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## ICT AND INNOVATION IN TEACHER EDUCATION

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### ABSTRACT

Innovation in education does not simply imply change in teaching, in addition to it, there must be change in the structures of learning. In the current digital era of 21<sup>st</sup> century which is greatly marked by rapid knowledge diffusion in various fields, ICT is creating a new roadmap for its use in educational field as well. ICT has the potential to bring transformation in the way educational experiences are provided to learners. To bring innovation in teacher education and reap the benefit of ICT in learning, it is essential that pre-service and in-service teachers have basic ICT skills and competencies. This paper discusses the role of ICT in bringing innovation for quality teacher education and highlights different ICT based approaches and resources, challenges and suggestive measures for effective integration of ICT in Teacher Education.

### Key words:

ICT, innovation, Teacher Education

### Introduction

In the current digital era of 21<sup>st</sup> century, Information and Communication Technology is becoming pervasive in societies around the world. In business, agriculture, marketing, health, education, tourism, security, and in other aspects, everywhere we are using ICTs. Gradually the use and utilisation of technology as well as ICT is increasing in family, society, institutions, all over the world. In line with it, ICT is creating a new roadmap for its use in educational field as well. Teacher education institutions also need to develop strategies and plans to enhance the teaching-learning process within teacher education programmes and to assure that all future teachers are well prepared to use the new tools for learning. The paradigm shift in teaching-learning process from teacher-centric approach to learner and learning centric approach calls for adopting innovative practices. In education, the word 'innovation' is used to describe a deliberate attempt to improve educational practices. Innovation in education does not simply imply change in teaching, in addition to it, there must be change in the structures of learning.

**Need of Innovative Practices in Teacher Education** Entering into the 21st century today's school curriculum is becoming increasingly complex. Many new areas of knowledge are getting integrated into it. The methodology of curriculum transaction is also undergoing transformations. To meet these demands, a teacher must supplement or replace traditional methods of instruction with innovative educational experiences. 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.

### **Innovation in Teacher Education Programme through ICT**

ICTs provide an array of powerful tools that may help in transforming the present isolated, teacher-centred and text-bound classrooms into rich, student-focused, interactive knowledge environments. To accomplish this goal requires both a change in the traditional view of the learning process and an understanding of how the new digital technologies can create new learning environments in which students are engaged learners, able to take greater responsibility for their own learning and constructing their own knowledge. A shift from teacher-centred instruction to learner-centred instruction is needed to enable students to acquire the new 21st century knowledge and skills. ICTs provide powerful tools to support the shift to student-centred learning and the new roles of teachers and students. The student-teachers must be trained in the pedagogical use of ICT which, in turn, can support them to become confident and competent in bringing innovation and quality of teaching. The curriculum designed for pre-service teacher education need to be upgraded in line with the policy recommendations to give knowledge and develop competencies to use ICT based resources in the teaching learning process. The practice-teaching activity during the course must be so planned and executed by which student-teacher can develop their expertise in handling the ICT resources effectively and thereby improve students' learning.

The following aspects need to be considered in bringing innovation in teacher education through ICT.

**(a) Innovative Approaches of Practice Teaching**

Practice Teaching is a crucial component of Teacher Education Curriculum. Innovation has to be embedded in Micro-teaching/ Simulation as well as during internship. Various ICT based Resources can help to make the Practice Teaching more interactive and thus prepare the teachers to gain mastery over the skills of experience-centered teaching and many more innovative practices.

**(b) Improvement in the methods of teaching**

Innovative pedagogy like art-integrated, sports-integrated pedagogic techniques can be adopted in the methodology of teaching various subjects. Integration of ICT can make it more lively.

**(c) Innovative Approaches of Evaluation**

Many innovative evaluation practices including Peer Group evaluation and CCE can be done more efficiently through use of ICT.

ICT, if used carefully can make a big difference in the way teachers teach and students learn and can help students acquire 21st century life skills like digital literacy, innovative thinking, creativity and effective communication. It is also believed that content-related technology knowledge, which is referred to as technological pedagogical content knowledge (TPACK) (Mishra & Koehler 2006, see fig. 1), is the most important factor for the effective integration of technology in the subject teaching.

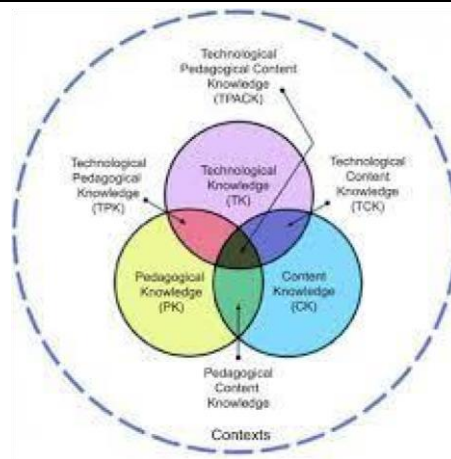


Fig.1 Technological pedagogical content knowledge (TPACK) Model

Pre-service and inservice teachers should possess knowledge and competencies required to use ICT based resources. Some of the subject-specific ICT based resources are discussed below.

### Subject specific ICT based Resources:

#### (a) ICT tools for teaching Geography

The use of ICTs in the teaching of geography helps enhance the excitement of geographical learning. Google Map, Google Earth, Motion pictures can give a live and vivid experience of geography related concepts. Interactive geospatial technology like Global Positioning System (GPS), Geographic Information System (GIS) and Remote sensing (aerial and satellite images) can also be used in teaching geography to students.

#### (b) ICT tools for teaching History

Power Point presentation depicting historical events, Google classroom, History in motion can be well used to take students back to the past to understand the events in an interesting manner. Timeglider is a web based timeline software that can be used in the teaching of history.

#### (c) ICT tools for teaching Mathematics

ICT is useful in developing higher order thinking skills and increase students' interest in mathematics. WolframAlpha, Mathematica, Geo Gebra, Mathematica player, mental math, talking math, CueThink are some of the ICT tools in teaching mathematics. Apps specially for Mathematics are My Math Flash Cards, Card Droid Math, Educreations, Sushi Monster, Everyday Mathematics Equivalent Fractions, Motion Math, etc.

#### (d) ICT tools for teaching Language

Language learning and teaching is considered to be a complex process. To make such a complexity easier, some advanced and ICT based resources include language lab, Overhead Projectors, iPods, listening/speaking -facilitative E-tools such as Podcasts and Vodcasts, etc.

#### (e) ICT tools for teaching Science

Virtual labs create enriching experiences for students by giving them the opportunity to behave and act like real scientists in real lab. Some other ICT based resources for teaching science include computer simulations, smartboards, Animations and hands on practical activity, etc. Apps specially for science are Happy Little Farmer, Brain POP, Smithsonian's National Zoo, Nearpod, NASA App, Frog Dissection, etc.

**(f) E- assessment Tools and resources -**

Online assessment typically include tests, quizzes and questionnaires that teachers can administer to students. Some of the ICT based assessment tools include ClassMarker, Hot Potatoes, Rubistar, E-portfolios, Exam Time, Flubaroo, Moodle, Socrative, TestMoz, etc. These tools can be well utilized in creating quizzes, questionnaires and test banks and these assessment techniques have the feature of automatic marking and grading system that saves a huge portion of time and energy devoted by teachers.

**Challenges for integrating ICT based resources in teacher education:**

Integration of ICT based resources in teacher education is a challenging affair as most of the teacher education institutions lack basic digital infrastructure facilities. The curriculum of teacher education courses is not upgraded in line with technological advancement and requirements. There is less scope for the student teachers to use new technology to support instructional innovations. In many cases the in-service teachers do not show a positive attitude towards the use of ICT based teaching and learning resources. Moreover, the capacity building of teachers is a major challenge to integrate ICT in their regular teaching-learning practices.

**Suggestions for effective use of ICT in teacher education:**

ICTs can empower teachers and learners, making significant contributions to learning and achievement. The main purpose of ICT implementation in education is to provide the prospect and trends of integrating ICT into the general educational activities.

Some of the suggestions for successful implementation of ICT in teacher education are as follows:

- Teacher education institutions should have the provision for computer labs along with internet connections that can guide the student- teachers.
- Proper workshops should be arranged time to time in the teacher education institutions.
- Teacher educators should be well equipped with all the digital equipments and to enhance in using ICTs skills among teacher-trainees.
- Government must provide proper resource and funding in developing software and hardware facilities in the teacher education institutions.
- Professional training in ICT usage should be organized for teacher educators to keep the latest technological up to date.
- Course content for ICT should be re-structured as per NEP 2020 guidelines for technology integration and it should be action-oriented.
- Teaching with technology integrated lesson plans should be made compulsory.
- In teacher education institutions proper ICT equipment's should be provided in all the classrooms such as computers, LCT projector, internet access, television, e-white boards, etc. for effective use of technology.

• Different e-platforms available should be strengthened and utilized, few programmes on SWAYAM or on such advanced platform/s can be compulsory for the student teachers as well as for the faculties, and the blended mode should be encouraged for the Teacher Education Programmes as well as for the Faculty Development Programmes.

## Conclusion

Teacher education plays a vital role in developing quality education. Teachers need to be trained to facilitate the learning process and make the process real, challenging and productive. ICT provides meaningful, absorbing media that makes teaching-learning more productive. Teacher Education institutes must create an environment for teachers to enable them to create an appropriate learning experiences for teachers to enable them to create an appropriate learning experience for students in the new era of learning. Moreover, prospective teachers need to explore and exploit the potential of ICT connected learning and put their insight in bringing innovation and creativity in their teaching.

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