selections, papers, clippings, other materials: policy document, textbook sample; specially developed introductory writing, film clippings; series of questions to be considered and answered as part of reading; Small field assignments to be undertaken with guidelines; assignment questions. Additional multimedia components developed and enriched over the years along with other scanned print resources are made available to learners in the form of CDs or downloadable from the net.

### **Green Teacher: Providing Continuous Learning Opportunity**

Centre for Environment Education (CEE) was established in August 1984 and has since been conducting in-service training programmes in environment , development education and communication to educators , communicators, teachers, teacher-trainers, forest officers, industries, communities, etc. in partnership with a number of national and international agencies. With increasing concern for mainstreaming EE in India it was decided to make it EE compulsory at all levels of education . This led to a demand for enmass teacher training in EE . In response CEE initiated the “**Green Teacher**” as one-year distance mode ‘Diploma in Environmental Education’ in partnership with the COL. The course designed as a **continuing learning opportunity** in EE for **practicing teachers** is aimed to train teachers to effectively take up environmental concerns and issues in the classroom, and engage their students in practical, action-oriented Environmental Education (EE) activities and projects. As the curriculum of Green Teacher was required to be :

**Skills-based:** Designing a curriculum which is skill-based and which can be effectively transacted and supported over distance mode of learning is challenging.

**Multidisciplinary/pluralistic perspective:** Since EE is multidisciplinary and open to all teachers/educators irrespective of teaching subjects , the course curriculum needed to have in-built multidisciplinary in the content as well as the writing style.

**Flexible and adaptable:** Since EE is dynamic and contextual; teaching-learning in EE needs to be real-life based it need to be flexible to suit a variety of contexts and situations across the nation. **Responsive:** The course curriculum was required to be responsive to individual specific needs of teachers and allow the learning experience not only to be

learner-centred, but also learner-controlled enabling learners bring in individual-specific inputs , enriching the learning process.

### **Integrating ICT as a Core Course at the B.Ed. level in M.S.University, Baroda**

Realising the importance of ICT in Education, a two credit compulsory course, namely, Information and Communication technology (ICT) was designed, developed and implemented in the B.Ed. programme offered by the Department of Education (CASE), faculty of Education and Psychology. The aim of this project is to integrate ICT in Education in Teacher Education. The findings of the study conducted on the performance and need of the course shows that “ the experience of institutionalization of ICT in education as a compulsory core course at the B.Ed. level (2002-2003) in the M.S.University of Baroda has been quite encouraging but challenging. For strengthening the course there is a need of upgrading the course curricula. The experience of CASE, Baroda strengthens the opinion that ICT in education is highly desirable and should be integrated as a compulsory core course at the B.Ed. level in all the TEI's , if we have to develop a media culture in our teachers. The success of the programme, inspite of all the impeding factors- limited staff, inadequate laboratory facilities, maintenance problems, sizable class and limited audio visual and electronic support facilities, inadequate technological culture, climate and attitude and that it could realize its objectives reasonably and satisfactorily shows the torch for other institutions to contextualise and replicate the experience.

### **Integration of ICT in Teaching –Learning Process in SNTD Girls’ School, Mumbai**

SNTD Kanya Shala is a secondary school in Mumbai with about 500 students studying in standards V to X through Marathi medium. There are 14 teachers and a Principal. School Committee has 2 to 3 Management representatives including the CEO.

In 1995, the School Improvement Programme was initiated with the financial support from the Rotary Club in Mumbai. Since 1997 computers were donated from MP/MLA funds and Rotarians created the Air-conditioned Computer Lab. They also donated the required software. So the infrastructure, Hardware and software, three important aspects of ICT Integration were taken care of.

After one and half years it was visible that ICT was not fully integrated in the school activities. Two major aspects viz. lack of e-Leadership on the part of the Principal and the apathy of the teaching staff were found responsible. Capacity building of Principal and teachers was a crucial issue, which was not addressed properly.

In order to introduce the students to the ICT, a new teacher was appointed. The schoolteachers felt a little relieved that they do not have to teach ICT to the students (with their inadequate knowledge base). The new teacher was full time teacher having mastery over the content as well as the teaching skills. A curriculum was chalked out for std. V to X and it was planned that each student will have at least 4 school periods (about 35 min per period) per week.

The students learnt many application software and were enthused to use the skills for practical purposes. Hence they prepared invitation cards, thank you cards, charts, posters,

used spread sheets for their own examination results, prepared PowerPoint shows on their own school and Class etc.

All the unit tests were computerized. The teachers took interest in using Computers in their own teaching. All the computer systems in the lab were put on LAN and hence it was easier to work together as a group.

Still the ICT was used only at application level since there was no courseware available on school curriculum in Marathi. Department of Educational Technology of SNTU Women's University developed 30 Interactive Multimedia Packages on 5 school subjects (Maths, Science, History, Geography and English). These 30 packages were introduced in the school and the students found them very interesting and interactive. They started using the computers for learning their own curricula. Teachers also found these packages very useful as difficult concepts were introduced through animations and graphics. Now the department is developing more such packages, which would soon be used in the schools.

### **Use of Distributed Classroom Technology for distance teaching at SNTU**

Interwise Co. offers a technological solution, which could be used as "Distributed Classroom". Maharashtra Knowledge Corporation Ltd. (MKCL), Pune has tried it out with their learners. Now MKCL and SNTU are planning to use it jointly. SNTU Women's University (SNTU), Mumbai plans to use it for their Center for Distance Education (CDE) so as to reach various study centers.

The first try out was conducted with the teaching staff of various departments and conducted institutions of SNTU. Various skills of using this new technology such as Presentation of the content using PowerPoint, or demonstrating content through Flash etc., hand raising during discussion, sending notes to moderator (the teacher/trainer), using white board, answering to the polls conducted or any multiple choice question asked by the teacher and so on were introduced and practiced during the sessions.

Though all the teachers were highly educated, and professionally sound, they had to learn these new skills by giving it a try. Since they were all **interested** in learning this new technology and apply it to their teaching-learning situations, this learning was enjoyable and therefore it was found easier to integrate. All the teacher educators should be lifelong learners and should not shy away from learning new technologies and applying them in the fields situations.

### **Teacher in the Sky – Beaming Educational programmes through satellites**

One of the objectives of Indian Space Research Organisation (ISRO) is to use satellite based communication capabilities in support of rural development. Towards this objective, the Satellite Instructional Television Experiment (SITE, 1975), the Kheda Communications Project (KCP) and the Jhabua Development Communications Project (JDCP), the Training and Development Communication Channel (TDCC) were conducted by the ISRO. With the experience gained in these projects and the tasted success, ISRO initiated a similar effort for rural development under Gramsat project using satellite communication and IP-Multisat technology in Andaman & Nicobar Islands (A&N).

Gramsat network of A & N is the first “state – of – the – art ” endeavour to connect remote islands, where even transport connectivity is very poor. For some islands it is once in a month. Major requirements for A & N networks are (A.K.Sangal, 2004):

- Communications network for E – Governance and Decision support system for state administration
- Interactive training for students, field functionaries, Primary school teachers, Members of Panchayati Raj Institutions, Health Functionaries etc.
- Internet access

A VSAT based network has been established connecting nine nodes in six islands in A&N. The system is used for messaging, data transmission, and videoconferencing and voice communication amongst other different functionaries.

The major elements of the network are:

1. Teaching end with Multimedia Videoconferencing System and a number of tools for imparting interactive education training to remote classrooms. Multi – point Conferencing unit (MCU) and IP- based VSAT system for uplinking the IP – Multicast/Multipoint conferencing.
2. All the sites are tested to provide the following:
  - IP – Broadcasting.
  - Interactive multicasting
  - Point – to – Point conferencing
  - Multipoint conferencing
  - Voice – over – IP (VoIP)
  - External Data Sharing (File transfer, PowerPoint presentations, internet access on LAN etc.)
3. Space segment capabilities providing necessary share of extended C-band transponder through INSAT – 3A system
4. The VSAT network works with shared hub on mainland (ISTRAC, Bangalore ).

Government Polytechnic, Port Blair is used as teaching end and E- Governance hub at Secretariat, Port Blair. All the VSAT terminals have 3.8 Antenna systems with 5W RF Power Amplifier except for Government Polytechnic hub at Port Blair that has 10W of power amplifier. The network works in SCPC – DAMA in Flex – web mode as independent Closed User Group (CUG).

**Lessons Learnt:** The provision has several advantages:

- Simultaneous training of large number of geographically dispersed people in the shortest time with uniformity in content
- Has a multiplier effect due to training of the trainers.

- Provide access to the best available learning resources, irrespective of the geographical location of learners.
- Repeatability of training courses/educational packages; easy updating and dissemination
- Enhanced involvement of the trainees / learners due to interaction capability and resultant greater learning gains.
- Enables enterprise wide participation
- Capability to share the same network by different user groups, with a provision to contextualise and choose specific topics for specific locations
- Significant savings in expenditure due to travel economics, human resources, frequent training, logistics and replication of teaching infrastructure.
- It can effectively supplement the conventional system of training and at times can itself become the major component of the training system

The year 1975-76 saw the emergence of India as a global player in education technology, when the concept of education through satellite was effectively demonstrated for first time through the Satellite Instructional Television Experiment (SITE). The SITE conducted using the American Application Technology Satellite (ATS-6) . Later with the commissioning of the INSAT in space in 1983, a variety of education programmes are being telecast. With the success of the INSAT based educational services, a need was felt to launch a satellite dedicated for educational services and ISRO conceived the EDUSAT project in October 2002. EDUSAT - a satellite exclusively dedicated to education, was successfully launched on board ISRO's Geosynchronous satellite launch vehicle, GSLV-3 in September 2004. EDUSAT provide a C – Band national beam, KU – Band national beam and five KU – Band regional beams facilitating imparting education in the regional languages. While the space segments can be provided by ISRO, the ground segment and utilization depends on the meticulous planning and coordination between various stakeholders in the field of education. Content generation and utilization planning will be most critical factors for effectiveness. The involvement of the Ministry of Human Resource Development (MHRD) and user agencies from all the sectors of education is therefore critical for the success.

Sector wise plans for use of EDUSAT have been developed with active participation and involvement of the users and the partnering institutes.

EDUSAT is expected to be used in the elementary education for improving access to education, creating awareness and motivating students and the community, carrying out edutainment, disseminate special programmes / modules for hardspots in the curriculum and for enrichment purposes.

While for Higher Education sector it is planned to build a knowledge repository of multidisciplinary subjects, as a strategy to counter the shortage of faculty in technical and vocational education, EDUSAT will be used to share the available expertise through modular programmes. This will be done by networking institutions, creation of virtual

laboratories, creation of database, access to expert lectures and technological developments in Industries and Research organizations etc.

Recognizing the importance of Teacher Training Institutes and the crucial role of teachers in bringing in an awakening and skill development among the target groups (students, community leaders and school teachers), it was decided to put EDUSAT to use in different spheres of Teacher Education. It is expected to be put to use to enhance the communication and presentation skills of the teachers, to motivate them through dissemination of Best Practices in the field, make available research material online and finally create an IT culture across the nation by introducing and developing IT literacy course for the teachers.

With large number of stakeholders involved, it will be a major challenge to make the operation of networks smooth and effective. While a lot of ground work is required for effective implementation of the slated plans and activities as of now the project implementation units are working on issues such as capacity Building of the Users, Content Generation, defining a management structure which could take on the overall responsibility of operation and management of the network and the hubs and evolving a ongoing feedback and monitoring mechanism.

As all of us are aware technology as a stand-alone will not work. The real challenge is the need to put technology – both space and ground segment, infrastructure, operations and maintenance systems, creative content generation, target group networking and professional management together ( Hansa Joshi and Madhavi Purohit , 2004).

### **Conclusion**

Today education can be provided via satellite, this will save time, reduce unnecessary mobility and more. However **to succeed, the digital divide need to be bridged.** Institutions could use the platform of satellite TV, radio, VSAT, etc. it could even create and use distance – learning centers. Communication technology can increase the range of subjects taught. Integrating ever-changing ICT is a challenge to the academia as it throws open new corridors for both teachers and learners. Its management requires leadership, which is very well accustomed to ICT as well as new processes of e-leadership. Planning, organizing, directing and coordinating of ICT for all sectors of education will be required. It will require a massive effort on the part of all educators. *Even small thing make a difference. Even if you cannot change people, you could make people aware of changes.*

Let us all come together and get ready to take up this challenge.

