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## INFORMATION AND COMMUNICATION TECHNOLOGY: ROLE IN TEACHER EDUCATION

### Education

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#### Abstract

*Modern world is a world of technological revolution. As every revolution reflects each aspect of human life and affects it immensely, it is needless to say that education has also been influenced by these technological advances. In today's world, the transmission of information and explosion of knowledge is very fast. In the new millennium Information and Communication Technology (ICT) has emerged as the driving force which has affected every sphere of human life. The paradigm will be shifted to advanced technology information society, industrial society, long term planning, creative learning and decentralization from traditional educational system. Hence, it is very urgent to take immediate steps to make the education more useful and relevant. Present paper, using theoretical data, empirically analyses the use of ICT in education particularly in teacher education sphere.*

**Key words:** Information and communication technology, teacher education, ICT.

The traditional way of imparting knowledge in the classroom are no longer the ultimate in the present times. Present era is the age of technology and competition. In this context, quality assurance is demanded everywhere and quality outcomes are expected from each and every field. Quality education is the pre requisite for the competitiveness and success. A teacher is the kingpin of any education system. Therefore, this fact should always be kept in mind that, it is the teacher who has to take the responsibility of quality reforms at the grass root level and it is only the ICT based education which ensures quality reforms by the teacher educators because human resources are more important for any kind of development as compared to other resources. Hence, in order to survive in this highly



competitive world, the most important requirement is technically trained teachers to improve the quality of education which is possible only with education enriched with ICT.

Government of India Ministry of Human Resource Development (MHRD) with its National Mission in Education through ICT has initiated an ICT policy in 2009 wherein the mission is to devise, catalyze, support, sustain ICT and ICT enabled activities and processes in order to improve access, quality and efficiency in the school system. It also promotes networking, research, evaluation and experimentation in ICT tools and ICT enabled practices to utilize the potentials of ICT in school education.

In the era of technological revolution every revolution reflects the aspect of human life and affects it immensely. It is needless to say that education has also been influenced by these technological advances. Technology has opened up a new vista for the modern man which has led to the shrinking of the world. As a result of globalization change that has brought about acceleration in the hi-tech changes over the past fifteen years created a new global economy which is powered by technology, fueled by information and driven by knowledge. The United Nations Educational, Scientific and Cultural Organization (UNESCO) implemented Beijing workshop (2003) on teacher training in ICT integration discussed guidelines for developing competency based standards for teacher education curriculum which comprised of core competencies related to pedagogy (new ways of doing things with information and communications technology (ICT), new theories of learning, pedagogical skills: selection, presentation and assessment technology (related concepts and operations, social, health, legal and ethical issues); and technology-pedagogy integration (ethical and legal use of technology to design effective learning experiences, manage students' learning, improve professional skills, support interaction in learning/social communities).

In today's world, the transmission of information and explosion of knowledge is very fast. In the new millennium ICT (Information and Communication Technology) has emerged as the driving force which has affected every sphere of human life. The paradigm will be shifted to advanced technology information society, industrial society, long term planning, creative learning and decentralization from traditional educational system and now it is very urgent to take immediate steps to make the education more useful and relevant.



There is a growing trend to apply ICT based technologies in schools and other educational institutions. Many schools have dynamic and vibrant virtual learning methods which gives students access to study materials, skills questions, sample papers and assignments. Some schools even have smart interactive white boards for teaching. Children find it more interesting and become more adept in multimedia presentations when engaging with them in their assignments. Quite a percentage (24%) of schools in India use Open Distance Learning. Teachers and students both claim that ICT-enabled learning is more interesting, interactive and keeps students hooked. Assignments are also accepted via email in many schools. ICT and Education in India (Upadhya 2012).

### ICT and Teacher Education

Now days, with emerging technology, the concept of teaching-learning has changed. A teacher is not merely supposed to provide information but to facilitate learning through proper design of learning experiences. The shift from teacher centeredness to learner centeredness in education demands the individualized exploration. Developments in the delivery of education are allowing individuals to explore new areas of learning and thinking which earlier could not be done with a pen and paper. They are discovering knowledge through inquiry and experimentation rather than memorizing facts in a teacher dominated classroom setting. The role of the teacher will change from a knowledge transmitter to that of a learning facilitator, knowledge guide, knowledge navigator & co - learner with the student (Bala, 2010).

Following table represent a shift from traditional classroom to modern classroom situation, with new emerging technology the nature of teaching - learning process has changed.

**Table 1**  
**Shift in teaching- learning situations**

Traditional paradigm	Modern paradigm
Chalk-Board Classrooms	Digital classrooms
Formal teaching-learning	Flexible teaching-learning



Didactic Learning	Interactive learning
Teaching-Learning from Technology	Teaching-Learning with Technology
Retarded retention of memory	Understanding of discussions
Dull and forcible environment of learning	Interesting and inviting atmosphere of learning
Single ability of learner: Listening	Expanding abilities of learner from listening to learning, discussing and writing
Learning aided with a pen and paper	Technology aided education via smart class
Manually handled information and data (Hard Copy- easily damageable)	Digitally handled information and data (Soft Copy-Durable)
Static learning	Dynamic Learning

Any education system can only be as good as its teachers. Any change in the education system has a direct impact on the teachers and the teacher education system. The importance of the role of a teacher as an agent of change, promoting understanding and tolerance has never been more critical than in the 21<sup>st</sup> century.

Under the changing scenario, teachers are expected to facilitate learning and make it meaningful to individual learners rather than just to provide knowledge and skill. Touching more lives, affecting the outcome of so many futures, a teacher is a role model for the students. If prospective teachers are poor leaders, the children suffer and if they have sound leadership, they blossom. As a teacher, it is of utmost importance that you tune your leadership skills and find the best style of teaching for the students you are facing.

In today's world, teachers need to be equipped not only with subject-specific expertise and effective teaching methodologies, but with the capacity to assist students to meet the demands of the



emerging knowledge based society. Keeping this in view, there is an increasing need to incorporate ICT based education to meet the challenges of globalization. As a result, teacher education in any country should adopt the new technology in their content and it is necessary for the teacher education institutions to wake up and reorganize their curriculum to accommodate the new era of Technology because human resources are important for any kind of development as compared to other resources. So, in order to survive in this highly competitive world, the most important requirement is of technically trained teachers to improve the teaching learning process & it is possible only from that type of education which prepares the man power (Prospective Teachers) for global challenges.

**Table 2**  
**Resultant domains of ICT**

Understanding in Education	Policy awareness	Policy Understanding	Policy Innovation
Curriculum and Assessment	Basic Knowledge	Knowledge application	Knowledge society skills
Pedagogy	Integrate technology	Complex problem solving	Self-management
ICT	Basic tools	Complex tools	Pervasive tools
Organization and administration	Standard classrooms	Collaborative groups	Learning organizations
Teachers professional Learning	Digital literacy	Manage and guide	Teacher as model learner

Source-UNESCO, Commonwealth of Learning (COL)



Since ICT has a transformative nature, it aims to change Indian knowledge based quality with improvement of the curriculum and instructions along with learning and assessment. It also aims at collaboration in interaction which is focused on the possibility for integration across any domain, emphasizing on whole than on parts. ICT inventions provide power to the user, regardless of his profession. As ICT is ever-changing, it also paves new ways in the sphere of learning and teaching technologies. ICT can benefit in the field of teaching learning process and to make this procedure more impressive and effective, its introduction also facilitates the study material with a variety of materials. ICT, if introduced in distance education, provides immense support through audio/video cassettes, radio, TV etc. The examination process and research activities get boost through the use of ICT. ICT is never static; education institutions on the other hand, are often slow to change. The volatile nature of ICT present challenges for education systems that must be accommodated planned for and harnessed to boost advantage of new learning and teaching technologies.

#### **Paradigms of ICT in Teacher Education**

For both social and economic reasons, all students will need computer and communications technology skills if they are to live successfully in a knowledge based society. Indeed, it could be argued that skill in using computer and communication technologies will be as fundamental to education in the 21<sup>st</sup> century as was literacy and numeracy in the 20<sup>th</sup> century. In this era of knowledge, economy education sector will be revolutionized by technology.

Bates (2001) states that knowledge based economies are those dependent on hi-tech sectors such as computing, telecommunications and biotechnology and service industries such as financial services, health, education, entertainment, hospitality and tourism. Such industries or employment sectors require a highly flexible and adaptable work force that can continually change as the knowledge-base and the external world changes around them. Thus, the new knowledge based organization requires not only technology skilled workers with up to date and recent knowledge, but also workers who are constantly learning, in order for the commercial companies to survive, or for public organizations to stay current and effective. These changes in the work force and demand for more flexibility from students and employers directly influence the kind of learning and hence the kind



of teaching now increasingly in demand from both students and employers in knowledge based economies.

Professional Development- The most critical factor in the successful integration of ICT into teacher education is the extent to which the teacher educators have the knowledge and skills for modeling the use of ICT in their own teaching practices because without know-how we cannot infuse this technology in teacher education program. Hence, it is important to provide professional development to teachers to help them choose the most appropriate technologies and techno modes to meet the demands of the curriculum and learner's need (Singh, 2010), "Unfortunately, most teachers' professional development in ICT is heavy on "Teaching the tools" and light on "using the tools to teach." In order to use technology in the classroom teacher should need to understand its benefits. It is not a onetime activity to keep current with new development. So, the ongoing professional development is necessary. It helps teachers to learn, not only how to use new technology, but how to maintain balance between traditional instructions and modern technologies. The Barrier most frequently referred to in the literature is lack of proficiency of English language in developing countries like India. English is the dominant language of the internet and major software produced over the globe. So, it is a serious barrier in infusion ICT in education. There is a need to develop the content matter in regional languages or to make English as a core part of our basic education system.

A large number of national and international institutions such as UNESCO, NCTE, NCERT, CIET, and SIET....describes the basic requirements to implement the ICT in teacher education programme. UNESCO in world education report on teachers and teaching in changing world, describes the radical implication of ICT over conventional teaching and learning. With the advent of new information-based technologies i.e. Internet and online databases, there has been access to enormous quantities of information. This information helps teachers to develop or improve lesson plans, exchange ideas, obtain information and find free animation and simulation to enliven their lessons. Students and teachers must have sufficient access to digital technologies and the internet in their classrooms, schools and teacher education institutes

The new ICT enables self-paced learning through various tools such as assignments, tutorials, computers etc., with sensitivity to different learning styles and continuous assessment of student's





progress. With the result, the teaching-learning enterprise has become more result-oriented. ICT facilitates the educational transaction between providers and users by keeping student well informed about the courses, enhancing teacher-learner contact through e-mail, chat session etc. enhancing active learning, sharing ideas, providing immediate feedback, encouraging paced learning and allowing for effective mapping for learning pathways.

High quality, meaningful and culturally responsive digital content must be available for teachers and learners. Teachers must have knowledge and skills to use the new digital tools and resources to help all students achieve high academic standards. Global technological developments demand that every educator should have top 20 technology skills (Turner, 2005). These are the skills relating to Word processing, Spread sheet, Database, Electronic presentation, Web navigation, Website design, E-mail management, Digital cameras, Computer network knowledge applicable to school system, File management and Windows Explorer, Downloading from web including e-books, Installing computer software, Web CT or blackboard teaching, Video conferencing, Computer related storage devices like disks, CDs, USB drives, zip disks, DVDs ect. , Scanner knowledge, Knowledge of PDAs, Deep web knowledge, Educational copyright knowledge and Computer security knowledge.

Generally, education is defined as a process of human enlightenment and empowerment and it is undoubtedly the most important input for improving the quality of life. An effective system of education results in the actualization of learners' potential and enhancement of their competencies, which improves the quality of their life and ultimately leads to the establishment of an enlightened, progressive and productive society. Education is considered as a preparation for future and as the society moves into the electronic environment of the future, individuals require new skills, changed attitudes, interests and updated knowledge to meet the needs of the future. Hence, education is supposed to help prepare the learners of all ages for the realization of new opportunities and overcoming the future shock in their journey on this super cyber highway. Therefore, the responsibility lies with education to enable them to utilize the marvels of this cyber world for successful living.



### Conclusion

Over the last two-three decades, the use of ICT has been an important topic in education. On the one hand, studies have shown that ICT can enhance teaching and learning outcomes. Education has a wider area and introduction of ICT in it is significant change to bring desirable outcomes. Since ICT has a potential to improve quality of education, hence it is prerequisite for effective teaching learning process. We live in a world that is constantly changing and being populous, every individual needs a different mean of getting knowledge and satisfaction. ICT enables each and every individual to excel through various tools in different life style and careers. India being the second most populated and also the second largest democratic country in the world, can implement various technologies of ICT in its teacher-training system since it has 50,000 teacher educators that can get benefits from it. Indian culture has always been rich and a teacher has always been the epitome of the utmost respect and reverence in our country. Since, the times have changed the process and techniques of teaching and learning need the inculcation of new strategies and new gadgets to provide quality to these aspects. ICT is quite affordable, accessible and relevant in improvisation of educational content and its delivery. The only need is for the teachers to realize the role they are expected to play in providing better leaders for the progress of the nation. A teacher is a true nation builder and if he does justice to his job, then only can the education system be effective and the implementation of ICT can be a boon to it. Since ICT plays a vital role in the 21<sup>st</sup> century, it can only guarantee any nation's success.

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