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INFORMATION AND COMMUNICATION TECHNOLOGY FOR TEACHER EDUCATION IN INDIA

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Abstract: Information and communications technologies (ICTs) plays a significant role in the teaching learning process. ICT-enabled learning facilitates active, collaborative, creative and integrative learning environment. Integration of ICT devices in the teacher education helps both teachers and students for exploring themselves. All levels of teacher education have undergone a revolution thanks to the new technologies and their seamless integration with curricula and classroom procedures. Teachers can now be more creative, adaptable, and willing to rethink how they approach teaching and learning thanks to recent advancements in ICT. In the past ten years, there has been a revolution in the ways that teachers can integrate ICT tools for professional development, in-service training, and teacher education. In India, new educational technologies have prompted educators to take on new roles and adopt innovative pedagogies and methods.

The National Education Policy (NEP) 2020 emphasizes the interdependence of technology and education, promoting digital platforms for virtual teacher preparation. It calls for funding for digital infrastructure, online teaching platforms, teacher training, and online assessments. ICT integration in pre-service teacher training programs is crucial for future teachers. Teacher Education Institutes must create a conducive environment for educators to design relevant learning experiences.

Keywords- ICT, National Education Policy, Teacher Education.

Introduction

Teachers help education realize its transformative potential for both the development of individual communities and the nation as a whole. They are the central component of the classroom's information-transmission process. A high-quality education for everyone depends critically on the caliber of instruction, educators, and teacher preparation. The fourth Sustainable Development Goal (SDG) highlights educators as the primary force behind achieving the Education 2030 agenda's "Providing Equitable Quality Education for All" goal.. Teachers' motivation, knowledge, and experience, their level of confidence, their access to ICT resources and training, and their technical and pedagogical support all have an impact on how well Information and Communication Technology (ICT) integration works (Cabanatan, 2002). Thus, teachers are important agents in achieving SDG 4 targets because of their knowledge, attitudes, beliefs, and practices. India's National Education Policy (NEP) 2020, which was just released, has by properly putting teachers at the centre of the educational system, further supported this idea. Over the past ten years, there has been a revolution in the ways that teachers can integrate ICT tools for professional development, in-service training, and teaching. More "learner-centric" learning environments can be created by teachers thanks to recent ICT advancements. It has made it possible for educators to be creative, adaptable, and open to changing the way they think about teaching and learning.

To supplement the current body of knowledge and instructional strategies, the Indian education sector has been adjusting to the newest ICT tools. Teachers are adopting new roles and embracing new pedagogies and approaches thanks to the new technologies. Innovations in ICT have made it easier for teachers to engage with students, enhance their instruction, offer feedback, and increase the classroom's overall efficacy. The relationship between technology and education is immensely important, according to the NEP, 2020. According to the policy, "extensive use of technology in teaching and learning, removing language barriers, increasing access as well as education planning and management" will be among the guiding principles of the educational system.

It highlights how ICT can be used as a useful tool to support teacher education and promotes using digital platforms for online teacher and training. The policy asks for funding for digital infrastructure, the creation of digital repositories and virtual labs, the development of online teaching platforms and tools, the training of teachers to become proficient online content creators, the design and implementation of online assessments, and the establishment of standards for pedagogy, content, and technology for online teaching and learning. The policy also acknowledges the following four critical elements of ICT integration in education: 1) establishment of ICT infrastructure in schools and other institutions for teacher education and education administration; 2) professional development of teachers and teacher education and establishment of professional learning communities; 3) creation of Open Educational Resources (OER) curricular resources for students and teachers;

and 4) construction of state-level infrastructure to support ICT integration, such as platforms for e-learning courses and OER repositories.

Pre-service teacher and in-service education programmes for primary/elementary and secondary/senior secondary school teachers are part of the Indian education landscape for professional development. Many digital platforms have been introduced as part of national initiatives like "Digital India" and the "National Mission on Education through Information and Communication Technology (NMEICT)" to harness the power of ICT to make the highest quality content accessible. Teachers have been assisted by digital platforms such as DIKSHA, NISHTHA, SWAYAM, and online MOOC courses to improve their knowledge and abilities. It has also been demonstrated that ICT-focused modules and courses are essential for pre-service teacher training programmes. With their flagship initiatives like "Project Shiksha" and "Dell Aarambh" for teacher training, private tech giants like Microsoft and Dell are significantly influencing the entire digital movement. ICT has aided not only in the evolution of training but also in the administrative procedures used by the nation's numerous teacher education institutions.

ICT Competency Framework for Teachers

"Rethinking the role of teachers in preparing and implementing ICT to improve and transform learning is necessary for the successful integration of ICT into teaching and learning. Education systems must regularly update and reform teacher preparation and professional development in order to ensure that all teachers can use technology for education, according to UNESCO. One way to promote excellent teaching and learning is through the integration of ICTs and the implications this has for teacher education programmes. There is a compelling case to be made for changing current practices in both pedagogy and content in order to effectively teach with technology.

In order to fully utilize the learning potential of new technologies in general and digital technology in particular, an efficient teaching-learning process is imperative in the modern world. This means that in order to support innovative ways of integrating technology, pedagogy, and content, educational communities must consider their context and go beyond the concept of technology literacy. The national and institutional goals will be supported by a well-researched roadmap encompassing different facets of the education domain. This article discusses a few of the top frameworks used as models in this aspirational direction.

UNESCO's ICT Competency Framework

ICT integration done well in the classroom and in schools can revolutionise pedagogy and give students more power. In light of this, it is imperative that educators possess the skills necessary to incorporate ICT into their professional practices in order to guarantee learning equity and quality. In order for teachers to guarantee that their students acquire the necessary skills, including digital competencies for life and work, they must be able to acquire the ICT competencies through teacher training programmes and continuous professional support.3.

The ICT Competency Framework for Teachers was created by UNESCO to serve as a guide for pre- and in-service teacher training regarding the integration of ICTs into the educational process. The framework offers an up-to-date road map for policy development and capacity building, and it is meant to be customized to support institutional and national goals. Teacher-training personnel, educational experts, policy-makers, teacher support personnel, and other providers of professional development are the people it is intended for. In addition to incorporating inclusive principles of non-discrimination, open and equitable information accessibility, and gender equality in the delivery of education supported by technology, the framework addresses recent technological and pedagogical developments in the field of ICT and Education. Teachers should strive for 18 ICT competencies, which are further divided into 64 specific objectives by the ICT CFT framework. The competencies cover a wide range of topics, including motivating educators, comprehending national priorities as stated in national ICT in Education policies, and how ICT can assist with curriculum development, assessment techniques, pedagogy, administration, and school and classroom organization.

The idea that teacher development is a process of lifelong learning is supported by the ICT CFT. It offers standards for evaluating teachers' ICT proficiency at the national level or conducting analyses of training programmes. The framework is meant to help UNESCO member states create national ICT competency standards for teachers, as well as to educate educational experts, legislators, teacher support personnel, and providers of professional learning about the role of ICT in educational reform. It promotes a method of teacher preparation that makes use of these important domains to clearly illustrate the pedagogical advantages of ICT. When developing or improving course development strategies, the framework offers a great point of reference. Notably, the framework offers a strong educational context for the development of ICT skills and competencies to integrate ICT into teaching and learning, rather than outlining an ICT application approach.

TPACK Framework

Teaching with technology effectively requires a certain kind of knowledge, which is outlined in the Technological Pedagogical Content Knowledge (TPACK) framework for teachers. The TPACK framework delineates a cohesive structure that acknowledges this intricacy while simultaneously offering direction for suitable technology integration (Koehler & Mishra, 2008; Mishra & Koehler, 2006). The three broad knowledge bases of technology, pedagogy, and content, as well as the relationships between and among these knowledge bases, define what teachers need to know according to the TPACK framework.

The knowledge that educators need to teach using technology is outlined in the TPACK framework, along with the intricate relationships between these various bodies of knowledge. A flexible framework that describes how quickly evolving technologies can be successfully integrated with a variety of pedagogical approaches and subject areas is necessary when teaching with technology. Therefore, adding a new piece of technology to an already-existing structure is not going to suffice to achieve good technology-based teaching. Effective technology-based instruction necessitates a change in the pedagogical and content domains as they stand.

Additionally emphasised in the TPACK framework is the function of context in teaching and learning. "Generic solutions to the problem of teaching" result from disregarding context (Mishra & Koehler, 2006, p. 1032). Since teaching is a context-bound activity, educators who have mastered TPACK use technology to create learning experiences that are suited to particular pedagogies, specific content, and particular learning contexts. Each element of the TPACK framework is covered in the sections that follow, along with a discussion of how they interact with one another. The intricacy of instruction is demonstrated by the TPACK framework. In addition, the TPACK framework serves as a theoretical and conceptual lens through which researchers and educators can assess how prepared pre-service and in-service teachers are to use technology in the classroom. Researchers have created both quantitative and qualitative instruments to measure TPACK for this reason (Koehler, Shin & Mishra, 2011; Schmidt, et al., 2009).

National Curriculum Framework for Teachers' Education under NEP 2020

The New Education Policy 2020 (NEP) has placed a strong emphasis on the part technology plays in producing teachers who are prepared for their jobs. It guarantees that instructional software will be accessible to educators and learners alike. To address the digital divide with the population whose digital access is severely limited, teaching-learning e-content will continue to be developed by all States in all regional languages, as well as by the NCERT, CIET, and CBSE. ICT tools like television, radio, and community radio will be extensively used for telecast and broadcast. There will be a particular emphasis on content in all Indian languages, and digital content will, to the greatest extent feasible, be made available to teachers and students in the medium of instruction. It also guarantees an ongoing dedication to significant innovation and research. India has been working to establish a strong foundation for the appropriate incorporation of ICT into Indian teaching methods. A new, comprehensive National Curriculum Framework for Teacher Education, or NCFTE 2021, was proposed by the NEP 2020 for use in pre-service and in-service teacher education for educators in the academic, vocational, and special education streams. After that, the NCFTE will be updated once every five to ten years to account for changes made to the NCFs and new demands in teacher preparation.

ICT for Teacher Education

Teacher training is a means of providing teachers with the necessary skills and knowledge to adequately fulfill their teaching duties and to develop professionally. It is an essential exercise that improves learning and teaching skills. Inadequate teacher preparation programs result in most teachers being unable to demonstrate adequate knowledge and understanding of the structure, function and development of their disciplines. Introduction to ICT was an encouraging step towards taking on new teaching responsibilities that include new pedagogies and approaches to teacher training. In India, teacher training is divided into two major streams: initial training, which focuses on preparing students for a career as a teacher, and in-service teacher training, which is offered by the government through Sarv Shiksha Abhiyan (SSA) or

NGOs and social enterprises. The National Council for Teacher Education (NCTE) is the advisory body of the teacher education system and is responsible for regulating and planning the development of teacher education in the country. The District Institutes of Education and Training (DIET) are responsible for training preschool and primary school teachers.

There are three aspects to effective models of ongoing professional development: Pre-service education emphasizes subject mastery, pedagogy, management techniques, and the use of a variety of teaching tools. In-service education builds on pre-service training and is directly related to teacher needs. Lastly, there is ongoing formal and informal pedagogical and technical support, made possible by ICTs, for teachers, with an emphasis on everyday needs and challenges. The cornerstone of the effective implementation of ICT integration is sustained investments in teacher education and coordinated efforts between pre- and in-service teacher training.

ICT has greatly contributed to the evolution of the entire process of the development, editing, and dissemination of the curriculum. The availability of a wide range of digital technologies has made it easier to develop digital materials in the forms of text, images, animation, audio, etc formats for videos. Teachers need to be better prepared to be able to adjust to new situations and take on new tasks because the world is constantly throwing new, complicated obstacles at them. One such issue is the epidemic that the globe is currently experiencing as a result of the Covid-19 virus. To produce a new generation of educators who can use a range of technologies and tools in all facets of academic, administrative, research, and extension work, the role of teacher education institutions becomes even more crucial.

A range of newly initiated professional development programs using ICT has begun to emerge in recent years, offering the following: -

1) A greater variety, and hence a greater chance of relevance and potential to meet diverse interests and needs

2) High quality of expertise directly accessible to teachers

3) Flexible to select programs and take them at one's own pace

4) Online mentoring, reflection, interaction with peers and experts, either in professional learning communities or in courses

Teacher education institutions are now increasingly focused on giving instructors a strong foundational grasp of the many media, including their affordances and restrictions. Teachers that actively use technology to teach and learn across disciplines develop these kinds of understandings. Teachers should learn how to use technology for knowledge construction, organisation, and communication rather than about technology itself (Barron & Goldman, 1994).

ICT for Pre-Service Teacher Training

The group of teachers engaged in teacher preparation programmes is known as pre-service teachers. A DIET or B.Ed. (Bachelors of Education) programme. It's critical for teacher development programmes to balance the foundational knowledge of computers with pedagogical understanding. The pedagogical use of ICT by student teachers has to be trained. The current training programmes have a strong emphasis on helping teachers produce digital resources by encouraging them to use a wide range of free and open source digital resources, as well as on understanding the nature of ICT and employing subject-related software tools and web resources. For teachers to achieve ICT integration in the classroom, they need to be proficient in both pedagogical applications of new information technologies and hardware and software components. Both the components are crucial for the correct use of ICT in classroom teaching.

Hardware and Software Component: This component's main goal is to familiarise student teachers with various software components and hardware devices. The objective is to assist them in comprehending the ways in which various ICT tools—such as digital platforms, tablets, smart phones, and desktop and laptop computers—may be applied to the teaching and learning process. They receive instruction on how to utilize ICT in the classroom as well as how to choose the right ICT gear. The intention is to introduce a broad range of ICT hardware resources to the teachers.

Pedagogical Application -This strategy focuses on preparing teachers for the effective integration of ICT pedagogy. Technology for knowledge construction, organisation, and communication is taught. Gaining a deeper comprehension of diverse media, their contextual usage, and their limitations is the aim.

Therefore, ICT integration in pre-service teacher training programmes is essential to preparing future educators for the classroom and enabling them to manage change and influence it for higher teaching standards. ICT innovation has proven beneficial to the administrative process as well as the training curriculum and modules that are always changing.

ICT for In-Service Teacher Training

To guarantee that their students acquire the necessary skills, including digital competencies for life and work, teachers must receive the training and continuous support they need to build the requisite ICT competencies. Rather than being a one-time event, professional development for teachers should be viewed as a lifelong learning process. To guarantee that their students acquire the necessary skills, including digital competencies for life and work, teachers must receive the training and continuous support they need to build the requisite ICT competencies. Rather than being a one-time event, professional development for teachers should be viewed as a lifelong learning process. The National Curriculum Framework for Pre-Service and In-Service Teacher Education Programmes; and the National Curriculum Framework for School Education. The National

Mission of Education Information and Communication Technology (NMEICT) has also been introduced in India. ICT can be creatively drawn for pre-service and in-service teachers' professional development and academic support. This is highlighted by the National Curriculum Framework for Teacher Education, which also emphasises the need for teachers to be oriented and sensitized to the difference between developmentally appropriate, critically useful, and detrimental use of ICT.

Conclusion

The Information and Communication Technology (ICT) has significant impact on teaching practices in India. With the help of ICT, teacher became able to deliver teaching more effectively. It make the teaching learning process more interesting and effective. Teacher can provide individualized instruction by using ICT devices in the classroom settings. It helps in providing diversified learning experience to both teachers and learners.

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