



# INTEGRATION OF ICT IN TEACHER EDUCATION

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## Abstract

Quality of education is directly proportional to a country's level of development and economic success. From the revered Gurukul system of the Vedic era to modern times, education in India has seen continuous evolution and growth. For as long as anybody can remember, Indian thinkers have stressed the need of helping each person reach his or her full potential. Beyond the four walls of a traditional school, the proliferation of modern communication and information technologies has opened up vast new vistas for human progress. In addition to enabling economic growth and higher productivity, information technology has given people the tools they need to become involved in many facets of society. It is critical that aspiring educators have extensive training and experience with ICT as technology is playing an increasingly important role in educational reform. The research highlights the significance of teachers' knowledge of techno-pedagogical topics and the incorporation of information and communication technology into the education of future educators and instructors.

**Keywords:** Technology, Integration, ICT, Techno- pedagogic- content and Pre-service teachers.

## Introduction

The world is seeing tremendous changes in many areas in this rapidly evolving 21st century, including education, science, technology, economics, social dynamics, and industry. National educational systems have clearly been impacted by global education, which has transformed them significantly. A paradigm change from one that prioritizes teachers to one that prioritizes students is taking place in the field of education, which is itself a never-ending journey. The educational system in our nation is facing new challenges and expectations as a result of these shifting paradigms. It is well acknowledged that the success of any country depends on the caliber and techniques of its educational system, much as the revered Gurukul education system of ancient India during the Vedic period.

From the dawn of civilization until the declaration of independence, the history of education in India is a fascinating tapestry of change and progress. Respected Indian thinkers have emphasized the need of encouraging people to develop their full potential by highlighting their distinctive strengths. Advancements in technology, better communication, expanding our understanding of the world, and applying scientific principles to every aspect of life are all urgently needed in this decade. On top of that, societal goals are

paramount, thus it's critical that our youth have the right frame of mind. When it comes to how a kid learns, there is no one more influential than their instructors. Engaging in continual professional development is crucial for them to remain up-to-date with current trends and keep a practical and realistic perspective. Equally important to teaching for and through life is the practice of embracing learning as a lifetime occupation. Helping educators acquire the knowledge and skills they need to carry out their jobs effectively and meaningfully is a top priority. Teachers nowadays must integrate ICTs (information and communication technology) into their lessons or risk falling behind the curve. Yet, one must not overlook the difficulties that come with integrating technology into the educational process.

This goes beyond just finding new materials and adding them to old school curricula. Instead, it comprises pushing students to actively use ICT tools to recreate their own learning. In comparison to the pupils in the earlier cases, this distinguishes them. Also, pre-service teacher preparation programs must include instruction in ICT since future teachers need to know how to navigate the ever-changing electronic world. Teachers can help students in the future by using these talents to create a more progressive educational system. The field of education is undergoing a dramatic shift right now, thanks to the revolution that information and communication technologies have brought about. This state-of-the-art curriculum gives students and teachers state-of-the-art tools to enhance the learning process while putting a premium on real-world problems. As a result, people are given a lot of opportunities and great resources, creating a unique educational environment, thanks to this dynamic transformation.

Educators and students may work together more effectively with the help of ICT, which in turn encourages a wider use of technology to make learning more engaging. Educators in the area of teacher preparation must possess an in-depth understanding of ICT and its applications in the classroom if they are to assist aspiring teachers in their pursuit of knowledge. Nowadays, it's more important than ever to learn how to utilize and understand information and communication technologies.

### **ICT in pre-service teacher education**

There is no doubt that many teachers nowadays are struggling to find the right ways to integrate technology into their lessons and pedagogy. There is a severe lack of opportunities for teachers to participate in professional development that would increase their proficiency with technology, and much less utilization of ICT in the classroom. So, it's critical to provide teachers with the know-how to use ICTs as a driver of long-term improvement in education.

To transform the preparation of future teachers by integrating modern and global viewpoints, it is essential that all parties involved in education, from preschool to university, work together with teacher preparation programs. Participation in educational technology activities by teachers who are just beginning is very beneficial, according to some study; nevertheless, evidence on technology-driven approaches to instruction is lacking. Teachers can improve their skills in instructional media and technology, become more excited about using these tools in their lessons, and increase the number of teachers who use technology for personal learning, teamwork, and research. They can also join communities that focus on evaluating how teachers use technology in the classroom. Even while younger educators may have an inherent comfort with technology, they must acquire practical experience to properly use their theoretical understanding in the classroom.

The fact is that most educators clearly have not had enough training to effectively incorporate technology into their lessons. The most important thing is to provide teachers real-world experience with technology so they can be prepared to teach with it. Providing opportunities for technology-supported learning that promote and allow the use of technology to improve learning, assessment, and instructional approaches is a requirement of all educational institutions that prepare teachers. Incorporating recent developments in the fields of learning science and technology into the pedagogical practices of teacher educators is crucial to accomplishing this goal. Ongoing professional development for teachers follows the same guidelines as teacher preparation. Such

growth should encourage and facilitate teachers' maturation into highly competent users of cutting-edge technology, creative and resourceful thinkers who can adapt to changing circumstances, and socially conscious professionals. To be a good educator in the modern day, one must be able to think outside of the box, solve complex problems creatively, adapt to different learning styles, analyze data, use research, and continuously improve their craft. Teachers who can do more than just impart information or enforce rules in the classroom are the pinnacle of educational achievement; hence it is critical that they have in-depth understanding, superior abilities, and extraordinary aptitudes.

The modern educator's job description now includes more of a facilitation function, helping students find, understand, and use resources to further their own learning and understanding. Collaborative efforts including friends, pupils, and distant specialists have transformed what was formerly a lonely career. Training programs that want to succeed in the teaching profession can help their students become better team players by giving them opportunity to practice using technology in the classroom, giving them feedback from their peers, and pairing them with mentors. Every educator, for their own benefit and that of their students, has to learn how to make good use of technology. Proficiency in the use of computers for research, collaboration, lesson preparation, and administrative activities is essential for educators. Despite the paucity of literature and research on the subject, student teaching may help new educators understand the power of technology in the classroom. The Information and Communication Technologies (ICT) Competencies Standards for Teachers (CST) were recently created by UNESCO in response to the growing recognition of the need to provide teachers with the knowledge and abilities to effectively integrate ICT into their classroom instruction. Teachers should empower their kids by embracing technology, and this initiative recognizes that need. Teachers need to be able to teach subject matter material successfully while incorporating technological ideas and abilities. This is true whether the classroom is virtual or in a physical location. If educators want to be prepared to meet the challenges of the next century as educators, they should follow the three steps laid forth by the UNESCO ICT-CST project.

- The illuminating approach to knowledge deepening.
- The refined and captivating approach to technology literacy.
- The revolutionary method for generating new knowledge.

## Significance of ICT in Teacher Education

We must prioritize the incorporation of ICT in teacher education. Keeping teachers in their traditional leadership roles is critical, but so is incorporating technology into the classroom. Educators may improve student engagement and information retention by skillfully combining conventional teaching techniques with ICT. It would be a mistake to ignore the many positive effects of ICT on teacher preparation programs. There is no denying the pervasiveness of ICT (information and communication technology) in modern life. Computers, plasma TVs, and cell phones are all around us even while we're at home, in our own rooms. We are currently living in a technologically-driven world, which is a direct result of the profound impact and transformation brought about by these technological breakthroughs. It doesn't matter where we stand on the topic; everyone can agree that ICT is crucial to our daily lives both today and in the future. The value of information and communication technologies in preservice teachers' preparation programs is immense. Here are a few important points:

- Online learning, or e-learning, provides a great opportunity to increase engagement and promote knowledge retention in the area of teacher education via the use of information and communication technologies.
- We can encourage a strong desire to learn and a love of teaching within teacher preparation programs by incorporating ICT into the classroom.
- Moreover, incorporating ICT into the national curriculum for teacher education is a must, as it leads to a better education overall.

### **Techno- pedagogic- content knowledge in teaching learning.**

Through the integration of a thorough comprehension of technology, the Techno-pedagogic content knowledge (TPACK) framework takes Shulman's initial idea of PCK to new heights. It posits that a strong basis for the smooth incorporation of technology into the curriculum may be created by simultaneously addressing subject knowledge, pedagogical knowledge, but also technical knowledge. Recognizing and using the interdependent nature of technical, pedagogical, and content knowledge is central to TPACK, with the ultimate goal of fostering an atmosphere that is ideal for significant and profitable learning. TPACK, or technological pedagogical content knowledge, is an advanced paradigm for analyzing and articulating the deep knowledge needed by educators to successfully support learning in a technology-driven classroom. TPACK stands for having strong technical skills, excellent teaching abilities, and extensive knowledge in a certain subject area. Technology has become an essential component of Shulman's educational content knowledge (PCK) as a result of the excellent work done by Mishra and Koehler. According to Shulman, educators can't do their jobs well until they fully grasp the interconnected nature of educational theory and practice and can use that knowledge to guide their students toward conceptual mastery.

### **Components of TPACK**

#### **· Technological Knowledge, or TK**

Technical knowledge (TK) includes not only an in-depth understanding of computer hardware and software, but also competence with presenting tools like document presenters and projects. A thorough familiarity with and skill in making good use of the many technological tools used in educational contexts is also required. A person with TK has an in depth understanding of IT and can use it effectively in their everyday life and at business. Recognizing the importance of information technology (IT) in accomplishing goals and adjusting to the dynamic nature of IT are other essential components. Information technology (IT) is crucial to many aspects of contemporary digital education, including but not limited to investigation, interactions, viewing of media, and creation.

#### **· Content Knowledge (CK)**

Teachers' extensive familiarity with the material they are teaching is known as "Content Knowledge" (CK). Within its bounds is a veritable treasure trove of scientific knowledge, including not only facts and jargon but also theoretical frameworks, principles, hypothetical constructions, novel ideas, and methods for acquiring this knowledge. Put together, CK represents the educator's level of expertise in the subject.

#### **· Pedagogical Knowledge (PK)**

The ability to expertly guide and direct pupils toward the desired outcomes in the learning process is known as knowledge of pedagogy (PK) among educators. It includes an in-depth familiarity with the many methods and procedures that make up education. Accurately measuring learning progress, understanding how students absorb information, controlling classroom dynamics, creating an engaging learning environment, carefully designing courses, and making creative use of learning aids are all part of this

expertise. Simply said, PK exemplifies the skill of carefully arranging, planning, and carrying out the teaching-learning process to guarantee the best possible outcomes.

#### · **Technological Content Knowledge (TCK)**

One who has extensive understanding of the intricate relationship between content and technology is said to possess Technological Content Knowledge (TCK). To do this, one must be cognizant of the mutually beneficial connection between content and technology. As important as it is for teachers to have a deep understanding of their subjects, they must also be adept at strategically using technology to enhance their lessons. As an added precaution, teachers should be familiar with the cutting-edge tools available on global marketplaces so that students' knowledge may flow freely. Some examples of educational software include e brary, virtual laboratories, virtual field trips, virtual computers, and dynamic periodic tables, Celestia, Rasmol, PhET, and Kalzium.

#### · **Technological Pedagogical Knowledge (TPK)**

A new era in knowledge transmission and acquisition is dawning with the integration of technological pedagogical knowledge with current pedagogical methods. As a result, students will have access to more interesting and relevant lessons and teachers will be better equipped to use technology to its full potential in the classroom. For example, Google Docs and Google Hangouts make it easy for people to work together on writing projects, independent of their physical location, doing away with the necessity for in-person meetings altogether. The incorporation of technology understanding into instructional practices is also a contributing factor to the growth of online learning. Learning Management Systems (LMS), MOOCs, and platforms such as Moodle are prominent examples. Technological education is a notion that highlights the positive relationship between technology and educational activities. It requires knowing how tech in education has the potential to change the game for classroom instruction. Teachers may improve their teaching techniques by using technology tools, thanks to this expertise. Improved efficiency and effectiveness in the classroom are possible outcomes of instructors using TPK to identify which technological tools will best support their pedagogical aims.

#### · **Technological Pedagogical Content Knowledge (TPACK)**

The phrase "technological pedagogical material knowledge" (TPACK) encompasses a wide range of expertise, including not just technical know-how but also topic knowledge, pedagogical understanding, and more. Learning is guaranteed to be both gratifying and stimulating when technology is skillfully adjusted to meet pedagogical needs. This allows for the successful transmission of specialized information inside specific educational contexts.

### **Need of ICT in Teacher Education:-**

- Pre-service and in-service teachers' training in the modern day is greatly enhanced by information and communication technology (ICT).
- Educators may connect with students and help them prepare for creating digital instructional materials with the use of ICT, creating a more engaging and high-quality learning environment.
- IT allows for the most efficient use of available software and hardware resources, which in turn improves the quality of instruction.
- Thanks to the incorporation of important digital resources like animated films, H5P modules, and YouTube's large library of information, ICT boosts the effectiveness of the educational atmosphere.
- When it comes to being ready to teach, information and communication technology (ICT) is a great help for educators. There is a wide variety of approaches used to integrate ICT into pre-service teacher education. Word processors, database managers, spreadsheet programs, and cutting-edge platforms

like Google Classroom and Kahoot are all part of the toolbox. Educators are equipped to excel in their practical teaching attempts via the use of diverse technology tools.

- With the help of ICT, teachers are no longer limited to the old methods of instruction and may instead use more modern pedagogical approaches.
- By removing barriers to communication, ICT helps students and instructors work together more effectively.

## Conclusion

Finally, society regards teaching as a highly esteemed profession. Teachers may improve their own knowledge and competence in the use of digital technologies in the classroom via the incorporation of ICT into education. In the end, student teachers become competent educators via acquiring and applying knowledge of ICT. Our education system is rapidly evolving, and it is crucial to acknowledge that information and communication technology is a key driver of this change. It has had far-reaching consequences for the way schools operate and for the responsibilities of both students and educators. Many Indian teachers have been fast to embrace modern technology in the classroom since the pandemic because they know it would help their kids succeed academically. In today's schools, technology such as laptops, TVs, desktops,

EDUCOM, smart classrooms, and memory sticks are ubiquitous. Hence, we must recognize the indispensable role of ICT in determining the trajectory of education going forward. These days, it's more important than ever to include ICT (information and communication technology) into classes for future educators. For the simple reason that educators are in a prime position to pave the way to a brighter future for their charges. The critical role of instructors in enabling effective learning via the use of ICTs must therefore be acknowledged. The quality of education in India may be improved if teachers are given the tools they need to do their jobs well.

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