

## ROLE OF ICT IN TEACHER EDUCATION

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### Abstract

ICTs are making dynamic changes in society. They are influencing all aspects of life. The influences are felt more and more at schools. Because ICTs provide both students and teachers with more opportunities in adapting learning and teaching to individual needs, society is, forcing schools aptly respond to this technical innovation. Therefore, this review article discusses the roles of ICTs, the promises, limitations. Today our classroom processes are mostly based on chalk and talk, thus there is an immediate need for orienting the teachers in ICT skills and program. The teachers should be trained in the use of modern tools. Technology based learning can be viewed as an innovative approach for delivering. Well designed, learner centered, interactive and facilitated learning environment to anyone are anywhere.

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 (UNESCO, 2002). ICT stands for Information and Communication Technologies. ICT is a part of our lives for the last few decades affecting our society as well as individual life. ICT which is now broadly used in educational world, Teacher, Student, administrator and every people related to education are popularly used ICT.

Teacher use ICT for making teaching learning process easy and interesting. A competent teacher has several skills and techniques for providing successful teaching. So development and increase of skills and competencies of teacher required knowledge of ICT and Science & Technology. Modern science and technological societies education demands more knowledge of teacher regarding ICT and skills to use ICT in teaching –learning process.

This paper discussed about the role of ICT in teacher education.

**Keywords:** ICT, Technology, Technical innovation, Teacher education, learning environment.

### Introduction

Today's age of 21st Century and it is also the age of information and technology (IT). Every aspects of life are related to science and technology. Huge flow of information is emerging in all fields throughout the world. Now information and technology is popularly using in educational field for making teaching learning process successful and interesting for students and teacher both. In 1998, UNESCO World Education report refers about student and teachers must have sufficient access to improve digital technology and the internet in their classroom, schools, teacher educational institutions. Teachers must have the knowledge and skills to use new digital tools to help all students achieve high academic standard. The quality of professional development of teacher education depends on the extent of ICT integration in teacher education programme. 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". Teachers are at the core of any living society. Technologies play an important role in training programme of teachers. Students' accesses knowledge and information through TV, digital media, cable network, internet and social media i. e. Facebook, Twitter, Whatsapp, Linkedinn, Igo, Line, Wechat etc. ICT is very important for Preservice teacher education programme

in the 21st Century. Without proper knowledge of ICT teacher cannot perform in his/her class room and it could not be said to be a complete one.

### Education

"Education is the complete development of individuality of the child, so that he can make his original contribution to human life according to his best capacity", opines T. P. Nunn.

A child is an integral part of society. A child has to bring in him the desired changes according to the needs and demands of the ever changing society, of which he is an integral part. Thus, Education bestows upon the child immense benefits. It brings up the child as the parents do. It guides him like an affectionate father and serves him faithfully like a wife.

Education develops the individual like a flower which distributes its fragrance all over the environment. In this sense, education is that conductive process which drags a person from darkness, poverty and misery by developing his individuality in all its aspects – physical, mental, emotional and social. With this type of around development, an individual becomes a responsible, dynamic, resourceful and enterprising citizen of strong good moral character who uses all his capacities to develop his own self, his society and his nation to the highest extent by contributing his best to national honour, national glory,

national culture and civilization of the nation of which he is a part, an integral part.

### **Why do we use 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 based on child centric education. So the teacher should prepare to cope up with different technology for using them in the classroom for making teaching learning interested. For effective implementation of certain studentcentric 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 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.

### **Recent Trends in Teacher Education:-**

Based on various changing needs of our society now emphasis is also given to the various educational theory and educational practices. According to these theories and practices changes are also undergo in teacher education also. It is natural that teacher education must include new technology. Teachers should also know the right attitudes and values, besides being proficient in skills related to teaching. As we know the minimum requirement of any training programme is that it should help the trainee to acquire the basic skills and competencies of a good teacher. Now-a-days new trends in teacher education are Inter-disciplinary Approach, Correspondence courses, orientation courses etc. Simulated Teaching, Micro Teaching, Programmed Instruction, Team Teaching are also used in teacher education. Now-a-day Action Research also implemented in Teacher Education. ICT acts as the gateway to the world of information and helps teachers to be updated. It creates awareness of innovative trends in instructional methodologies, evaluation mechanism etc. for professional development.

Thus, it can be said that education is the backbone of a nation and Teacher plays an important role in the process of education.

### **Role Of Teachers In The Process Of Education:**

The future of a nation is fashioned in a classroom. Education is a socially oriented activity which is associat-

ed with strong teachers having high degrees of personal control with learners.

A teacher plays an important role in the process of Education. A teacher is considered to be the architect of the nation. In other words, the future of the nation lies in the hands of a teacher Aristotle rightly says -

“Those who educate children well are more to be honoured than they who produce them; for these only gave them life, those the art of living well”.

A teacher acts as a facility center of information and knowledge. A teacher after gathering information from specified sources like text books, personal notes, library etc. communicates it to the students.

Not only this a teacher develops the quality of creativity in students. A teacher arises a passion for the subject among the students by getting them to look at issues in a variety of ways. A teacher instills a hunger in their students to learn more on their own which strengthens the good future of students.

According to Verma (2010), a teacher plays a significant role not only in class teaching learning situation but in social engineering too.

### **Need of Teacher Education:**

“A good teacher is like a candle – it consumes itself to light the way for others”.

Very truly says Nikos Kazantzakis that – Ideal teachers are those who use themselves as bridges over which they invite their students to cross, then having facilitated their crossing, joyfully collapse, encouraging them to create bridges of their own.

But a teacher becomes a good and an ideal teacher only in that condition when he/she is able to motivate students by using creative and inspirational methods of teaching. Teaching is one of the most complicated jobs today. It demands broad knowledge of subject matter; curriculum and standards; enthusiasm, a caring attitude and a love of learning; knowledge of discipline, class room management techniques and a desire to make a difference in the lives of young people.

Great teachers set high expectations for all students. Effective teachers have lesson plans that give students a clear idea of what they will be learning, what the assignments are and the grading policies. These assignments have learning goals and give students ample opportunities to practice new skills.

A good teacher has empathy and positive mental attitude. A good teacher knows that his/her students are visual, auditory or kinaesthetic learners and is adept at creating presentation for all three.

With all these qualities of a good teacher and effective teaching approaches there is no wonder that teachers would be able to make a difference in the lives of the students.

But the teachers would be able to acquire these effective qualities of teaching and will be able to become great teachers when they would be properly trained. This arises the necessity of teacher's education.

Therefore, teacher education refers to the policies and procedures designed to equip prospective teachers with the knowledge, attitude, behaviors and skills they require to perform their task effectively in the classroom school and wider community.

With the 'teacher education' teachers are able to become like a window through which young people will see their future.

### **Information And Communication Technology:**

Any knowledge economy, depends on the development of its educational sector as education is the driving force of economic and social development in any country.

Information and communication technology has become common place in all aspects of life. It has a great impact in education and is a strong agent to improve in many areas of educational endeavour.

Information and communication technology usually abbreviated as ICT is usually a more general term that stresses the role of telecommunication, broadcast media, all types of audio-video processing and transmission and network based control and monitoring functions in any form of endeavour. The expression was first used in 1997 in a report by Dennis Stevenson to the UK Government and promoted by the National Curriculum documents for UK in 2000.

According to Blurton, Information and communication technology is defined as "diverse set of technological tools and resource used to communicate, create, disseminate, store and manage information". Across the past 20 years the use of ICT has fundamentally changed the practices and producers of nearly all forms of endeavour and especially in educational endeavour.

### **Technologies Included In Ict:**

ICT helps to keep pace with the latest developments with the help of different technologies included in it.

Technologies included in ICTs are: - Radio and Television (broadcasting technology), Telephone, Computers and Internet, Video cameras, cell phones, personal digital assistants.

Some of the services available through ITC are: -

- www – www stands for world wide web which is one of the most important and widely accepted services (like IRC, E-mail etc.) of the Internet. Its popularity has increased dramatically, simply because it's very easy to use colourful and rich content.
- According to Dennis P. Curtin (2002): - "Web is a series of interconnected documents stored on computer sites or websites".
- E-learning – E-learning is also known as online learning. E-learning encompasses learning at all levels both formal and non-formal that uses an information network – the Internet, an intranet (LAN) or extranet (WAN). The components include e-portfolios, cyber infrastructures, digital libraries and online learning object repositories. All the above components create a digital identity of the user and connect all the stakeholders in the education. It also facilitates interdisciplinary research.
- Group Discussion – Internet Relay Chat (IRC) is among the popular Internet service people mostly use for live chatting. Group of people with common interest can exchange views / opinions with each other instantly through Internet.
- Description of the internet technologies required to support education via ICTs (www, video conference, Tele-Conference, Mobile Conference, CD Database, Word-Processor, Intranet, Internet etc.)
- E-Modules – Modules written are converted and stored into digital version into a computer using word processor accessible by the user through internet.
- Audio – Conferencing – It involves the live (real-time) exchange of voice messages over a telephone network when low – band width text and still images such as graphs, diagrams or picture can also be exchanged along with voice messages, then this type of conferencing is called audio-graphic. Non-moving visuals are added using a computer keyboard or by drawing / writing on graphics tablet or whiteboard.

Video – Conferencing – Video Conferencing allows the exchange not just of voice and graphics but also of moving images. Video-Conferencing technology does not use telephone lines but either a satellite link or television network (broadcast / cable).

Web – Based Conferencing – Web-based conferencing as the name implies, involves the transmission of text and graphic, audio and visual media via the internet; it requires the use of a computer with a browser and communication can be both synchronous and asynchronous.

Open and Distance Learning –

Open and distance learning is defined by the Common-

wealth of Learning as: -

“a way of providing learning opportunities that is characterized by the separation of teacher and learner in time or place or both time and place; learning that is certified in some way by an institution or agency; the use of a variety of media, including print and electronic, two-way communications that allows learners and tutors to interact, the possibility of occasional face-to-face meetings, and a specialized division of labour in the production and delivery of courses.

All these services availed through ICT plays a great role in teacher education. It allows higher participation and greater interaction. It also improves the quality of education by facilitating learning by doing, directed instruction, self-learning, problem solving, information seeking and analysis and critical thinking as well as the ability to communicate, collaborate and learn.

#### **Teacher Education And Ict -**

Education, as we know is instrumental in ensuring that future generation is well informed and competent. Therefore, the progress of any country depends upon the quality of education offered and its practices.

Education in India has undergone various phases and stages of development starting from the Gurukul system of education in the Vedic age to the new system of education in the post-independent period. At all stages of development there was a concern for bringing in quality education on the practical aspects in education.

The great Indian thinkers had emphasized on developing the inner potential of individuals by reflecting upon unique potential of individuals.

Getting educated is solely dependent upon the individual teacher's role to set conditions and generate environments for learning.

Traditionally, the teacher used to be the complete source of knowledge for the students. But now, in many cases, the teachers do not possess adequate information and knowledge to supplement the view of the student.

Nextly, as unfortunately, because the quality and accessibility of education varies so greatly between regions, the educational system of our country often fails to deliver the level of education necessary to ensure good competency.

Many educational institutional have limited resources for buying books, stationary, furniture and other class room materials. Teachers also lack adequate qualification and training to engage their students in learning. Their lesson plans are most often outdated or irrelevant. Now, if the teacher's scope of gathering information and knowledge is limited how can you expect magic and wonders from

teachers as well as students? These jeopardize the available quality of education.

But now, the pace of technological revolution and emergence of a knowledge society has changed the traditional role of teacher. In present scenario, teachers need to help their students in: how to learn, how to grow in future, how to develop study skills, how to conduct fundamental research, how to examine, evaluate and access information and also how to question and then dismantle unauthentic structure of knowledge and cognition if need be. Therefore, in this age of rapid change and uncertainty, there is one thing of which we can be certain – teachers will need to adapt to change if they are to survive and keep pace with new methods and technologies. Arguably the area of most rapid change is that of ‘Information and Communication Technology’.

All these expectations may be met only through need based, goal oriented and meaningful in – house discussion, conferences, symposia, workshops, refresher and orientation courses, crash courses, capsule courses and subject based courses, interdisciplinary and holistic approaches to education and quality research and by enriching existing libraries.

The teacher educators and individual teacher ought to sincerely and persistently work hard toward this goal. And the achievement of use of this goal becomes easy by the use of user – friendly ICT in the both the fields of children education system and teacher education system.

ICTs offer many new possibilities for teacher education. Using ICTs as tool for training of teachers is as important as introducing the basics of ICTs to the prospective teachers. ITCs support effective professional development of teachers through regular use of technologies.

#### **Rationales for introducing ict in teacher education:**

ICT is introduced in teacher education at various levels as a compulsory subject or a special field subject. Sometimes, it is also introduced as one of the subjects to be studied under a course titled ‘Educational Technology’.

There are four main rationales for introducing ICT in teacher education. The first rationale for introducing ICT in teacher education is ‘Social’. ICT plays an important role in society and thus the need for familiarizing student teachers with ICT is increasing day to day.

The second rationale for introducing ICT in teachers education is ‘Vocational’. ICT prepares the student teachers for jobs that require skills in technology.

The third rationale for introducing ICT in teacher education is ‘catalytic’. There is a great utility of technology to improve performance and effectiveness in teaching,

management and many other social activities.

The fourth rationale for introducing ICT in teacher education is 'Pedagogical'. The present era is an era of competition and in this era there is a great need to utilize technology in enhancing learning, flexibility and efficiency in curriculum delivery for teachers so that they can effectively contribute in the overall development of children. Various other rationales for introducing the course are as follows: -

1. Understanding the scope and importance of ICT in contemporary society.
2. Developing effective perspectives and attitude towards emerging technologies.
3. Developing skills in handling, maintaining and protecting different types of hardware and equipment in institutions of learning.
4. Acquiring a theoretical basis of ICT and to develop an awareness about recent developments in the area of ICT.
5. Acquiring the necessary skills of handling software packages for the purpose of education in the institutions of learning.
6. Acquiring knowledge about new Internet technologies and their place in the field of education.

#### **A Framework For Using Icts In Teacher Education:**

In planning for infusion of ICTs into teacher preparation programmes, the factors important to a programmes, the factors important to a programmes' success must be considered. A holistic framework proposed by the UNESCO (2002) takes into account the factors, e.g. cultural, educational, technology resources that are important in planning the integration of technology into preservice curriculum.

These factors have been discussed below: -

'Context and Culture' identifies the culture and other contextual factors that must be considered in infusing technology into teacher curriculum. It includes the use of technology in culturally appropriate ways and the development of respect for multiple cultures and contexts, which need to be taught and modelled by teachers.

'Leadership and Vision' are essential for the successful planning and implementation of technology into teacher education and require both leadership and support from the administration of the teacher education institution. 'Lifelong learning' acknowledges that learning does not stop after school.

'Planning and Management of change' is a factors or theme born of today's context and accelerated by technology itself. It signifies the importance of careful plan-

ning and effective management of the change process.

These factors / themes may be understood as strategic combination of approaches that help teacher educators develop the four core competencies.

The ICT competencies are organized into four groups: 'Pedagogy' is focused on teacher's instructional practices and knowledge of the curriculum and requires that they develop applications within their disciplines that make effective use of ICTs to support and extend teaching and learning.

Finally, 'Technical Issues' is an aspect of lifelong learning theme through which teachers update skills with hardware and software, as new generations of technology emerge.

Various other competencies which are to be developed on the part of student teacher through ICT would be: -

1. Surfing the Internet and locating useful information from the internet for the development of lesson plans.
2. Developing lesson plans incorporating student use of technology in the learning process.
3. Evaluating and selecting appropriate software for a particular subject as per student need.
4. Generating printed documents like student assignments, newsletters, communication etc. utilizing a variety of applications software like word processing and desktop learning.
5. Managing student data; using data management tools for efficiently managing learning.
6. Developing assignments and project work for students; giving them broader and deeper knowledge in a field of study; developing critical thinking and infusing creativity among students.

#### **Objectives of using ict in techer education:**

The aim of teacher education is to develop skills and appropriate knowledge among teacher trainees for using and integrating the correct technology in an appropriate manner. Every teacher should know how to use technology, pedagogy and subject area content effectively in their daily classroom teaching. It is clear that merely introducing technology to the educational process is not enough. One must ensure technological integration since technology itself will not lead to change. Rather, it is the way in which teachers integrate technology that has the potential to bring change in the education process. Hence, attitude and self-efficiency towards technology play an important role. For teachers to become fluent in the usage of education technology means going beyond mere competence with the latest tools to developing an understanding of the complex web of relationships among users, tech-

nologies, practices and tools. Teacher must understand their role in technologically – oriented classroom. Thus, knowledge about technology is important in itself.

In techno-pedagogy there are three areas of knowledge, namely: -

Content, pedagogy and technology.

1. Content (C) is the subject matter that is to be taught.
2. Technology (T) encompasses modern technologies such as computer, Internet, digital video and common place technologies including overhead projectors, black boards and books.
3. Pedagogy (P) describes the collected practices, processes, strategies, procedures and methods teaching and learning. It also includes knowledge about the aims of instruction, assessment and student learning.

#### **Role/ importance of ict in teacher education:**

At present a new era has evolved in the education sector by means of ICTs.

Different ICTs are now set to become instrumental to help expand access to teacher education, strengthen the relevance of teacher education to the increasingly digital work place and raise teacher educational quality, helping make teaching and learning into an engaging, active process connected to real life.

ICT has a great role in the context of teacher education: -

1. It envisages excitement to the student teacher's eyes, ears and more importantly the head.
2. ICT fulfils the needs of student teachers by providing items and packages of higher standard and interest.
3. It helps in transforming the definition of literacy, learning and knowledge; a definition that increasingly includes multimedia digitized literacy.
4. Multimedia provides a kind of control over the learning environment to the pupil teachers and they experience learning from their failures and I practices.
5. ICT facilitates the student teachers to have control on lesson, pace sequence, content, feedback, which in turn enhances the efficiency of learning.
6. Unlike books, it is interactive in nature and creates motivation and interest among pupil teachers in turn meeting the individual unique needs effectively and efficiently.
7. Develops the ability of self learning and interacting individually.
8. ICT helps in implementing ICT driven distance education programmes where the teachers are given new opportunities for acquisition of a new knowledge.
9. Thus, ICT is a powerful new development with ambitious role in teacher education, Digital and Internet

based multimedia transforms the present trend in the filed.

#### **Limitations:**

The present approach for ICT integration is dismal as an “add on” approach because of following reasons:

1. ICT basics are taught to teacher trainers focusing on technical issues, but little emphasis is given to pedagogical aspects.
2. Educational technology courses are taught in a rather traditional way and show little evidence of using new technology to support instructional innovations.
3. Student teachers don't know how to use new technology in their classroom instruction when they go to schools.
4. Technology input is not integrated in the curriculum courses, especially method courses.

These are certain basic problems associated with the integration aspects of technology. These are major hurdles in the integration of ICT in teaching-learning process. Further the time spent for practical sessions is less, as more time is spent for theory sessions. The total approach of introducing ICT at pre-service level is not very serious.

In teacher training programs, the ICT education scenario is struggling with the following problems:

1. Only at the awareness development level are objectives being achieved, but higher order thinking skills regarding the use of ICT tend not to be occurring.
2. Technology, pedagogy and content area integration is a rare feature. All components are dealt separately which creates confusion for student teachers.
3. There is a serious discrepancy among syllabi of teacher training institutions and secondary schools. Syllabi of teacher training institutions are not on a par with school level curriculum.
4. Time duration of the courses related to ICT education is too short to develop knowledge and necessary skills among students to achieve higher order thinking skills.
5. There is a lack of availability of proper infrastructural facilities at most of the institutions.

#### **Suggestions: -**

The objective of implementing ICT at the pre-service level is to develop techno-pedagogues. Teachers should be in a position to integrate technology into teaching / learning as well as develop the art and skill of “webogogy” (i.e. to make use of Internet technology, exploring it, accessing information from it to use in teaching learning etc.). So, objectives must be set at the attainment of ap-

plication and skill levels rather than just at the knowledge and understanding levels. The professional development of teachers needs to be given importance. There must be congruence between the school curriculum and teacher training curriculum. Otherwise, teachers are not ready to utilize their knowledge to effectively design teaching/learning process, project work, and assignments. In addition to offering ICT as a compulsory and special course, integrated approaches need to be studied along with methods courses. This will help student teachers to develop the concept of 'techno pedagogy' to a greater extent.

### Conclusion

Teaching occupies an honorable position in the society. ICT helps the teacher to update the new knowledge, skills to use the new digital tools and resources. By using and acquire the knowledge of ICT, student teacher will become effective teachers. ICT is one of the major factors for producing the rapid changes in our society. It can change the nature of education and roles of students and teacher in teaching learning process. Teachers in India now started using technology in the class room. Laptops, LCD projector, Desktop, EDUCOM, Smart classes, Memory sticks are becoming the common media for teacher education institutions. So we should use information & communication Technology in Teacher Education in 21st Century as because now teachers only can create a bright future for students.

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