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Use of Information Communication Technology for Effective Teacher Education

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Abstract
Government of India in its National Policy on Education 1986, and modified in 1992, stressed upon employing educational technology to improve the quality of teaching learning process. The significant role of information communication technology (ICT) in school education has been highlighted in the National curriculum framework 2005 (NCF). According to a United Nations report (1999). Today's technologies are essential tools for teaching and learning. A variety of ICT can facilitate not only delivery of instruction but also learning process itself. The use of ICT's as presentation tools (through overhead projector, LCD projects, T.V., Electronic white boards, guided web tours, where students simultaneously view the same resources on computer screens) is seen to be of mixed effectiveness. Today the use of ICT has caused substantial changes in teacher education because presentation of information changes learners' perception and understanding of the world, the vast distribution and easy access of information has changed relationships between educators and learners; and the flexibility of spatial and temporal dimensions in the cyberspace changes human beings' learning life. ICT can be used in many ways in classroom. ICT which can be adopted in classroom situations as integrated approach, enhancement approach,, complementary approach. To cope up with the changing educational scenario, teachers and teacher educators have to adopt ICT and even to tame it for maximum output.

Keywords: Information Communication Technology, Teacher Education, Challenges and Constraints

1. Introduction
A teacher occupies a pivotal position in the field of education. He is the friend, philosopher and guide of the students. Teacher education means programme of education, researcher, training for human resources, equipping them to teach at pre-primary, primary, secondary stages of school education, non-formal/adult education and correspondence education through distance mode.
The first decade of 21st century have witnessed a paradigm shift from teacher-centeredness to learner centeredness. The role of a teacher as well as target opens up the possibilities for innovations involving constructive learning. Government of India in its National Policy on Education 1986, and modified in 1992, stressed upon employing educational technology to improve the quality of teaching learning process. The significant role of information communication technology (ICT) in school education has been highlighted in the National curriculum framework 2005 (NCF). According to a United Nations report (1999) ICTs cover Internet service provision, telecommunications equipment and services, information technology equipment and service, media and broadcasting, libraries and documentation centers, commercial information providers, network-based information services and other related information and communication activities. Today's technologies are essential tools for teaching and learning. A variety of ICT can facilitate not only delivery of instruction but also learning process itself. Teachers must be prepared to empower students with the advantages technology can bring. The use of ICT's as presentation tools (through overhead projector, LCD projects, T.V., Electronic white boards, guided web tours, where students simultaneously view the same resources on computer screens) is seen to be of mixed effectiveness. Teacher education institutions are facing challenge of preparing a new generation of teachers for effective use the new learning tools in their teaching process. One of the major challenges in ICT use in education is balancing educational goals with economic realities. ICTs in education programs require large capital investments which ultimately is an issue of whether the value added ICT use offsets the cost, relative to the cost of alternatives.

Need of ICT
In our system of teaching, most of the time was consumed for input-output and less time was left for processing. But with the use of ICT in teaching, the input and output time have reduced and time for processing part is more. With the increase in process time, the time for discussion,

correlation with other subjects, learning have increased. Moreover, the environment in classroom is changing. Therefore, the teacher should prepare him/her self for use of technology in classroom. ICT offers the opportunities to teachers for their own professional development along with day to day developmental activities. Today the use of ICT has caused substantial changes in teacher education because presentation of information changes learners' perception and understanding of the world, the vast distribution and easy access of information has changed relationships between educators and learners; and the flexibility of spatial and temporal dimensions in the cyberspace changes human beings' learning life. Literature revels to the power ICT can have in teaching and learning processes (Newhouse, 2002).

ICT APPROACH in classroom

ICT can be used in many ways in classroom. There are three main possible approaches to ICT which can be adopted in classroom situations.

- **Integrated approach:** This aims at planning the use of ICT within the subject to enhance concepts and skills and improve attainment by learners because they are controlled with challenges to their existing knowledge and given deeper insights into the subject under study.
- **Enhancement approach:** This approach mainly focuses on the use of technology to enhance the present topic through some aspect of the tasks and assignments. Innovative presentation method like electronic white board is used to promote discussion and visualization of problems. This approach could improve learning by presenting topic in new way, promoting debate among learners and encouraging them to formulate their own explanations.
- **Complementary approach:** The main focus of this approach is to empower students' learning through ICT. This improve the capability of students in doing homework by taking notes on the computer by using e-mail or by word processor. It suggests that homework and other hand written assignments can be reduced and learner can focus more on subject.

Impplementation of ICTs in Teacher Education

It cannot be expected from a teacher and teacher educators to implement ICTs in education without the presence of essential conditions in their work environment. International Society for Technology in Education (ISTE) in 2000 suggested stiome essential conditions for implementing ICTs in teacher education:

- **Shared Vision:** There is proactive leadership and administrative support from the enre system.
- **Accedss:** Educators have access to current technologies, software and telecommunications networks.
- **Skille Educators:** Educators are skilled in the use of technology for learning.
- **Professional Development:** Educators have consistent access to professional development in support of technology use in teaching and learning.
- **Technical Assistance:** Educators have technical assistance for maintaining and using technology.
- **Content Standards and Curriculum Resources:** Educators have knowledge in their subject matter and current in the content standards and teaching methodologies in their discipline.
- **Student-Centred Teaching:** Teaching in all settings encompasses student-centred approach.
- **Assessment:** There is continuous assessment of the effectiveness of technology for learning.
- **Community Support:** The community and school partners provide expertise, support and resources.
- **Support Policies:** School and university policies, financial provisions and rewards structures are in place to support technology in learning.

To cope up with the changing educational scenario, teachers and teacher educators have to adopt ICT and even to tame it for maximum output. Every teacher and teacher educator need to be the expert in handling different ICT tools. Efforts need to be taken by the appropriate bodies to implement those essential conditions for implementing ICT in teacher education successfully.

Challenges in Use of ICTs in Teacher Education

The challenge for teacher training is to enable teachers of the future to explore and exploit the learning potential connected to ICT and to equip them to facilitate the learning process by developing creativity in use of ICT in relation to the subjects they teach. It is not only a question of using ICT as a tool in learning and teaching but to explore it in the interest of innovative andfruitful learning and teaching processes. The education through online learning is still to get movement. Online courses, in-depth understanding of the pedagogical issues related to online education remains unexplored.

Teacher education institutions are facing challenge of preparing a new generation of teachers for effective use the new learning tools in their teaching process. One of the major challenges in ICT use in education is balancing educational goals with economic realities. ICTs in education programs require large capital investments which ultimately is an issue of whether the value added ICT use offsets the cost, relative to the cost of alternatives. Put another way, is ICT-based learning the most effective strategy for achieving the desired educational goals and if so, what is the modality and scale of implementation that can be supported by existing financial, human and other resources ?

Many ICT-based education programs funded by aid agencies or by corporations could not be sustained because Government failed to step in with the necessary financing; nor were the local communities in a position to generate the resources needed to continue these programs. There is no single formula for determining the optimal level of ICT use in the educational system. Significant challenges that policy-makers and planners, educators, education administrators and other stakeholders need to consider include educational policy and planning, infrastructure, language and content, capacity building and financing.

Constraints in Use of ICTs in Teacher Education

Teacher education as it is today in the country, if not adapted to the demands of changing needs, it would be impossible to shape our educational system in the desired direction of knowledge. There is a big gap between professed teaching behavior in teacher education courses and actual teaching behavior in the classrooms. Many constraints have been noticed while using Information and Communication Technologies (ICTs) in teacher education. These are as follows:

- Lack of in-service training, human resource interaction and appropriate administrative support.
- Large number of educational institutions with inadequate teachers and facilities.

- Traditional techniques of teaching in crowded classrooms.
- Lack of work culture and new approaches.
- Lack of well-designed programs.
- Poor facilities of library, laboratories and other required things.
- Lack of appropriate hardware, software/materials and technical support.
- Lack of basic knowledge/skills for ICT use.
- Lack of computers and other presentation equipment in classrooms,
- Lack of motivation of the teacher educators concerning the use of ICTs in their courses and classes.
- Lack of world class Technical Education Institutions and good role models for prospective teachers.

In response to above mentioned constraints, our education system demands a revolution in the process and content of teacher education programmes. Since the last century, education has faced a variety of social, cultural, economical and technical challenges. As the study and practice of facilitating learning and improving performance, the field of educational technology attempts to overcome challenges by developing new approaches and frameworks. In this context, information and Communication Technologies (ICTs) represent a new approach for enhancing the spread of information and helping to meet these challenges. ICTs comprise the use of at least a computer and the Internet as well as computer hardware and software, networks and a host of devices that converts information present in the form of text, images, sounds and motion into general digital form.

Effective Use of ICTs in Teacher Education

No technology can fix bad educational philosophy, policy or practice, nor can it compensate for a lack of political commitment. The decisions about what to use, how to use and when to use are political and educational decisions that must be made consciously and daringly (UNESCO, 2004). For effective use of ICTs, following points must be kept in planning

Provide Training to Teachers

The provision of ICT access and an educationally sound ICT training programme can only have the required impact if the public administration fully supports this major transformation. Respective Governments need to look carefully into the necessary pre-requisites and consequences of ICT use at the level of curriculum development, the examination system, teacher incentives, among many others. Efforts are needed to mainstream ICT appropriately in all subject curricula. The examination systems should be modernized to support ICT rich curricula. As the first institutions are getting ready to offer comprehensive ICT teacher training based on educational principles and targeting subject teachers, the Government could support the existing and upcoming professional development initiatives. A clear incentive package could make it attractive for teachers to undertake similar training.

Make ICT a Priority

Success in ensuring that teachers acquire the skills and knowledge they need to use technology effectively opens the door to all kinds of new educational opportunities for both teachers and students and downstream economic opportunities for graduating youth and their countries. This success is the key to participation in the global knowledge economy. Accordingly, teacher professional development in the use and application of technology must be given the priority and resources it deserves, while still maintaining a constructively critical eye on its costs and methodologies.

Modernize Training and the Curricula

The fundamental aim is to give the learners the opportunity to become critical thinkers, problem solvers, information literate citizens, knowledge managers and, finally, team members who are proficient in collaborating with others. Meeting this aim requires a fundamental change in how teachers are trained in curriculum development approaches.

ICTs in all Subjects

ICTs should be infused into the entire curriculum. Throughout their teacher education experience and professional development programmes, pre- and in-service teachers should learn how to incorporate/ use ICTs into their own subjects. Restricting technology experiences to a single course or a separate area of teacher education will not prepare students to be technology using teachers.

Teacher Training

- Train the ICT Faculty of formal and non-formal sector of education.
- Make the teaching profession very attractive to attract and retain best talents as faculty.

It is high time that teacher education gets its self-tune to the challenges and brings necessary changes in its curriculum. There is need to redesign teacher education to focus on the learner, to provide a greater 'space' for the personal, social and professional development. Further there is need to professionally equip prospective teacher to evolve pedagogic approaches and create a learning environment that addresses the needs of learners. A sustained engagement with educational practice and theory will enable student teachers to generate knowledge and continually seek clarity of ideas. The process to prepare such teacher would therefore include providing opportunities as stated below (curriculum framework for teacher education a discussion Document, 2006);

- Developing the ability for self-analysis, self-evaluation, adaptability, flexibility, creativity and innovation; developing oneself as a professional.
- To observe engage and communicate with children.
- For content enrichment to generate understanding and knowledge, examine disciplinary knowledge and social realities and develop critical thinking.
- To develop professional skills in pedagogy, observation, documentation, analysis, drama, craft, story-telling and reflective inquiry. Participating teaches also understand that knowledge is constructed through experiences in shared and collaborative contexts.
- Transform existing practices towards more child friendly methods and methods suited to strengthening conceptual learning and understanding rather than rote learning.
- To enable teachers to implement and achieve specific targeted aspects in the curriculum, such as the use of a type of technology, or the addition of topics such as population education, etc.

These practices in teacher preparation program will initiate novice teacher to get the feel of the profession and its requirement in today's context. Teacher should get enough practice to connect his/her teaching to the life outside so that

the teaching is not just text book centric and involving scope for self-analysis, self-evaluation.

Changes in Teacher Education Programmes Required

- Training teachers in individualized pedagogy skills working as a Facilitator of learning helping students to discover their talents, realize their physical, intellectual potential and help develop desirable social values to function as responsible citizen.
- Making conscious effort for curriculum renewal keeping in mind societal and personal needs of the learner.
- Understanding the fact that knowledge is as personal experience constructed in the share context of teaching learning.
- Developing sensitivity to the social, professional and administrative context in which they need to operate.
- View appraisal as a continuous educative process.
- Develop needed skills for counseling.

Understanding that learner is an active participant rather than a passive recipient in the process of learning. Learning should be appreciated as a participatory process that takes place in the shared social context of learners immediate environment extended to national requirement and international concerns. Enhancing learning through multiple exposure and facilitator of learning, encouraging learner to continuously achieve educational goals.

The various skills and competencies to be developed on the part of students teachers are

- Developing lessons plans incorporating student use of technology in the learning process
- Surfing internet and locating useful information from the internet in the development of lesson plans
- Evaluating and select appropriate software for a particular subject and as per student needs.
- Generating print based documents (e.g., student assignments, newsletters, parent communication, etc.) utilizing a variety of application software.
- Using instructional management and student data management tools for efficiently managing learning.
- Using technology to gather, organize and report information about student performance.
- Developing ideas to generate activities for students interactive learning like evaluating websites, comparing contrasting two learning situations given on web etc.
- Developing assessment tools to evaluate technology-based student projects (including: multi-media, word processing, database, spreadsheet, desktop publishing and internet/telecommunications).
- Using internet to find resources to advance professional knowledge and skills (including locating professional organizations, communicating with other teachers electronically, and participating in on-line professional development workshops and seminars)
- Participating in instructional technology conferences, workshops, and seminars for professional development.
- Developing web based portals for content cum pedagogy.

Government Projects on ICT Use In Education

Educational technology programme: Educational Technology Programme was started during the Fourth Plan period in 1972 for widening access to and bringing about qualitative improvement in education. Using the expansion of broadcasting facilities with the advent of INSAT and simultaneous demand for educational software, ministry of education has taken up the responsibility of producing educational television programmes. Under the scheme, Central Institute of Education Technology was set up in NCERT and State institute of Education Technology in six states. In order to meet objectives of National Policy on Education, 1986, the scheme was revised by strengthening of both Video and Audio programme production capabilities.

Computer Education in School: A pilot project on Computer Literacy and Studies in School (CLASS) was initiated in 1984-85 in 284 selected secondary/higher secondary schools jointly by the Department of Electronics; and Education to acquaint teachers and students with the range of computer applications and its potential as a learning medium. Installation of hardware and its maintenance continued to be the responsibility of Computer Maintenance Corporation. NCERT continued as the nodal agency for software development, academic support and organization of teacher's training. The Steering Committee for the project was jointly headed by the secretaries of both the departments. Upto 1986-87 the schools received a set of two BBC micros, which was increased to five from 1987-88. The evaluation of the project done in 1986 by the Space Application Centre, Ahmadabad. In pursuance of the objective laid down in the NPE, an expanded programme was prepared in 1987-88 to cover 13000 higher secondary schools all over the country. However, due to paucity of funds this was not finalized. Since 1999 a new concept of ITC developed, through which all Senior Secondary Schools are being provided with computer education programme network.

USAID-funded Technology Tools for Teaching and Training (T4) dot-EDU India Initiative : This programme's aim is to improve primary school education and reach vulnerable and underserved populations, especially girls with main objectives: to provide teachers in-service training for both content enhancement and professional development; to provide instruction in English, Math, Science using a multi-channel strategy i.e., via interactive radio and video programme as well as CD and print based materials. It seeks to assist India in applying its burgeoning technological capacity to the quest for quality education for all. The program signals the creation of a new partnership between Indian and U.S. educators that will define how technology can be used in ways that will more directly improve learning.

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