ABSTRACT:
The present paper focuses on growing impact of information and communication technology on the field of education, its wide use in education and the need of teacher training to use ICT effectively in the classroom teaching-learning process, the challenges before education, efforts made by the government in terms of formulation of policy on ICT in school education, implementation of different schemes to enhance the use of ICT, provision of in-service training for working teachers, inclusion of a paper on ICT in pre-service courses, current status of ICT in teacher education, problems of teacher training, recommendations of NCF-2005, and suggestions.

Key Words: Information Communication Technology (ICT), In-service Training, Pre-service, Educational Technology,

Objectives of the paper:
1. To study the importance of ICT in school curriculum.
2. To review the existing arrangement for the training to use ICT in teaching learning.
3. To study the government policy and schemes to employ ICT to improve quality of education.
4. To find out the current status of ICT in teacher education in pre-service education.
5. To focus on the problems of training.

INTRODUCTION:
The 21st century calls for a wider vision of education which includes core subjects, learning and thinking skills, ICT skills, Life Skills and 21st century content. According to Rajiv Katyal, Director of Education, Rashtriya Madhyamik Shikshan Abhiyan, the 21st century skills in education are the components for Knowledge Economy. The knowledge society of which we are the part requires update of our knowledge and skills regularly throughout our life. This is the only way we can cope with technological change in every field of life.

Training to the teachers is absolutely essential if technology provided to the schools is to be used effectively. The use of technology in the teaching learning process has occupied prime position right from KG to higher education. The expenditure on the technology hardware and software is wasteful unless the teachers are trained for its use.

Educational technology is not and will never be transformative on its own- it requires teachers who can integrate technology into curriculum and use it to improve student learning. Technology can never replace teacher but it can prove the best weapon in the hands of teacher at every level for a long time. The phenomenon of globalisation has its roots in the economic and financial sectors but it has posed challenges before the field of education. Technology is at the heart of globalisation. In the field of education the ever smart and techno friendly generation of students could use technology independently to acquire knowledge and develop their skills without involvement of teachers. Many a
times it so happens that the teachers are not in a position to handle the technology and they have to take help from the students to use it or else they fail. The teachers should be made expert to use technology as well as to integrate it with the subject. The Information and communication technology is a part of educational technology. It has occupied the life of man in such way that it has shaken the traditional teaching and learning approaches and poses new challenges to the educational community.

**The Definition and Meaning of Educational Technology**

B. C. Mathis: Educational Technology refers to the development a set of systematic methods, practical knowledge for designing, operating and testing in schools. Educational technology is a system in education in which machine, men, media, material and methods are interrelated and work together for the fulfillment of specific educational objectives. A judicious use of these together with new functions and roles of educational personnel can bring about more efficient and effective teaching-learning.

An adequate knowledge of theory and practices of educational technology and their proper use would enable the teacher to understand and effectively discharge his new roles in the educational system in an age of ‘information explosion,’ ‘Knowledge explosion,’ ‘Population explosion,’ and ‘expectation explosion.’

**Meaning of Information and Communication Technology (ICT):**

Information and Communication Technology is defined as all devices, tools, content, resources, forums, and services, digital and those that can be converted into or delivered through digital forms, which can be deployed for realizing the goals of teaching learning, enhancing access to and reach of resources, building of capacities, as well as management of the educational system.

These will not only include hardware devices connected to computers, and software applications, but also interactive digital content, internet and other satellite communication devices, radio and television services, web based content repositories, interactive forums, learning management systems, and management information systems. These will also include processes for digitisation, deployment and management of content, development and deployment of platforms and processes for capacity development, and creation of forums for interaction and exchange.

**Challenges before Education:**

The challenge of developing alternate modes of education, continuing education, teacher capacity building, and information systems for efficient management of the school system are being addressed. With Information and Communication technologies becoming more accessible, reliable and mature, the prospect of leveraging ICT for education is becoming increasingly feasible.

A few studies conducted on the use of Internet in Teacher Education Institutions revealed that the student teachers largely lack in info-savvy skills and techno-pedagogic skills.

There is a shift from e-Learning 1.0 (Online learning) to e-Learning 2.0 (Twitter, Face-book) to e-Learning 3.0 (Semantic Web), that is, from content to community to artificial intelligence. There are proposals for e-Teacher Education. Smart Classrooms are emerging, wherein; we have e-learning and e-testing. Terms like Wi-Fi, iPad, e-Book, e-Reader, e-News Letter, Webinar are widely used. Digital Lesson Designs and e-Portfolios have become common features. There are compendiums of e-abstracts and surveys of educational research in India on the World Wide Web. The NCTE is expediting teacher education on e-Technologies through an MOU with Intel. There is a wide scope for transformation of teacher education through technology.
According to Cabero (2001) the flexibilization of time-space accounted for by the integration of IT into teaching and learning process contributes to increase the interaction and reception of information such possibilities suggest changes in the communication models and the teaching and learning methods used by teachers, giving way to new scenarios which favour both individual and collaboration learning.

The potentiality of computer technology can be minimal unless it is accompanied by other pedagogical measures.

The integration of technology in teaching learning process leads to the changes in the role of teacher as well as learner and creates new teaching and learning environment and methodologies such as e-learning, web based learning, online learning, offline learning, open and directive learning.

The teacher has to acquire skills which are required in this new environment. The role of a teacher changes from single transmitter of knowledge to become facilitator, integrator of new ICT media researcher, designer, collaborator, learner and evaluator. Like updating of software, antivirus, different sorts of apps, operating system the teacher has to update him/her continuously to keep pace with the change.

The teacher is dealing with a ‘SMART’ generation who are surrounded by the smart gadgets like smart TV, Smartphone, and smart watch. They want their teacher to be a smart person and smart worker.

National policy on ICT in School Education, 2012:

“The ICT policy in school education aims at preparing youth to participate creatively in the establishment, substance and growth of a knowledge society leading to all round socio-economic development of the nation and global competitiveness.”

- ICT has immense potential as a tool of social transformation and economic growth in India.
- ICT @ schools scheme seeks to provide holistic support covering schools in isolated and remote areas of the country of country towards progressive use of technology in school education.
- What is ICT?
- ICT can address teacher capacity building ongoing teacher support and strengthen the school system ability to manage and improve efficiencies.
- Using internet and the internet as mere information delivery devices grossly underutilizes its powers and capabilities. There is an urgent need to develop and to deploy a large variety of applications, software tools, media and interactive devices in order to promote creative, aesthetic analytical and problem solving abilities and sensitivities in students and teachers.
- All teachers in a school will be expected to become advanced users of ICT integrating ICT skills into their professional development as well as their teaching learning practices across all areas of the curriculum.

INFORMATION & COMMUNICATION TECHNOLOGY (ICT) IN SCHOOLS

The scheme has following essentially four components.

(i) Partnership with State Government and Union Territories Administrations for providing computer aided education to Secondary and Higher Secondary Government and Government aided schools.

(ii) Establishment of smart schools, which shall be technology demonstrators.

(iii) Teacher related interventions, such as provision for engagement of an exclusive teacher, capacity enhancement of all teachers in ICT and a scheme for national ICT award as a means of motivation.

(iv) Development of a e-content, mainly through Central Institute of Education Technologies (CIET), six State Institutes of Education Technologies (SIETs) and 5 Regional Institutes of Education (RIEs), as also through outsourcing.
Coverage:
The scheme currently covers both Government and Government aided Secondary and Higher Secondary Schools. Financial assistance is provided for procurement of computers and peripherals, educational software, training of teacher, development of e-contents, internet connectivity & set up of smart schools.

**Financial Assistance and cost norms:** Financial assistance is given to States, CIET and SIETs on the basis of the approvals accorded by Project Monitoring and Evaluation Group (PMEG) chaired by Secretary (School Education and Literacy). The project cost is shared between Centre and States in ration of 75:25 except for the NER states including Sikkim where it is 90:10. As per ICT Policy

The National Policy on Education 1986, as modified in 1992, stressed the need to employ educational technology to improve the quality of education. The policy statement led to two major centrally sponsored schemes, namely, Educational Technology (ET) and Computer Literacy and Studies in Schools (CLASS) paving the way for a more comprehensive centrally sponsored scheme – Information and Communication Technology @ Schools in 2004. Educational technology also found a significant place in another scheme on up gradation of science education. The significant role ICT can play in school education has also been highlighted in the National Curriculum Framework 2005 (NCF) 2005.

All teachers in a school will be expected to become advanced users of ICT integrating ICT skills into their professional development as well as their teaching learning practices across all areas of the curriculum.

ICT enabled teaching-learning encompasses a variety of techniques, tools, content and resources aimed at improving the quality and efficiency of the teaching learning process. Ranging from projecting media to support a lesson, to multimedia self-learning modules, to simulations to virtual learning environments, there are a variety of options available to the teacher to utilize various ICT tools for effective pedagogy. Each such device or strategy also involves changes in the classroom environment, and its bearing on effectiveness. Availability of a wide range of such teaching-learning materials will catalyse transformation of classrooms into ICT Enabled classrooms. Use of interactive ICT tools for teaching and learning, e.g. virtual laboratories will be promoted. The development of digital learning resources in the form of e-books, animations, lessons, exercises, interactive games, models and simulations, videos, presentation slides, plain text materials, graphics, or any combinations of the above, will be encouraged. Use of digital resources should be harmonised with the requirements of the curriculum and supplement it.

Capacity building of teachers will be the key to the widespread infusion of ICT enabled practices in the school system. A phased programme of capacity building will be planned. In service training of teachers will comprise of Induction Training as well as Refresher Courses. The induction trainings will be provided by the Regional Institutes of Education of the NCERT, State Councils of Educational Research and Training (SCERTs) or such other institutions of the Central and State Governments and will preferably be completed before the commencement of the academic year. The refresher trainings will be carried out every year to enable teachers to share, learn and keep abreast of the latest trends in ICT based teaching learning processes. The induction training will be followed by teacher’s evaluation to ensure that the minimum competency is achieved.

Training in ICT will be integrated with general training programmes organized for teachers and school leaders at all levels in order to popularize its use and to demonstrate effective practices in ICT.
Beginning with an initial sensitization through ICT operational skills and ICT enabled subject teaching skills, teachers will become part of online professional groups (e.g. English teachers association) to continue their education, pool in their resources and actively contribute to the strengthening of domain specific knowledge within the country. The forums will also facilitate continuous development of ICT skills introducing them to tools and resources in different subjects / specializations as well as create and share learning resources in those subjects. Teacher participation in the digital content development process will catalyse its broad based usage in the classrooms. Teacher capacities will be developed in instructional design, selection and critical evaluation of digital content, and strategies for effective use of digital content to enhance student learning.

Intel Teach program is a globally acclaimed program that is being implemented in 40 countries worldwide. It aims to help classroom teachers learn how best to use technology to improve teaching and learning. This collaborative project aims to provide professional development in technology integration to all teacher educators across the country. The objectives of this project are to impart sustained professional development to all teacher educators from all recognized institutions of teacher education across the country. NCTE and Intel had signed this MOU in December 2006 for Project XPDITTE with the aim to impart sustained professional development to all teacher educators from all the recognized institutions of teacher education across the country and to make Information Communication Technology (ICT) a part of the teacher education curriculum.

Project XPDITTE achieved huge successes in its three years of existence, reaching out to 74 Universities & 10 SCERTs. More than 8000 Teacher Educators in 2000 Teacher Education Institutions across 18 states have been impacted in the three years of this project. One national & one state level contests were very successfully organized during this period. Guru Gobind Singh Indraprastha University, Delhi conducted a ‘National Contest on Best integration of Technology in Teacher Education’ and Andhra Pradesh State Council of Higher Education (APSCHE) conducted state level contests on ‘Technology Integration in Education’ for Colleges of Education, Teacher Educators and Student Teachers.’

The Intel Teach to the Future programme provides a flexible, modular curriculum delivered by teachers for teachers. The curriculum is based on MS Office 2000 Professional as a teaching and learning tool. The training incorporates the use of the Internet, web page design and multimedia software. Countries have the prerogative to modify the modules and training offerings based on specific country needs and context.

India is amongst the countries that provide ICT training at both pre- service and in-service level.

Intel India has trained 230,540 numbers of teachers at in-service level and 29,702 teachers at pre-service level.

Three main trends in content focus

1. Basic computer literacy-
   It deals with hardware and software/ applications without necessarily being connected to teaching and learning (ActDen; iTrain of Bellanet). In some countries, the content just deals with developing skills on the basic operations and functions of a computer with no software applications included in the training.

2. Basic computer literacy also as the main focus, but this time in relation with or in support of teaching and learning activities as shown in their practicum and exercises.
3. Contents that integrate the use of ICT and pedagogy; use of ICT in teaching specific subjects in the classrooms; the Internet as a pedagogical innovation and used for collaborative activities; school and classroom management with troubleshooting techniques thrown in for a few of the programmes.

The Central Institute of Educational Technology has developed National Repository for Open Educational Resources (NROER). The Repository was launched by the Hon’ble HRM, Govt. of India, during the National Conference on ICT for School Education on 13 August 2013 in New Delhi. The Repository is now in public domain for use and can be accessed on http://nroer.gov.in. The Repository makes available a wide range of e-content.

Current Status of ICT in Teacher Education: Ministry of Human Resource Development conducts periodic ICT trainings for Teacher Educators in collaboration with INTEL. Till now, 9 Educator Academies have taken place in which, 216 Teacher Educators from Assam, Bihar, Chhattisgarh, Madhya Pradesh, Meghalaya, Sikkim, Uttar Pradesh, Uttarakhand and West Bengal have been trained. For 2014-15, 06 more ICT trainings are scheduled. The Bureau has also made available audio visual material on its website www.teindia.nic.in on core issues in teacher education.

Pre-service

All the universities have introduced ICT a core course or optional course pre-service courses with the aim to orient and train them to use ICT in their pre-service teacher training programmes. They will also be expected to enable pre-service teachers to be sensitised to and practice the use of ICT.

All teacher trainees passing out of teacher education programmes will obtain adequate levels of competency in ICT and ICT enabled education. This proficiency will gradually form a part of the eligibility criteria for teacher appointments.

National Council for Teacher Education (NCTE) has already laid down guidelines about availability of ICT infrastructure in each such training institution. NCTE would prescribe appropriate curriculum in ICT corresponding to the ICT curriculum in schools, to be revised periodically, for such teachers.

Network and connectivity - Broadband

An EDUSAT network will be planned at each state with interactive terminals (SIT) and receive only terminals (RUT).

Free and open source software – O.S. and software applications will be preferred in order to expand teaching learning, creation and learning.

A wide variety of software applications and tools, graphics and animations desktop publishing, web designing, specialized subject software

Development of Content –

Use of interactive tools for teaching and learning, Virtual laboratories, digital learning resources in the form of e-books, animations, lesson-exercises, interactive games, models and simulations, video, presentation, slides, plain text materials, graphics. Use of these resources- requirement of the curriculum & supplement it.

Teachers and students will be encouraged to develop digital learning resources

Central institute of Educational Tech – (CIET), NCERT, IGNOU, SIET play proactive role and support capacity building activities of teachers in digital content development and usage.

Access of Digital library

Teacher Training on ICT use is Education is Asia and the Pacific.

WWW.World-links.org/english /html/Countries.html

Most of the training programmes carry general objectives aimed at developing awareness, knowledge, and skills is either the use of computers or the integration of computers into teaching. As to what
specific competencies are being developed or strengthened is the various uses of ICT is teaching, these are most often not well articulated.

Problems:
- Lack of time for both formal and informal training
- Organizational inertia.
- Lack of interest among the teachers.
- Lack of time to prepare ICT resources.
- Lack of knowledge to resolve technical problems.
- Lack of personal management skills to change
- Perception that PCs are complicated to use.
- Lack of motivation to change long-stand pedagogical practices (BECTA – 2004)

CONCLUSION:
To conclude,
The contribution of information and communication technology (ICT) in the field of education is unparalleled. The government as well as private education institutes spends much on the provision ICT and spends good amount to train the teachers to use it effectively. But the truth is that teachers lack competencies to use ICT effectively. It is the need of the time to develop competencies of teachers to use ICT in teaching-learning process as it has proved a very effective tool in imparting quality education. The teachers need to acquire info-savvy skills and techno-pedagogic skills to create long lasting impact on students’ learning. When we want to integrate ICT in teaching with the aim to provide quality education we must develop core competencies of teachers to handle hardware and use software technology in day to day classroom teaching. The training programmes are to be organised frequently with specific aims and objectives.

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