Information and Communication Technology (ICT): A Paradigm shift in Teacher Education

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Abstract

Information and communication technologies (ICT) have become commonplace entities in all aspects of life. Across the past twenty years the use of ICT has fundamentally changed the practices and procedures of nearly all forms of endeavor within business and governance. Education is a very socially oriented activity and quality education has traditionally been associated with strong teachers having high degrees of personal contact with learners. The use of ICT in education lends itself to more student-centered learning settings. But with the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important and this importance will continue to grow and develop in the 21st century.. ICT helps in improving the quality of education stating that information and communication technology is an important instrument that can transfer the present isolated, teacher- centered and book-centered learning environment into a student –centered environment. ICT can change the traditional concept of learning process and the components of ICT should be integrated in the education program me in such a way that teaching should be enabled to face the new demands and improve the efficiency and effectiveness of education at all levels in both formal and non-formal settings. Thus, we must accept the new paradigm and technology in teaching learning process. Educational institutions need to develop strategies, plan to improve teaching-learning process and ensure that all teachers are well prepared to use the new tools for learning. The emergence of the knowledge-based society is changing the global status of education .Now; it is the time to develop a new knowledge-based global society. In developing countries like India, there are many untrained teachers in this

area. The new ICT would be able to reach these teachers and can provide quality education all around the globe.

Introduction

21st century is the age of Information and Communication Technology**.** All over the globe, there is a trend to use ICT in the teaching learning process. The teacher and learner must gain access to technology for improving learning outcomes. Educational reforms include successful designing and implementation of ICT in teaching learning process, which is the key to success **.**It involves use of computers, computer software and other devices to convert, store, and process, transmit and retrieve information and includes the services and application associated with them. ICT is an acronym that stands for:

1.**Information**- it covers the topics such as meaning and value of information; how information is controlled; the limitations of ICT; legal considerations; how data is captured, verified and stored for effective use; the manipulation, processing and distribution of information; keeping information secure and designing networks to share information.

2. **Communication**-networks of sending and receiving equipment, wires and satellite links. (a) Internal networks-Local Area Network (LAN) (b) external networks-Wide Area Network (WAN).

3. **Technology**-collection of techniques, knowledge of how to combine resources to produce desired products, to solve problems, fulfill the needs or satisfies wants; it includes technical methods, skills, processes, techniques, tools and raw materials. The Ministry of Human Resource Development (MHRD),Government of India and the Indian Span Research Organization(ISRO) took a path breaking policy decision to launch a dedicated educational satellite, in which the use of ICTs can make substantial changes both in teaching and learning.

ICT in Teacher Education

The need for teacher training is widely acknowledged. Professional development to incorporate ICTs into teaching and learning is an ongoing process. Teacher education curriculum needs to update this knowledge and skills as the school curriculum change. The

teachers need to learn to teach with digital technologies, even though many of them have not been taught to do so. The aim of teacher training in this regard can be either teacher education in ICTs or teacher education through ICTs. A teacher's professional development is central to the overall change process in education. They are unsure of how to make most effective use of ICT as a powerful and diverse resource and one which can potentially alter traditional teacher–student relationships. If they are to invest time and energy in embracing the technology, teachers need to understand and experience the potential benefits of using ICT. Moreover, they need to have access to the evidence that supports the improvements in teaching and learning, including case studies and examples of effective practice. If the necessary changes in education are to be realized, they need strong leadership and support along with a school development plan for the integration of technology. They also need technical support so that they feel comfortable in using the technology and are more willing to experiment. The Future lab study shows many affirmative results from review of a number of UK case studies on teacher training. Although they are not representative, most of these studies highlight positive impacts of teacher training with ICT, such

as increasing teacher self-assurance and aptitude in the use of IT resources by providing them fully equipped multimedia portable computers (MPTP) or by supporting online teacher communities. The "Talking Heads Online Community" pilot study showed that informal online communities can help to reduce head teacher isolation, enable head teachers to generate and exchange insights regarding practices for school improvement, and provide an effective way for gaining quick access to a spectrum of perspectives on key topical issues.

Four Theme Framework for Teacher Education Pro

UNESCO has projected a holistic framework taking into consideration four supportive themes viz. context and culture, leadership and vision, lifelong learning, and planning and management of change. The framework of competencies is encircled by the four supportive themes. The curriculum framework also suggests that each teacher is allowed to interpret the framework within his or her context and personal approach to pedagogy, which is always related to the subject discipline or content area, rather than to uses of ICT and the efficiency of using the ICT

Traditional Teaching versus Virtual Learning

Traditionally learning was hard, based on deficit model of student, and process of transfer, and reception was individualized and facilitated by division of content into small units and a linear process, but introduction of ICT has changed the traditional concept. ICT defines learning as neutral, social, active, linear or non-linear, integrative, and contextualized, based on ability and strength of students. Use of ICT in teaching-learning environment can bring a rapid change in society. It has the potential to transform the nature of education i.e., where and how learning takes place and role of learners and teacher in the process of learning. It is essential that teachers must have basic ICT skills and competencies. It is for the teacher to determine how ICT can best be used in the context of culture, needs and economic conditions. Good teaching is not simply adding technology to the existing teaching and content domain rather it should cause the representation of new concepts and requires developing sensitivity to the dynamic, transactional relationship between the three components of knowledge: Content, Technology and Pedagogy.

During the last three decades, the changes in educational environment have been phenomenal. The model, focus, role of the learner and technology has been changed drastically from traditional instruction to virtual learning environment as depicted below.

Changes in Teaching-Learning Environment

MODEL	FOCUS	ROLE OF LEARNER	TECHNOLOGY
TRADITIONAL	TEACHERS	PASSIVE	CHALK AND TALK
INFORMATION	LEARNERS	ACTIVE	P.C.
KNOWLEDGE	GROUP	ADAPTIVE	P.C. NETWORK

Shifting the emphasis from teaching to learning can create a more interactive and engaging learning environment for teachers and learners. This new environment also involves a change in roles of both teachers and learners. The role of the teachers will change from knowledge transmitter to that of facilitator, knowledge navigator and sometime as co-learner. The new role of teachers demands a new way of thinking and understanding of the new vision of learning

process. Learners will have more responsibilities of their own learning as they seek out, find, synthesize, and share their knowledge with others [2]. ICT provides powerful tools to support the shift from teacher centered to learner centered paradigm and new roles of teacher, learner, curricula and new media. The major shifts have been described in a tabular form below.

Changes in Teachers' Roles

FROM	TO
Transmitting of knowledge	Guide & Facilitator of knowledge
Controller of Learning	Creator of Learning Environment
Always Expert	Collaborator &CO learner
Learning to Use ICT	Using ICT to Enhance Learning
Deactivate/Expository	Interactive/Experiential/Exploratory

Changes in Learners' Roles

FROM	TO
Passive Learner	Active Learner
Reproducer of knowledge	Producer of knowledge
Dependent Learner	Autonomous Learner
Solitary Learner	Collaborative Learner
Solely Learning Content	Learning to Learn/ Think/Create & communicate

Changes in Curricula & Delivery

FROM	TO
Memorising facts	Inquiry Based
Artificial Teaching Exercise	Authentic Learning
Rigid Delivery	Open & Flexible Delivery
Fixed Time and Space	Any Time Any Where

Single Path Progression	Multi Path Progression

Changes in Media Applications

FROM	TO
Single Sense Stimulation	Multi Sensory Stimulation
Single Media Application	Multimedia Application
Delivery Of Information	Exchange Of Information
Monologue Communication	Dialogue & Collaborative
Analogue Resources	Digital Resources

All these changes taking place in learning and teaching, demand a new learning environment to effectively harness the power of ICT to improve learning. ICT has the potential to transform the nature of education: where, when, how and the way learning takes place. It will facilitate the emergence of responsible knowledge society emphasizing lifelong learning with meaningful and enjoyable learning experiences.

Research has shown that the appropriate use of ICTs can catalyze the paradigmatic shift in both content and pedagogy that is at the heart of education reform in the 21st century]. If designed and implemented properly, ICT-supported education can promote the acquisition of the knowledge and skills that will empower students for lifelong learning. When used appropriately. ICTs – especially computers and Internet technologies – enable new ways of teaching and learning rather than simply allow teachers and students to do what they have done before in a better way. These new ways of teaching and learning are underpinned by constructivist theories of learning and constitute a shift from teacher centered pedagogy – in its worst form characterized by memorization and rote learning – to one that is learner centered.

Changes to pedagogical practices in classrooms require that teachers should have access to infrastructure Policy-makers, administrators, and teachers are using a variety of tools and strategies to improve access to learning opportunities, improve the teaching and learning experience for teachers and students, and make effective use of limited resources.

*A. **Basic Computer/Technology Operations and Concepts**:* Teachers should use computer systems to access, generate and manipulate data; and to publish results. They should also evaluate performance of both hardware and software components of computer systems and apply basic troubleshooting strategies as needed.

*B. **Personal and Professional Use of Technology**:* Teachers should apply tools for enhancing their own professional growth and productivity. They should use technology in communicating, collaborating, conducting research, and solving problems. In addition, they will plan and participate in activities that encourage lifelong learning and will promote equitable, ethical and legal uses of computer technology resources.

*C. **Application of Technology in Instruction*** Teachers should apply computers and related technologies to support in their grade level and subject areas. They must plan and deliver instructional units that integrate a variety of software, application, and learning tools. Lessons developed must reflect effective grouping and assessment strategies for diverse populations.

It is also important to keep in mind that ICTs in education are a potential double-edged sword—while ICTs offer educators, tools to extend education to hitherto inaccessible geographic regions, and to deprived children and empower teachers and students through information, there is also the danger that such technologies may further widen the gap between the educational *haves* and *have-nots*. However, technology is only a tool and the success of ICTs in enhancing the delivery of quality education to the needy, without widening the gap, will depend largely on policy level interventions that are directed toward how ICTs must be deployed in school education.

Although ICTs do offer many beneficial opportunities for education, they are no substitute for formal schooling. The role of technology is to support school education and not replace it, though the technology may play an appreciable part in meeting the needs of children who cannot go to a conventional school. Access to ICTs ensures enhancement of traditional or formal education systems, enabling them to adapt to the different learning and teaching needs of the societies.

ICT impact on professional development of teachers

Technology has the potential to transform the professional environment for educators. Through the application of network technologies to research and collaborative planning, teachers can break loose from the isolating environments that the teaching profession had imposed on them in the past. Technology impacts not only on the teaching and learning process but also on the ways and opportunities educators learn. The developments in technology influence two important aspects of education. One is the way schools train prospective teachers (pre-service) and the other is how schools design continuing education for their teachers to learn on the job either at the physical workplace or at virtual learning (in-service). Universities and other teacher training institutions have an active role in professional development beyond just providing undergraduate or graduate level teaching. This is because subject matter expertise and discipline knowledge reside in the universities.

Teachers are members of learning communities; they learn from each other. Exchanging ideas with one another and solving common problems are powerful ways of learning among teachers. But the of teaching have often prevented regular or sustained sharing. Fortunately, technology can provide some solutions to structural problems that serve as obstacles to sustain collaboration among teachers. Inadequate training is the most important obstacle to the effective use of technology in instruction and in professional development. If teachers did not get enough of it in pre-service, then the learning gaps must be filled through in-service training.

Conclusion

Rapid changes in technology will ensure that ICT will proliferate in the classroom. It is predicted that there will be many benefits for both the learner and the teacher, including the promotion of shared working space and resources, better access to information, the promotion of collaborative learning and radical new ways of teaching and learning. ICT will also require a modification of the role of the teacher, who in addition to classroom teaching will have other skills and responsibilities. Teacher training institutions, professional development schools, societies and public educational agencies must continue to identify study and disseminate examples of effective technology integration that answer professional development needs. Many will become specialists in the use of distributed

learning techniques, the design and development of shared working spaces and resources, and virtual guides for students who use electronic media. Ultimately, the use of ICT will enhance the learning experiences for children, helping them to think and communicate creatively. ICT will also prepare our children for successful lives and careers in an increasingly technological world.

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