Importance of ICT Pedagogy Integration in Teacher Education

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Abstract- *Teaching is becoming one of the most challenging professions in our society where knowledge is expanding rapidly and modern technologies are demanding teachers to learn how to use these technologies in their teaching. While new technologies increase teachers' training needs, they also offer part of the solution. Information and communication technology (ICT) can provide more flexible and effective ways for professional development for teachers, improve pre- and in-service teacher training, and connect teachers to the global teacher community. This paper analyses and organizes a variety of approaches found in ICT uses in teacher training into a four-cell matrix. Based on the analysis of those approaches, it discusses new possibilities and challenges that ICT has brought to teacher training and professional development. It concludes with discussion of emerging research issues with respect to ICT integration into teacher training and networking.*

Keywords: Attention, Effectiveness, Outcome, Learning Process, Contemporary

Introduction

Information and Communication Technologies (ICT) has great potential for enhancing teaching and learning outcomes. The realization of this potential depends much on how the teacher uses the technology. This would in turn depend, among other things, on the kind of training that the teacher has undergone. ICT have the potential to enhance access, quality, and effectiveness in education in general and to enable the development of more and better teachers in particular. As computer hardware becomes available to an increasing number of schools, more attention needs to be given to the capacity building of the key transformers in this process, namely, teachers.

ICTs are one of the major contemporary factors shaping the global economy and producing rapid changes in society. They have fundamentally changed the way people learn, communicate and do business. They can transform the nature of education - where and how learning takes place and the roles of students and teachers in the learning process.

ICT - Origin & Definition

Information and communications technology, usually called ICT, is often used as a synonym for information technology (IT) but is usually a more general term that stresses the role of communications in modern information technology. ICT consists of all technical means used to handle information and aid communication, including computer and network hardware as well as

necessary software. In other words, ICT consists of IT as well as telephony, broadcast media, and all types of audio and video processing and transmission. The expression was first used in 1997 in a report by Dennis Stevenson to the UK government and promoted by the new National Curriculum documents for the UK in 2000.

ICT is often used in the context of "ICT roadmap" to indicate the path that an organization will take with their ICT needs. The term ICT is now also used to refer to the merging (convergence) of telephone networks with computer networks through a single cabling or link system. There are large economic incentives (huge cost savings due to elimination of the telephone network) to merge the telephone network with the computer network system.

Importance of ICT in Teacher Education

The development of any nation depends mainly on the standards of its educational institutions. Teacher has a pivotal role in the process of development. According to Dr. Sarvepalli Radhakrishnan, Mahatma Gandhi and Vivekananda, teacher has a prominent role in character building, quality education, value oriented education and health promotion through their teaching. In the 21st century, education in general and quality education in particular has a dominant role in the process of development. Today's trainee teachers are tomorrow's real teachers. It is important and necessary to take care about present teacher education system. In the scientific and technological world ICT has a crucial role in the process of teaching and learning.

Globalization and technological changes have accelerated during the last fifteen years and have created a new global economy. Education is one of the main keys to economic development and improvements in human welfare. Teaching is becoming one of the most challenging professions in our society where knowledge is expanding rapidly and much of it is available to students as well as teachers at the same time. 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 knowledgebased society. Teachers therefore require familiarity with new forms of ICT and need to have the ability to use that technology to enhance the quality of teaching and learning. Many countries including India have realized the need for providing teachers with training in ICT and have launched various professional development initiatives. However, many of the training activities to date have been one-off, crash courses which focus on computer literacy and do not enable teachers to integrate ICT in their day-to-day teaching activities and master the use of ICT as an effective tool to improve teaching and learning. The EFA Global Monitoring Report also confirms the central role of teachers in any education system, emphasizing that the quality of education is directly linked to how well teachers are prepared for teaching.

The given below table gives full information about learning and memory. ICT is a multidimensional tool. The impact of ICT is very much when compare to any other. More learning and memory takes place through ICT.

Table 1: Process of Learning and Memory.

LEARNING THROUGH	WE REMEMBER
Taste 1.0%	20% of what hear
Touch 1.5%	30% of what we see
Hearing 11.0%	50% of what we see and hear
Smell 3.5%	80% of what we say
Sight 83.0%	90% of what we say and do

Thus, the very basis of learning is sense experience, and the very psychology of teaching aids is as follows: I hear - I forget, I see - I remember, I do - I learn/understand.

ICTs which include radio and television, as well as newer digital technologies such as computers and the Internet have been touted as potentially powerful enabling tools for educational change and reform.

ICT Pedagogy Integration in Teacher Education

One of the essential aims of teacher education is to enable student teachers to develop their knowledge and understanding of subject matter, children, teaching strategies, and the school curriculum, and to help them draw upon this knowledge in the shaping of their classroom practice. Typically, through lectures and seminars on teaching methods, child psychology, classroom processes, and subject matter, through classroom observation and teaching experience, through discussions with tutors and teachers about classroom practice, and through the encouragement to reflect upon and analyze their own teaching, it is expected that student teachers will build a coherent, enlightened, integrated body of knowledge that will inform, and in turn be informed by, classroom practice.

The picture depicted by Calderhead and Robson describes how teachers' professional journeys start and continue throughout their teacher preparation. One of the key features of the profession of teaching is that teacher learning does not stop with teacher preparation in teacher education institutions. Classroom practice continues to inform teachers' classroom instruction. Teachers' classroom instruction has been studied for decades. Numerous studies have analyzed teaching and how and why teachers act and teach in particular ways. In studying what teachers do in classrooms, social science research has also focused on teachers' thought processes and what they believe about their work.

Teachers think about a variety of issues during the planning and the implementation of teaching; they constantly make decisions. In reviewing the teacher thinking research, Clark and Peterson explain that teachers have theories and belief systems that influence their perceptions, plans, and actions. Teachers' teaching and the thought that precedes and follows it produce teaching preferences. A teacher's preferred way of teaching is based on the teacher's values or ideal teaching style and on the teacher's abilities and skills.

In the scientific, technological, modern and globalized world ICTs have a pivotal role in the process of teaching and learning. ICT helps the students and the teachers to learn effectively within the period. It affects the multi-senses of the individuals. It is necessary to integrate ICT methodology in Teacher Education curriculum for the best learning of the trainee-teachers.

Components of ICT in Teacher Education

Actual components of ICT in Teacher Education:

- Deployment
- Curriculum Development
- Content Availability
- Training and Usage Support
- Educational Management
- Maintenance and Technical Support

Teacher Training Approaches

Research indicates that ICT can change the way teachers teach and that it is especially useful in supporting more student-centered approaches to instruction and in developing the higher order skills and promoting collaborative activities (Haddad, 2003). Recognizing the importance of ICT in teaching and learning, a majority of the countries in the world including India have provided ICT teacher training in a variety of forms and degrees. Even though many teachers report that they have not had adequate training to prepare themselves to use technology effectively in teaching and learning, there seem to be several efforts around the world in which countries are effectively using technology to train teachers, and/or are training teachers to use technology as tools for enhancing teaching and learning.

ICT teacher training can take many forms. Teachers can be trained to learn how to use ICT or teachers can be trained via ICT. ICT can be used as a core or a complementary means to the teacher training process (Collis and Jung, 2003).

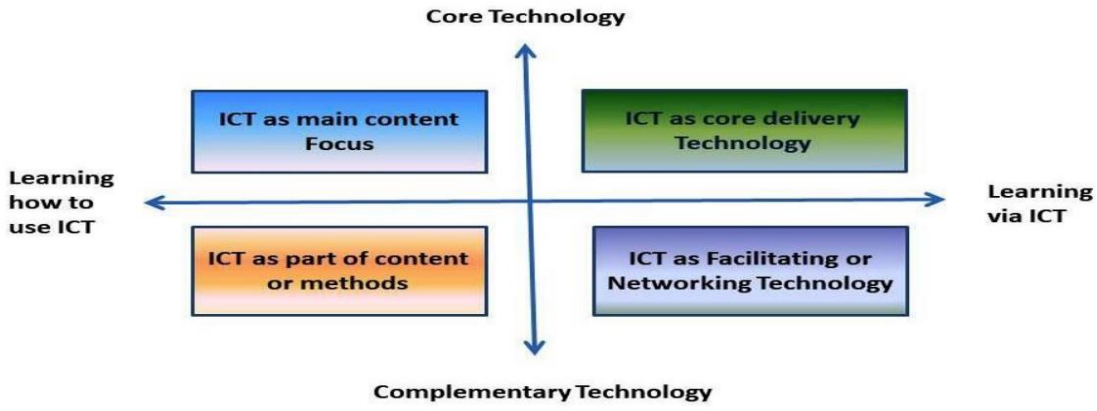

Figure1.1: Categories for ICT in Teacher Training

ICT Use as Part of Teaching Methods

This approach integrates ICT into teacher training to facilitate some aspects of training. Two cases below show how a variety of ICT are adopted as part of effective training methods. In these cases, teachers are provided with examples of ICT-pedagogy integration in their training process.

Captured Wisdom is a resource developed by the federally-funded (USA) North Central Technology in Education Consortium for K-12 teachers, school administrators and extended to adult literacy educators. It uses videotape and CD-ROM to help US teachers to see how technology can be integrated into their work. The Captured Wisdom (tm) CD-ROM Library is made up of stories about teachers who are making meaningful and creative uses of technology in their instruction. These CD-ROMs contain video descriptions and demonstrations of how technology is used in teachers' classrooms. They provide "examples of real educators and learners using successful practices of technology to support instruction and learning in their classrooms. Video sequences are viewed by teachers' focus groups who then discuss the strategies and techniques of classroom management, assessment, etc. In this specific case, teachers learn how to use ICT in their classrooms by actually being engaged in the process of ICT-integrated training.

Another example of this approach can be found in the School Administrators' Technology Integration Resource project. It is a bilingual Canadian initiative which provides tools and resources to help school administrators successfully integrate ICT into curriculum in their school. It includes the National Center for Technology Planning clearinghouse of school district ICT plans, advice on how to provide technology, successful practices in introducing ICT, perspectives on staff development, a beginners' guide to the Internet, etc. The focus of this project is not on the basic skill development but on the development of ICT pedagogy integration skills of educators by sharing successful cases and practical ideas.

UNICEF's Teachers talking about learning also illustrates the application of this approach to ICT teacher training. It is designed for international collaboration between teachers in developing countries using the Internet and television. It provides access to teacher training materials and useful links and promotes discussions among teachers.

The cases discussed above use ICT as part of training methods and promote teachers' ICT pedagogy integration in the classroom by demonstrating examples and allowing discussions among teachers throughout the whole training process. Participants of the training are asked to actually use ICT to learn about ICT skills and develop ICT integrated pedagogies. These training strategies seem to be supported by other research that argues that teachers are likely to benefit by actively experiencing ICT skills as a learner (Jung, 2003).

ICT pedagogy approach

Emphasis is on integrating ICT skills in a respective subject. Drawing on the principles of constructivism, pre-service teachers design lessons and activities that center on the use of ICT tools that will foster the attainment of learning outcomes. This approach is useful to the extent that the skills enhance ICT literacy skills and the underlying pedagogy allows students to further develop and maintain these skills in the context of designing classroom- based resources.

UNESCO planning guide for ICT in teacher-education cites three key principles for effective ICT development in Teacher Education that were put forward by the Society for Information Technology and Teacher Education.

1) That technology should be infused into the entire teacher education programme, implying that ICT should not be restricted to a single course but needs to permeate in all courses in the programmes.
2) That Technology should be introduced in context. Accordingly, ICT application like word-processing, databases, spread-sheet and telecommunications should not be taught as separate topics rather encountered as the need arises in all courses of TeacherEducation programmes.
3) That students should experience innovative technology-supported learning environment in Teacher-Education programmes. This requires that students should see their lecturers engaging in technology to present their subjects utilizing power point or simulations in lectures and demonstrations. Students should also have the opportunity to use such applications in practical classes, seminars and assignments.

The application of these three principles will be a mile stone towards effectively integrating ICT in Teacher-Education.

Teacher and Technology

Teacher has a prominent role in the process of teaching and learning. First of all, it is necessary to give training for teachers for effective use of technology.

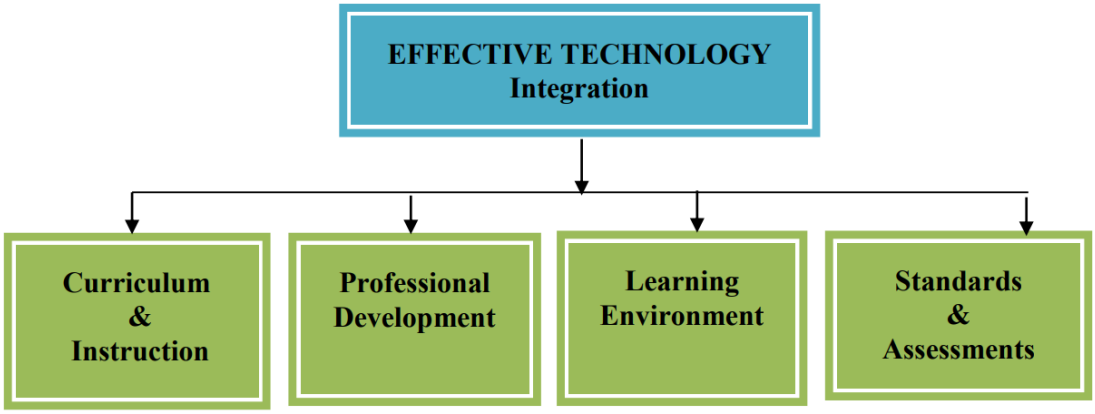

Figure 1.2: Teacher and Technology

Changing Role of Teacher

Under the changing scenario, there is a need to redefine the role of a teacher-educator. The National Council of Teacher Education, Jaipur (NCTE), based on a thorough job analysis, has come out with three areas in which a teacher-educator needs to acquire mastery. These are i) five performance areas; ii) ten competency areas; and iii) five commitment areas (NCTE, 1998). For the successful integration of ICT in teacher education, the teacher in addition to taking up the role responsibilities mentioned in these areas, must shoulder the additional, rather survival responsibilities outlined below:

- Act as a role model for pre-service trainees and in-service teachers, demonstrating the use of technology across the curriculum.
- Encourage technology integration among the trainees, colleagues, teachers and parents.
- Be involved in planning and implementing ICT professional development training.
- Be up-to-date with the latest technological developments and advise the institutions concerning technology advancements and upgradation.
- Act as a role model for pre-service trainees and in-service teachers, demonstrating the use of technology across the curriculum.
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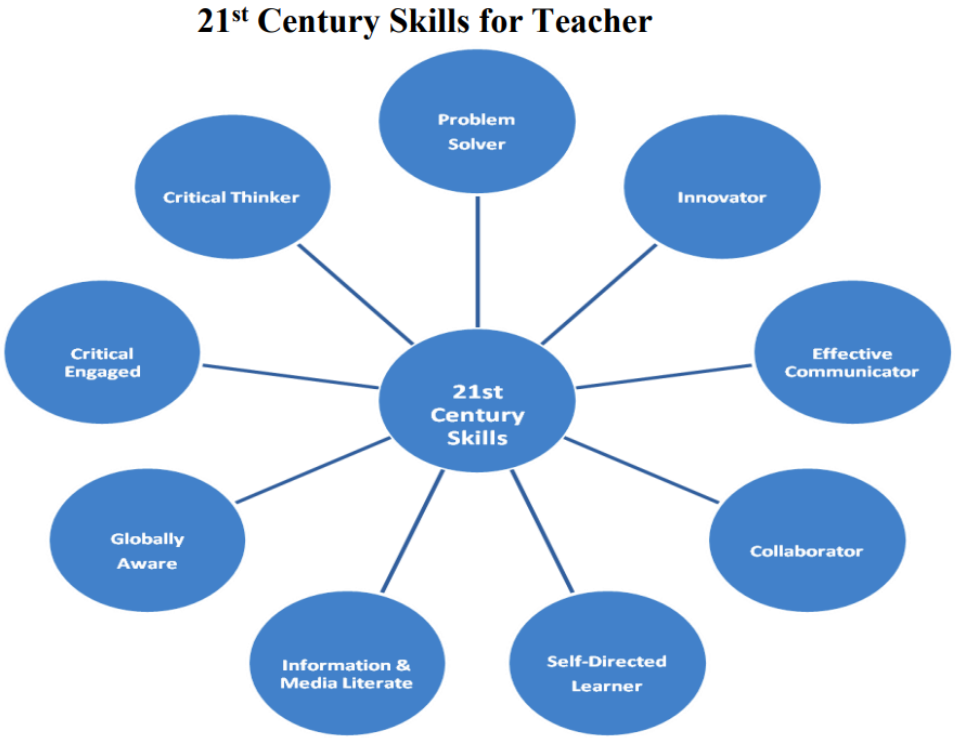

Figure 1.3: 21st Century Skills for Teacher

Globalization and advancements in technology are driving changes in the social, technological, economical, environmental and political landscapes at such a pace and magnitude that is too great, and too multiple to ignore. As society changes, the skills that students need to be successful in life also change.

Teacher has a prominent role to teach all type of skills to the students. It is the duty of institute of teacher education to develop all the skills in the trainee teachers. Teacher has a multiple role in the process of teaching and learning. All of you know about the value of teacher in our Indian tradition. He acts as a guide, philosopher, friend and parent. Among these roles a role model and effective teacher has the above mentioned skills i.e., 21st century skills. ICT helps the teacher to teach and learn these skills effectively.

Conclusion

Several paradoxes could be recognized in the research literature considering the use ICT at school as well as in teacher education. Students have rich experiences of use of technology outside of school, but do not use technology for learning at school. Teachers are skilled technology users, but they are unable to take advantage of their competence and to apply it to the way they teach in school. Today's trainee teachers are tomorrow's real teacher. It is necessary and important to take care about trainee teachers. Integration of ICT in pedagogy of teacher education is important. ICT helps both in teaching and learning process. The impact of ICT is very much there on the student community. It is the time to change the attitude of teachers and students towards the use of ICT in teaching and learning process.

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