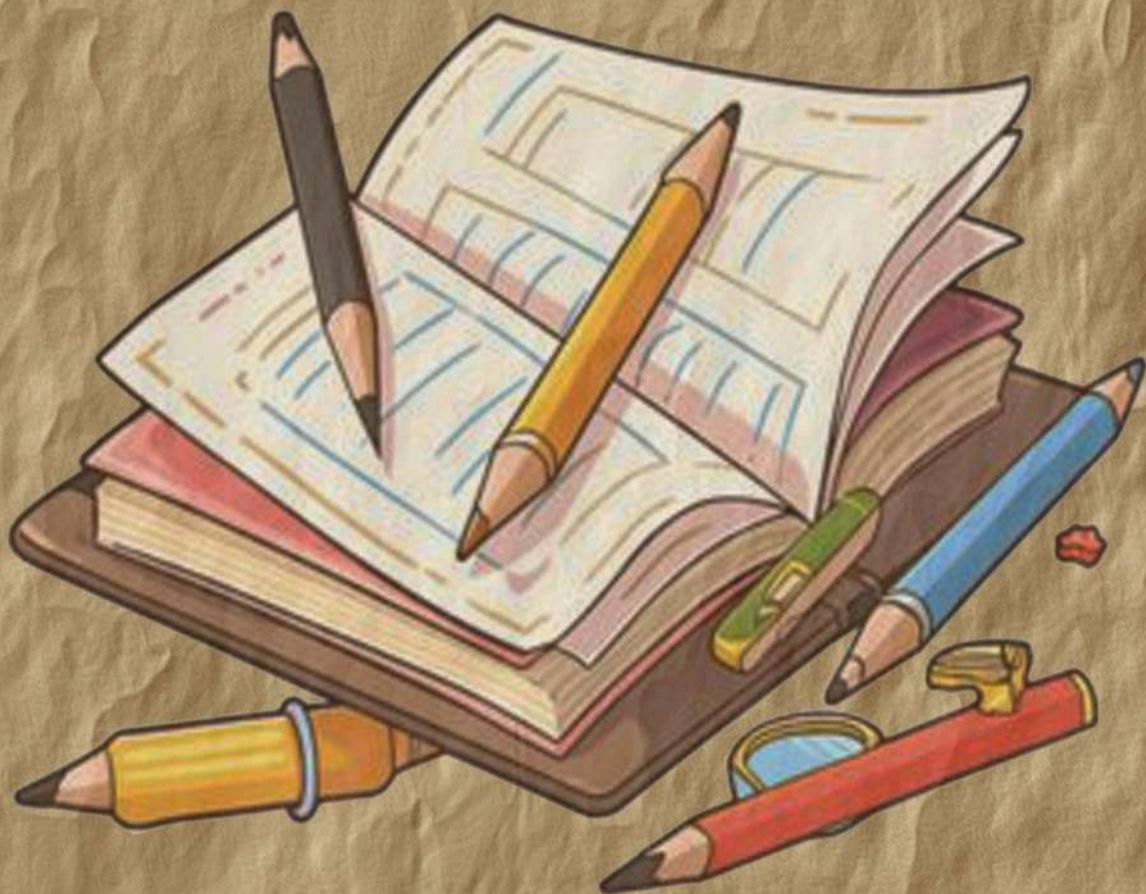


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PREFACE

Indian education system catering over 300 million students of various categories is expanding continuously to bring considerable transformation. It is expected to be more accessible, inclusive and aligned for catering needs of the fast changing global society. The emerging digital technology is immensely influencing school and higher education system leading to significant changes in coming days. Digital learning with interactive apps and online resources will be more used by students. The National Education Policy, 2020 will not only promote innovative teaching and learning processes but also emphasize inclusion of Indian Knowledge System (IKS) into curriculums at all levels of education, which purports to promote indigenous Indian systems of knowledge. Blended learning with integration of online learning and traditional class room teaching offering flexible and personalized experience will be in focus and used widely. There will be shift in curriculum directing towards environmental awareness, entrepreneurship, project based experiential learning etc. to prepare the students for upcoming job market. Schools and parents will more focus to promote creativity, critical thinking, empathy, physical, emotional and social skills.

The Higher Education will emphasize on multidisciplinary approach with multiple entry and exit points. It will be more flexible and accessible with promoting online and distance education programmes to cater needs of diverse group of students and working professionals. Industry- Academia collaborations between universities and industries will be encouraged to address needs of job market with emphasis on internship programs, hand on training/ workshops, guest lectures by industry professionals etc. Vocational education will emphasize on re-skilling, up-skilling & life long learning to meet needs of job markets.

Education is a dynamic process with the teacher being the central focus. It provides new shape to the individual and consequently the nation. It has potential to play a significant role to bring about social change, economic growth and political development in any society. Teacher and Teacher Education needs to be oriented to achieve sustainable development goals (SDG). Individual excellence and life long learning matter a lot for success in Teacher Education. The teachers have to be updated with disciplinary knowledge and emerging digital technology regularly as their students used to access it. So, the performance can very well surpass degrees. A teacher has to compete with global teaching community to remain relevant in the current technology dominated environment. There is need that students at all levels should be taught by well qualified, passionate, motivated, professionally trained and well equipped teachers to promote creativity. The present volume of the Journal *Educatum* tried to address various issues pertaining to Teacher Education to enhance the knowledge in the discipline of education.

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IMPACT OF ICT ON INNOVATION IN TEACHER EDUCATION: A REVIEW

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Abstract

Teacher education is a discipline which educate the progressive generation on what has gone by where we are, where we want to go and what we like to creole. observing, healthy, meaningful and long life. It is one of the significant areas where a lot of innovative ideas can he tried out and practiced. It is a program that is related to the development to teacher proficiency and competence that would enable and empower the teacher to meet the requirements the profession and face the challenges therein. The study has been conducted with the objective/studying how JCT can he used fur innovations in the teacher education and to study the innovations that can he brought about in teacher education through the use of ICT. It also discusses the innovative tools that can be used in this regard. Considering the objectives and nature the study secondary sources of data have been used in the current study. Related article, journals and books have been followed for gathering required information. Internet sources have also been used as a major source of information for the study. The study reveals that Technology plays very important role in bringing about innovation in the teacher education.

Keywords: *ICT, Teacher Education, Innovation, Integration, Teaching, Implementation*

INTRODUCTION

Education is the light that points the right direction for humanity to take off. The purpose of education is not only to equip students to read and write, but also to equip them with rational thinking, knowledge and independence. If there is a desire for change, there is hope for progress in any field. Creativity can be developed and innovation benefits both students and teachers. A key person in an educational institution who plays a key role in bringing about the transformation from the darkness of ignorance to the Light of knowledge is the teacher. Teachers play a central role in determining student learning in schools. Students who have access to good teachers perform better regardless of other factors. Education includes teaching and learning not just specific skills, but something less concrete but more profound. The transmission of knowledge, positive judgment and well-developed wisdom. One of the

fundamental aspects of education is the transmission of culture from generation to generation. Education is defined as ‘the development and realization of an individual's potential and talents. It is the application of pedagogy, a collection of theoretical and applied research related to teaching and learning. The world is increasingly connected, the environment is becoming volatile, technology is constant changing our relationship with information, changing global conditions force us to rethink what we learn, but more what matters is where and how you learn. We need 21st century education.

According to Watson, the impact of Information and Communication Technologies (ICTs) has significantly revolutionized contemporary work practices and is currently undergoing a transformative process within educational systems. The incorporation of Information and Communication Technology (ICT) in education naturally aligns with the creation of student-centric learning environments. As in the global landscape increasingly transitions to digital media and information, the significance of ICT in education becomes progressively vital and is anticipated to further expand and evolve throughout the 21st century. According to Kofi Annan, the former Secretary General of the United Nations, emphasizes that achieving Universal Primary Education by 2015 requires the utilization of information and communication technologies (ICTs) to open the gateway to education systems. Museveni, noted that in the contemporary world dominated by technology and knowledge, the integration of Information and Communication Technology (ICT) is not merely optional but imperative. The quality of education relies on advancements in information technology across various aspects, including boosting learner motivation, enhancing fundamental skills, and expanding teacher training in technology.

REVIEW OF LITERATURE

Educational technology, as explained in "The Educational Technology Handbook" by Steven Hackbarth (1996), involves a systematic process of developing solutions to problems of teaching and learning. Over time, technology has transformed education by providing sophisticated tools that have revolutionized the entire educational system. In the early days of education in the United States, such as at the founding of the Boston Latin School in 1635, teaching primarily involved professors lecturing without visual aids, and students using paper and ink for notes. Significant inventions, such as the modern library by John Dury in 1651 and the introduction of books possibly by the Sumerians around 1300 BC, facilitated research and expanded access to knowledge.

Throughout history, innovations like chalkboards (1700s), pencils (1795), film strip projectors (1930s), and overhead projectors (1940s) gradually changed the dynamics of teaching and learning. These technological advancements were driven by the evolving needs of educators and students. The introduction of interactive whiteboards, commonly known as smart boards, in 1991 (Cabrera, 2012) marked a significant shift from traditional chalkboards. Smart boards allowed for interactive engagement between students and professors, enhancing the classroom environment. Similarly, the increasing presence of computers in classrooms, as noted by Chris

Dede (2009), has made them indispensable tools for education, with the internet playing a significant role in students' lives. The evolution of computers, from their introduction in schools in 1977 to widespread availability by the year 2000, has revolutionized educational practices. Additionally, handheld calculators, first invented by Texas Instruments in 1967, simplified mathematical processes and facilitated learning. However, as Bentalla (2011) emphasizes, educational technology alone is not transformative; it requires educators to integrate it into the curriculum effectively. While technology plays a crucial role in modern education, it is essential not to become overly reliant on it, as Watson (2001) suggests. Information and Communication Technologies (ICTs) have significantly revolutionized work practices and educational systems, according to Watson (2001). Their incorporation in education aligns with the creation of student-centric learning environments, and their significance is expected to continue growing in the 21st century (Amin, 2013). The enhancement of information technology is vital for fostering quality education, including improving learner motivation, refining fundamental skills, and advancing teacher training in technology (Saravana kumar, 2018). As the global landscape increasingly transitions to digital media and information, the optimal utilization of computers and the Internet holds promise for enhancing education across various levels and environments (Human, 2014).

OBJECTIVES

The study has been conducted with the objective of studying how ICT can be used for innovations in the teacher education and to study the innovations that can be brought about in teacher education through the use of ICT. It also discusses the innovative tools that can be used in this regard.

The objectives of study are:-

- The proper integration of ICT tools initiates a significant transformation in classrooms, turning them into dynamic environments conducive to exploration and experimentation for both educators and learners.
- It fosters the development of essential skills and knowledge among students, empowering them to become lifelong learners capable of adapting to changing contexts and challenges.
- As ICT continues to evolve in education, both teachers and students gain proficiency in utilizing IT devices. This literacy enables students to effectively access and utilize information, thereby enhancing their ability to think critically and independently.

METHODOLOGY

Considering the objectives and nature of the study secondary sources of data have been used in the current study. Related articles, journals and books have been followed for gathering

required information. Internet sources have also been used as a major source of information for the study.

MEANING OF ICT

Information and communication technology is a class of technologies in the form of tools, equipment and application support used to collect, store, retrieve, use, transmit, manipulate and distribute information as accurately and efficiently as possible. Enrich your data. Helps develop user knowledge and communication, decision-making, and problem-solving skills.

Teacher education with ICT: Her use of JCT in education should be nurtured, encouraged and nurtured as new interactive relationships between teachers, learners and technology an in high demand. It's time for teachers to acquire technical know-how. Otherwise, you will face undesirable problems. Guoyuan Martin, Johan, and Jotondeur (2009) found that "Successful ICTi11tcgrnlio11 is clearly related to the thinking processes of the class teacher. such as:13.Teacher's belief in ICT, Teacher effectiveness and teachers' attitudes. This result underscores the importance of an integrated and simultaneous understanding of teachers' thought processes .They also suggested that teachers' It suggests that there is a need to challenge. In an era or innovation and technological progress, it is teachers who ensure innovative educational strategies to improve quality education. The teacher education system is an important instrument for improving quality-oriented education systems.

ASPECTS OF USING TECHNOLOGY STRATEGIES IN TEACHER EDUCATION

Today, teachers are using electronic media for teaching and learning processes in the classroom. All teachers should use all kinds of teaching techniques in their teaching strategies.

1)Electronic learning:-E-Learning involves more than just presenting and making materials available on the Internet. The learner and the learning process should be at the heart of e-learning. Also called online learning.

2)Ubiquitous learning: -It means "learn anywhere". Fulfilling the e-learning promise of "anytime, anywhere, in any situation".

3)Virtual learning: -Virtual learning refers to all learning activities that take place in a discontinuous educational environment where learners and teachers are separated in time and space. When used effectively, it transforms the entire teaching and learning experience, making learning so vibrant, vivid and realistic.

4. Blended learning: Blended learning is online learning in a face-to-face classroom. It is sometimes called "hybrid learning". This includes a mix of face-to-face, self-paced learning and online classes.

5) Blogs: The term web blog refers to simple web pages that consist of short paragraphs of

links called opinions, information, personal diary entries, or posts. Educational blogs are powerful and effective technology tools for teaching and learning processes.

6) Wiki: A wiki is a webpage or her group or web pages that can be easily edited by anyone who has been granted access. Wikis offer an opportunity to deliver more inclusive, collaborative and constructive learning in our teaching and learning environment.

7) Collaborative e-Learning: Group interactions result in the acquisition of knowledge, skill, and attitudes by individuals.

8) M-learning: It is one of the wireless technologies that can be used anytime, anywhere, by anyone. It means "learning by doing".

INNOVATION IN EDUCATION

Teachers are implementers of policy reforms and initiative determined beyond the classroom. Teachers are in need of tighter standards and greater accountabilities. Teachers are not just here to do this job in the classroom-to do a job that is prescribed for them. They are here to be professionals in which they participate in the business of trying to work out what is best for the schools, what is best for the kids and how education should be practiced.

INNOVATION IN TEACHER EDUCATION PROGRAMS MULTIFACETED ROLE OF ICT

ICT plays a direct role in education. ICT is used in schools, educational institutions, and society. Proper use of ICT contributes to improving the quality of education. ICT carries out educational, cultural, social, professional and administrative tasks in institutions. ICT plays a key role in changing and modernizing education systems and in innovative ways in the teaching and learning process. Most teachers practice traditional teaching methods. Nevertheless, ICT must be used in the educational process. Teachers without ICT skills need to acquire digital age skills to use technology to obtain information, solve problems, share knowledge and generate innovative ideas. Future teachers are trained to use information and communication technology (ICT) effectively as part of their teacher education curriculum.

SUPPORT PEDAGOGICAL INNOVATIONS WITH NEW TOOLS

Mind Map:

Mind maps were developed by Tony Buzan in the late 1960s to help students take notes using only keywords and images. It can be used by teachers to explain in an innovative way. Visual quality makes them much quicker to create, easier to remember, and easier to review. Mind maps are also very easy to review, as you can easily refresh the information in your head with just one glance. They are also effective in remembering shapes and structures and providing

the cues needed to recall the information they contain. The key idea behind mind mapping is to use all kinds of visual and sensory tools at your disposal to learn and remember more effectively. Images, music, colors, and even touch and smell help us learn our arsenal and retain information for the long term. The key is to create a mind map that makes the most of these things, based on our creativity, our thoughts, and the interconnection of ideas in our own heads.

Z-to-A approach:

This approach first tries to explain the application part of a particular concept. The teacher should first explain the application of a particular Concept and the implications of that application. For example, management motivations are described in such a way that organizations derive broad benefits from the use of some technique, such as promotions and awards. Would like to know what promotions and awards are. Teachers begin to explain what promotion is and what motivational theory is in management.

Encouragement to experiment:

Innovation in the learning and teaching process comes from a variety of actors, both learners and teachers. Policies should aim to empower educators and institutions in the local context to develop value-added and by using or creatively using digital tools and media for specific learning topics.

Exchange of networking and best practices:

Teachers lack knowledge about the practical application of new approaches in a variety of contexts and should be encouraged and supported to document and share the innovative practices they develop and encounter in their teaching. Incentives for objective evaluation of enabling and disabling factors should be implemented.

Teacher training and support:

ICT and social computing can improve learning effectiveness and learning outcomes, but the results depend on the approach used. Early and incumbent teacher education must therefore disseminate knowledge and best practices with new and innovative approaches, encourage teachers to experiment with digital and media technologies, and reflect on the learning effects of their own teaching methods. Building and participating in teacher networks and pursuing innovative practice development in this field should be part of teacher education.

Open and networked institutions:

Policies should encourage institutions to take advantage of available networking opportunities. Institutions can also publish learning materials (open educational resources) to engage learners and support informal learning outside the institution. Inter-institutional networks can enrich student curricula and transfer subject-related knowledge among professionals. Institutions

should encourage collaborative networks among teachers, researchers, and professional networks to support the creation and exchange of learning innovations.

Restructuring Teacher Education Programme through ICT:

Teacher education as a profession is the product of many interacting needs, government policies, professional, institutional and organizational agendas and educational accrediting agency benchmarks. Conversation and innovation, policy and outcomes, curriculum and pedagogy, relevance and utility are thus interrelated hallmarks of teacher education programmes.

Appropriate reforms are also proposed from time to time by the UGC Teacher Education and NCTE Agencies. These are the actual preparation of the teacher on the one hand and the actual preparation on the other. All these institutions have probably focused on removing structural constraints in teacher education. Most desired, however, is to change the inner story of teacher education programs, requiring changes in the methods, materials, approaches, and skills employed by teacher educators. One of the major weaknesses of the teacher education system is the complete discrepancy between the practices taught by teacher educators and the practices followed by teachers. There are many examples of this. For example, while student teachers are theoretically taught to use the latest technology to improve classroom communication, the number of teacher training institutions using the latest communication media is countable on your fingers. Although similar strategies for improving assessment systems such as continuous global assessment, internal assessment, and scoring systems have been taught to student teachers, there is a need to make student-teacher assessments more appropriate, valid, or reliable. You can't adopt a process or practice that makes you into a teacher education. If the teacher educators who train teachers also lack these, can we expect positive attitudes, desirable motivation, and commitment from our students? The world has entered the information age. Pedagogical technology is of particular importance in innovating teacher education. Create intranet/internet-enabled virtual teacher training centers for technology- distributed teaching and training. All the necessary skills and training can be delivered on the network in a number of ways, but the reality is a little different. This should be changed. Every teacher should be her ICT capable. All teacher education programs should include intensive training in the use of modern her ICT tools, including offline and online electronic resources such as CD-ROMs, multimedia and the Internet. ICT should include all available ICT facilities such as videoconferencing, data travelers in teacher education, etc. One of the most important reasons consider integrating her ICT into teacher education is to put learning in the hands of users.

SIGNIFICANCE OF THE STUDY

Technology has facilitated learning for learners by accommodating the different styles that learners possess. Before the introduction of technology in education, teachers had to spend

many nights in class developing, drawing 30 visuals for students, and repeating concepts taught in class. Teachers' use of technology in the classroom narrows the "generation gap" between teachers and students. Students feel that their teachers are ready to change with the times and prepare them for 21st century skills. In this regard the present study is significant enough for all the academicians.

CONCLUSION

Information technology is dramatically changing the learning style of students. Teachers learn and work. Internet-enabled phones, handheld computers, digital cameras, and MP3 players are revolutionizing college life. Technology is also changing the classroom experience. Information and communication technology has brought many innovations to the educational field. Dramatically changing the old paradigms of teaching and learning. In the new paradigm of learning, the role of the student is more important than that of the teacher. The concept of paperless and pen less classrooms is evolving as an alternative to old teaching and learning methods. Today, knowledge is being democratized as the role of the teacher is replaced by that of an intermediary. Interactive instruction is required and with the advent of multimedia. This changing role of education is inevitable. The incorporation of Information and Communication Technology (ICT) into teaching holds significant importance in shaping student's learning attitudes, fostering creativity, facilitating knowledge construction, influencing the learning environment, refining teaching strategies, honing problem-solving skills, and promoting a deeper understanding of concepts through diverse tools. The expectation is that through the integration of ICT in teaching, educators can elevate their competence and effectiveness in classroom instruction. The increasing use of ICT in pursuit of educational objectives profoundly impacts the teaching and learning process. Recognizing that students already have a keen interest in and engagement with technology, this presents remarkable opportunities for schools and teachers to enhance the effectiveness of teaching and learning by integrating various forms of technology into the classroom.

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