ICT IN TEACHER EDUCATION-AN APPRAISAL

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Abstract
The present age has been greatly influenced by the tremendous development in the information and communication technologies. There is hardly any sphere of life that remains unaffected. The world is changing at a very fast pace and so are the needs of the society and citizens. The education sector too needs to adapt accordingly so that it is able to cater to the needs of the new generation, the digital natives, as they are popularly called. As the teachers are entrusted with the task of preparing the future citizens, it is very important that they are equipped with all the skill and knowledge to survive and flourish in the new technology oriented educational system. Hence, there is an urgent need to reform the teacher education in the context of the unprecedented scientific and technological development.

Here arises the need to integrate ICT in teacher education. It not only helps the teachers to access the vast resource of knowledge and information but also explore, devise and use new techniques to teaching learning process to ensure qualitative improvement. "The student teachers' adoption of ICT use in the classroom has strong positive correlation with the pedagogical training rather than technical skills (Law, Pelgrum & Plomp, 2008). When used pedagogically, Information and Communication Technology (ICT) have the potential to address most of the educational challenges.
Keywords: ICT, Teacher Education, trainee-teacher, pre-service training, instructional material.

Introduction
The educational scenario today is very complex with varied needs, competing requirements, pressures and dwindling resources. We need an educational environmental system that will give the training and skill to students to use technology and its inventions as a tool for teaching and self-improvement. Educationists hold a responsibility to create an environment that improves student outcome and support opportunities for all. Naturally the traditional ways of and approaches to teaching are failing to deliver. Over these years, technology too has made remarkable progress. Computers, internet, laptops, mobiles, i-pads and other technological inventions have become inseparable part of our life.

The ICT or Information and Communication Technologies have become the buzzword nowadays. They are making rapid and dynamic changes to all the spheres of society. It is but obvious that its impact will be deeply felt in the field of education. ICT enables both the teachers and students to adapt learning and teaching to individual needs. Society too forces the institutions to aptly respond to this technological boom.

The world is changing rapidly in all its dimensions. To cope with these changes, the learning needs of the students of generation-Y are also changing accordingly. They are the digital natives. Digital activity is like a mother tongue for them. The Teachers need to be equipped with modern competencies to cater to the needs of the students. Consequently, the new realities and challenges to Teacher Education Institutions are coming up. Here comes the significance of ICT. The various innovations in the use of Information and Communication Technologies have important implications. The Teacher Education in India needs to be completely revamped to include the changes taking place across the world. The skill and competencies of the teachers of today can be and should be enriched with the new opportunities and possibilities especially those in electronic and other related applications.

What is ICT?
ICT is the acronym for Information and Communication Technology.ICT is, as the very name suggests, the use of information technology to communication. It is the catch-all phrase used to describe a range of technologies for gathering, storing, retrieving, processing, analyzing and transmitting information. ICT incorporates the use of digital technologies like computers, satellite, mobile phones and the Internet. The developments in ICT have certainly made the task of managing information, introducing innovations in products, processes and organizational structures cheaper, easier and certainly efficient.

Information and Communication Technologies are instrumental in shaping the new global economy and producing rapid changes in society. In a decade or so the new ICT tools have brought about a sea change in people's mode of communication and business. The influence of ICT is pervasive in all the fields i.e agriculture, industry, medicine, business and commerce, engineering etc. They have the potential to transform the nature of education-where and how learning takes place and the roles of students and teachers in the learning process.

New Challenges for Education and Teachers

Society and social evolution greatly influence education, knowledge and learning. As society is dynamic, education in general and teaching-learning in particular cannot remain static but adapt to changing circumstances, aspirations and requirements. Information and communications technologies have brought drastic and profound changes in society and radically influenced knowledge, teaching and learning. The students of the generation-Y, are characteristically very much different from the ones a decade ago. In order to remain relevant, education must mould and shape itself to the changing scenario.

The present generation is not only characterized by unprecedented technological boom. It is the generation of the internet and its networks. The digital natives as they are often referred to are equipped with unique competencies to operate electronic devices and also a strong command of informatics and computers. They are very much adept in multi-tasking. Accessibility, immediacy and mobility are keywords. At the same they are confronted with multiple complex issues i.e. unemployment, globalization, competition, ecological issues insecurity, transitory nature of things etc.

Among the various challenges the generations is facing the major ones are new knowledge, net- works, and collective intelligence.

New knowledge

No longer is traditional and well-established knowledge enough to understand the world and to address the major problems of our societies. Basic knowledge of the 'generation Y' cannot be reduced to 'read, write, and count'; knowledge cannot be reduced to the addition of traditional school subjects. There is a tremendous accumulation of knowledge, and knowledge is getting more complex. We must admit now that formal knowledge gathered from books and in schools is not the only form of knowledge. Social knowledge gathered informally is becoming more important. Knowledge is often linked with competencies. Jacques Delor in his Learning: The Treasure Within proposed four pillars of education:

- Learning to know
- Learning to do
- Learning to live together
- Learning to be

These days the terms 'information society', 'knowledge societies or 'digital society' are in vogue. These certainly imply the human dimension of the new trends and context. Knowledge has become a commodity that can be bought, sold, exchanged or stored. For the present generation, the concept of knowledge has undergone tremendous change.
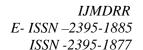
Networking

Another challenge for the digital native is the complex structure of information sources. Earlier, organizations used to have hierarchical structure where information was disseminated through catalogues, directories, tabled of content, lists etc. There was only one way to access a person or information. But ICT in general and internet in particular has totally radicalized the system by introducing multiple ways of processing and thinking. We are always within a network. We can directly access people or source of information through different ways. 'Network thinking' is the buzz word now. This profoundly changes the vision of the human relationships and concept of the world. This network has made possible the concept of 'cloud computing'

Collective Intelligence

ICT has ensured networking and collaboration among human beings. This has given rise to collective approach to human endeavors. It is manifested not only in physical affairs but in mental and intellectual activities as well. Collective intelligence is not merely a collection of individual intelligences in a group but involves a kind of 'added value' which can work wonders. The networked society needs and reinforces collective intelligence. There are a host of problems that the world faces at present. Individual or local attempt to solve them might prove futile. But a global network of collective intelligence made possible by ICT can easily find solution to them for the betterment of the human civilization.

In this scenario, teacher education is confronted with critical situation. The institutions providing teacher education must adopt a leadership role in the transformation of education to avoid being irrelevant in the context of technological boom. ICT can have multiple benefits in the field of education. And to realize it to the fullest, we must equip the teachers, both in-service and pre-service with the basic ICT skills and competencies. It has become almost mandatory for the teacher educations institutions and programmes to provide leadership for teachers and shape new pedagogies and tools for learning. They must also devise ways to make optimum use of the new technologies with respect to culture, needs and economic condition of the locality. What is required to actualize this is an integrated and collaborated effort of the teacher education institutions, K-12 teachers and administrators, national and state educational agencies teacher unions, business and community organizations,

politicians and other important stakeholders in the educational system. The strategies and programmes should be so designed as to ensure improved teaching-learning process within teacher education programmes. This will certainly fortify the abilities of the new generation teachers to fruitfully use the innovative tools of learning.

Implication of ICT in Education
In the earlier times, human beings engaged in the pursuit of knowledge mainly for enrichment and wisdom but in the post-industrial modern society it was for employment. The development of technologies has certainly opened up new avenues of employment. With the advancement of technology, the requisite skill and competencies also change. The introduction of computers in the classroom has replaced the traditional technological aids and has considerably facilitated qualitative learning. It has become almost mandatory to embrace the technological advancement in the teaching and learning process to keep up with the emerging needs and opportunities. The ICT play both the vocational and pedagogic roles. The benefits can be felt from sociological and economic points of view. Education through computer technologies such as interactive multimedia, computer conferencing and the internet are becoming very popular these days all over the world. Again the schools and the text books are not the only source of knowledge to the students of generation Y. They look for varied and infinite knowledge as per their needs and requirements. The computer-based environment provides opportunities for the learner to acquire the knowledge and apply them to solve the real life problems.

The information and communication technology is pervasive in almost all the fields of education-- teaching-learning, information storage, retrieval and dissemination, assessments and evaluation of students, educational research and administration.

The need of ICT in Teacher Education
The classroom is now changing its look from the traditional one i.e. from one way to two way communication. Now teachers as well as students participate in classroom discussion. Now Education is more child centric education. So the teacher should prepare to cope up with different technology for using them in the classroom for making teaching learning interesting. For effective implementation of certain student- centric methodologies such as project-based learning which puts the students in the role of active researches and technology becomes the appropriate tool. ICT has enabled better and swifter communication; presentation of ideas in more effective and relevant way. It is an effective tool for information acquiring. Thus students are encouraged to look for information from multiple sources and they are now more informed than before. So for this reason ICT is very much necessary for Teacher Education.

ICT Integration in Teacher Education: The Rationale
Education systems around the world are under increasing pressure to use the new information and communication technologies to teach students the knowledge and skills they need in the 21st century. The 1998 UNESCO World Education Report, Teacher and Teaching in a Changing World describe the radical implications ICT have for convention teaching and learning. It predicts the transformation of the teaching-learning process and the way teachers and learners gain access to knowledge and information.

UNESCO in the World Education Report (1998) rightly observes that to meet the changing needs of the present society, teachers and students must have sufficient access to improve digital technology and the internet in their classroom, schools, and teacher-education institutions. Teachers must have the knowledge and competencies to make optimum use of the novel digital tools to ensure the students' standard academic achievement. The quality of the professional development of teacher education largely depends on the extent of the ICT integration in Teacher Education. According to UNESCO (2002) ''ICT is a scientific, technological and engineering discipline and management technique used in handling information, its application and association with social, economic and cultural matters''.

The tremendous progress of science and technology has led to the advent of fresh possibilities having great educational potential. But they are still to be explored to the best. The emergence of these possibilities is largely due to the confluence of two phenomena of recent development- the augmentation in the quantity of information available in the world and the capacity to communicate among the people of the world. The opportunity exists to harness this force and use it positively, consciously, and with design in order to contribute to meeting defined learning needs. (UNESCO World Education Report, 1998).

Pre-Conditions of ICT Integration in Teacher Education

To effectively harness the power of the new information and communications technologies to improve learning, the following essential conditions must be met.

❖ The mindset of the teachers must change to go beyond the traditional methods and abreast the new technologies for better results.

❖ Digital technologies and the Internet must be made accessible to the students and teachers alike in their classrooms, schools and the teacher education institutions,

❖ High quality, meaningful and culturally responsive digital content must be available for teachers and learners.

❖ Teachers must have the requisite knowledge and competencies to make use of the innovative tools and resources to ensure students' academic excellence.

Teacher education institutions are faced with the challenge of preparing new generation of teachers to effectively use the new learning tools in their teaching practices. For many teacher education programmes, this daunting task requires the acquisition of new resources, expertise and careful planning. In approaching this task it is helpful to understand:

❖ The impact of technology on global society and the implications for education.

❖ The extensive knowledge that has been generated about how people learn and what this means for creating more effective and engaging student centered learning environments.

❖ The stages of teacher development and the levels of adoption of ICTs by teachers.

❖ The critical importance of context, culture, leadership and vision, life-long learning, and the change process in planning for the integration technology into teacher education.

❖ The ICT competencies required of teachers related to content, pedagogy, technical issues, social issues, collaboration and networking.

❖ The importance of development standards to guide implementation ICTs in teacher education.

❖ The essential conditions for successful integration of ICT into teacher education.

❖ Important strategies to consider in planning for the infusion of ICT in teacher education and managing the change process.

❖ With the emerging new technologies, the teaching profession is evolving from an emphasis on teacher-centered, lecture-based instruction to student centered, interactive learning environments. Designing and implementing successful ICT enabled teacher education programmes is the key to fundamental, wide-ranging educational reforms.

❖ Teacher education institutions may either assume a leadership role in the transformation of education or be left behind in the swirl of rapid technological change. For education reap the full benefits of ICTs in learning, it is essential that pre and in service teachers able to effectively use these new tools for learning. Teacher education institutions and programmes must provide the leadership for pre and in service teachers and model new pedagogies and tools for learning.

❖ The challenge confronting our educational systems is how to transform the curriculum and teaching-learning process to provide students with the skills to function effectively in this dynamic, information-rich and continuously changing environment.

❖ Education is at the confluence of powerful and rapidly shifting educational, technological and political forces that will shape the structure of educational systems across the globe for the remainder of this century. Many countries are engaged in a number of efforts to effect changes in the teaching –learning process to prepare students for an information and technology-based society. The UNESCO world education report 1998 notes that the new technologies challenge traditional conceptions of both teaching and learning and , by reconfiguring how teachers and learners gain access to knowledge, have the potential to transform teaching and learning processes. ICTs provide an array of powerful tools that may help in transforming the present isolate, teacher-centered and text-bound classrooms into rich, student focused, and interactive knowledge environments. To meet these challenges, schools must embrace the new technologies and appropriate the new ICT tools for learning. They must also move toward the goal of transforming the traditional paradigm of learning.

ICT Orientation of Teacher Education to Increase Professionalism

Teaching as a profession lacks professionalism. The teachers are yet to be professional like the doctors, lawyers, civil servants etc in the truest sense of the term. The attitude of the teachers is not solely responsible for this. The nature and quality of pre service teacher training programmes is in a great way responsible for this. Bose (2010) rightly observes that these programmes fail to prepare the would be teachers to adapt to the modern ICT based teaching-learning system to cater to the needs of the generation Y children who are quite prone to using the latest technologies. For example the lessons plans are still prepared with the traditional teacher centered methods and teaching aids in mind. But the approach has certainly

become learner centered and requires new set of abilities to assess the individualized independent and technology based learning. Hence, there arises the need to enhance professionalism for integrating ICT oriented educational system. There is an urgent need on the part of the teacher training institutes to integrate ICT into the curriculum to enable the future teachers to integrate ICT into the curriculum they would be dealing with. The requirements for this include.

Adoption of Collaborative Learning Approach
Teachers and text books are not the only source of information. Learning is in fact an interactive and collaborative process. ICT integration facilitates this approach to a great extent. ICT can be used for sharing information and exchanging views that support learning. The teacher training institutions should adopt this collaborative approach during training with the help of ICT so that the trainee teachers realize learning to be a social and integrative process.

Approach Reformation
The modern day educational system advocates a leaner centered constructivist approach for which the teachers have to create a conducive and stimulating environment for the students. The basic assumption behind this is that learning is spontaneous process facilitated by the collaboration with peers, teachers, parents etc. it certainly requires the use of ICT. Unfortunately, the teachers themselves have not encountered any such situation during their own training and therefore cannot create one for their students. So, it is of utmost importance that the teacher-training institutions should also use a similar approach.

Technology Orientation of Teachers
To be able to adopt and implement an ICT based education system, the first requirement is of course the inculcation of technological skills in the teachers. They should be computer literate and able to browse over the internet. This is required for accessing, creating, storing and retrieving information as well as presenting it to the learners in a fruitful way. It will also help them to remain updated in this knowledge driven society.

Curricular Reformation
Bose (2010) rightly observes that the realization of the potential of ICT for furthering the goals of education, its widening accessibility and its much needed integration in the educational process in the schools around the world are having a profound influence on all aspects of education. Teacher education curriculum needs to update this knowledge and skills as the school curriculum change. The aim of teacher training in this regard can be either teacher education in ICTs or teacher education through ICTs.

Exploring Educational Soft wares
The teachers should be encouraged and trained to access, prepare and use various educational software in the teaching learning process. These not only break the monotony of the traditional teacher centered methods where the students remain for most of the time passive but also make learning multi sensory.

Apprising about the Ethical Issues
The use of ICT facilitates learning greatly but at the same time invites certain inadvertent dangers. The teachers should be encouraged to use these modern technologies but should also be apprised about the code of conduct and the risks involved in violation. They should be made aware of the rules governing access and use of information, copyright laws etc during the training.

Potential Role of ICT in the Field of Teacher Education
Given the multi-dimensional utility of the Information and Communication Technologies, it can play multifaceted roles in the field of teacher education. Integration of ICT not only enhances the teacher professionalism at the same time equips the teachers with knowledge, skill and competencies to effectively carry out the teaching learning process ensuring the academic excellence of the students. The various roles ICT can play with respect to the teacher education are discussed in a nutshell below:
  ❖ ICT helps in the mutual interaction between the students and teachers.ICT facilitates both in pre-service and in-service teachers training.
  ❖ ICT helps the teachers in enhancing their quality of teaching and providing feedback.
  ❖ ICT helps in effective use of ICT software and hardware for teaching learning process.
  ❖ ICT can make teaching innovative and helps in improving the effectiveness of the classroom.
  ❖ ICT helps in improving professional development and educational management as well as enhances active learning of teacher trainees.

- ❖ ICT helps in increasing teachers' knowledge to survive in the knowledge based educational system.
- ❖ ICT helps teachers to execute their skills in the practical class room situation and prepare students for their social and vocational life.
- ❖ ICT as assistive tools for example while making assignments, communication, collection of data and documentation as well as conducting research.
- ❖ ICT can be used as medium for teaching and learning. The teachers can use it for teaching and the learners can use it for learning. Motion pictures, animation, simulation training help a lot in this regard.
- ❖ ICT is an effective tool for the organization and management of educational institutions.
- ❖ ICT helps teachers to teach effectively in large classroom, engaging the attention of all the students even of the most uninterested students.
- ❖ ICT helps to design a student centered environment, keeping the students interacted in the teaching-learning process.
- ❖ ICT is of immense importance in teacher training.

Conclusion

Teacher education is faced with innumerable challenges in the context of the changing needs of the present generation arising out of the tremendous growth of science and technology and their growing impact in the day to day life. To make teacher education take the challenge and prepare the future teachers with adequate competencies, it is almost incumbent that it incorporates the latest developments in the fields of ICT. It helps to enhance the pedagogic skills of the teachers with the help of the modern technologies available on one hand and trains them in the use of ICT so that they can access the infinite resource of knowledge available and impart their lessons to the students in much more interesting and effective way. Thus ICT not only improves the quality of teacher training but also the quality of teaching-learning process in the classroom. It is high time that the government frames policies to increase the scope of ICT integration in teacher education.

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