



INFORMATION AND COMMUNICATION TECHNOLOGY IN TEACHER EDUCATION: EMERGING CURRICULAR TRENDS

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ABSTRACT:

India's ignorance and poverty accumulated over centuries of inertia; exploitation and foreign domination; arresting progress to great extent. Now however the country has progressed a lot in science and technology. Information and communication technology is wide-spread everywhere. It is even familiar to small children but it is a matter of regret that our teacher-educators do not have complete access to this process. This paper emphasizes different curricular aspects of ICT in teacher education which is need of the hour for present generation teachers.

KEYWORDS:

INTRODUCTION

Information and Communication Technologies (ICT) are a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information. Communication and information are at the very heart of the educational process, consequently ICT-use in education has a long history. ICT has played an educational role in formal and non-formal settings, in programs provided by governmental agencies, public and private educational institutions, for-profit corporations and non-profit groups, and secular and religious communities.

Information and Communication Technology (ICT) is basically an umbrella term that encompasses all communication technologies such as internet, wireless networks, cell phones, satellite communications, digital television etc. that provide access to information. During the past few decades, ICT has provided society with a vast array of new communication capabilities and has fundamentally changed the way we live now. We find a world of difference in the practices and procedures of various fields such as medicine, tourism, banking, business, engineering, etc. as they operate now in comparison to how they operated two decades ago. In contrast, the impact of ICT on education in India, however, has been far less and slow.

ICT IN TEACHER EDUCATION

Information and Communication Technologies (ICT) that are becoming increasingly pervasive in societies around the world are also reaching schools. With numerous global advancements in ICT it is essential that educators have a thorough working knowledge of these media and their influence on the performance and engagement of their students. There is no firm agreement on the definition of

ICT, as these technologies evolve almost daily. Here we assume that ICT includes, but is not limited to, personal computers, laptops, printers, LCD projectors, palm devices, iPods, fax machines, cell phones, Internet, and Intranet.

In almost all sectors of education the role of the teachers is changing from being not only a transmitter of knowledge but also that of facilitator of the teaching-learning process. Owing the onset of information and communication technology. New applications of technology and enhanced accessibility to it are introducing new possibilities of teaching and learning. The traditional boundaries of the classroom are giving way to virtual learning and online courses. All these development would have profound impact on teacher education programmes and processes (Jindal & Gupta, 2012).

This technology invites learners to be more independent and the curricula to be more dynamic. Teachers need to complement their content and pedagogy expertise by utilizing online facilities. Use of ICT effectively requires a change in classroom practice rather than mere acquisition of technical skills. Teachers need to familiarize themselves with possibilities approaches and application in the use of ICT, the facilitation of teaching learning. These technologies along with overhead protector and computer projections have the potential to make teaching. Learning and training processes more efficient and cost effective. It has opened up new possibilities of reaching out to the still un-reached disadvantaged groups and children with special needs (Niederhauser & Stoddart, 2001).

The educational channels need to be organized, strengthened and utilized for creating awareness strengthened, and utilized for creating awareness, providing instructions and offering solutions of problems faced by learners of specific age. The increasing use of

technologies has brought changes in the modes and methods of instructional processes which are becoming more learner-centered. New interactive relationships among teachers, learners and technologies are emerging

Teacher education programs at the pre-service and in-service levels must have ample scope for inducting pedagogic skills and management of technologies as important components of teaching learning environment to enhance efficacy to transaction. These need to integrate teaching-related practices with the existing methodology course and introduce specialized course to equip the student teachers with skills to operating and maintaining hardware, acquiring and utilizing software of different kinds i.e. structured textual materials, teaching aids, audio-visual cassettes, multimedia, CD ROMs and sharing information through networking in collaborative and participative methods. The application of ICT in the education setting has to be cultivated, promoted and nurtured. Teacher educators have to develop new understanding approaches and attitudes in harmony with new developments in information technology. Their proficiency in these areas would help them to train student teachers effectively. Teacher's education institutions will have a take leadership in using information technology (Kirschner & Selinger, 2003).

As technology has created change in all aspects to society, it is also changing our expectations of what student must learn in order to function in the new world economy. Students will have to learn to navigate through large amounts of information, to analyze to make decisions and to master new knowledge domains in an increasingly technological society. They will need to be lifelong learners, collaborating with others in accomplishment complex task, and effectively using different systems for representing and communication knowledge to other. A shift from teacher centered instruction to learner centered instruction is needed to enable students to acquire the new 21st century knowledge and skills (Sasseville, 2004).

SOME EMERGING CURRICULAR TRENDS OF ICT

- **Computer Fundamentals**

Computer is an advanced electronic device that takes raw data as input from the user and processes these data under the control of set of instructions (called program) and gives the result (output) and saves output for the future use. It can process both numerical and non-numerical (arithmetic and logical) calculations.

A Computer has four functions

Input

The input hardware allows you to enter data into the computer. The primary devices used are the keyboard and mouse.

Keyboard - The keyboard looks like the typewriter. A numeric keypad is located to the right of the keyboard. Numeric keys have the same placement as a 10-key calculator, which allow the operator to enter data rapidly.

Mouse - The mouse is a device that allows you to control the movement of the insertion point on the screen. The operator places the palm of the hand over the mouse and moves it across a mouse pad, which provides traction for the rolling ball inside the device. Movement of the ball determines the location of the beam on the computer screen. When the operator clicks the mouse, the beam becomes an insertion point which indicates the area you are working on the screen. You can also click the mouse and activate icons or drag to move objects and select text. There are other input devices, such as touch screen, joystick, modem, scanner, and voice recognition systems.

Processing

The central processing unit or (CPU) is the "brain" of your computer. It contains the electronic circuits that cause the computer to follow instructions from ROM (read only memory) or from a program in RAM (random access memory). By following these instructions information is processed. The CPU contains three parts.

1. Arithmetic Logic Unit - ALU is where the "intelligence" of the computer is located. It can add and compare numbers. To multiply 2×4 the computer would add $2 + 2 + 2 + 2$. The ALU makes decisions by determining if a number is greater, less, or equal to the other number. Processing is completed in nanoseconds, which is a billionth of a second.

2. Memory - Two types of memory contained on a chip are RAM (Random Access Memory) or ROM (Read Only Memory). ROM memory has been installed on your computer by the manufacturer and cannot be altered. ROM is the memory that determines all the basic functions of the operation of your machine, such as startup, shut down, and placing a character on the screen. RAM is temporary memory, which displays the information you are working on. RAM remembers what you see on your screen while you are working. Today's applications required large amounts of temporary memory, which may require you to upgrade and add more RAM memory.

3. Control Unit - This is the part of the unit, which directs information to the proper places in your computer, such as calculation of information by the ALU unit or to store and print material.

Output

Output devices such as a monitor or printer make information you input available for you to view or use.

A monitor's front is called a screen with a cathode ray tube (CRT) attached to the screen. Portable computers use a (LCD) liquid crystal display. Today's super video graphics array (SVGA) monitors display 256 sharp and clear colors.

Printers used with computers fall into two categories, impact or nonimpact. Impact printers, such as dot matrix print by contact against a ribbon making imprint on paper. Inkjet printers print images by not touching the paper. Ink jet printers spray ink onto the page while a laser printer works like a copying machine. Laser printers print a higher

quality product but cost from \$500 to \$10,000 whereas an ink jet produces better quality than a dot matrix and can be purchased from \$150 to \$300. The personal computer user most commonly purchases an ink jet printer for home use.

• **Web- Based Admission**

Technology is changing the way we live our life. It has added many comforts and various facilities, services have improved significantly. We can now book our railway tickets, bus tickets, airline tickets online sitting at home. We need not have to stand in long queues. Even we can order our lunch online for free home delivery. Technology can be used to improve various administrative and educational processes as well. Every day we get various news about dissatisfaction of the students, parents about various admission processes. Technology usage is minimal in admission processes. Pictures of long overnight queues of the parents for KG admission, long queues in the banks to collect college application forms of various institutes is the norm in India. Students, parents had to spend lot of time in filling admission forms of their ward. Sometimes there are errors of form misplacement by courier agency, institute authority. Then of course students, parents need to wait for the merit list. Compilation of the merit list as per caste, reservations, quota criteria is also big task in front of institutes. By this time I am sure long admission queues, chaos have come in front of you. As every one of us has experienced this situation at least once.

Thanks to technology, now things are going to change in India. Now you will be able to even submit application form of any school, colleges online sitting at your home. Many organizations in the USA, Europe are implementing such standards where you would be able to submit online admission forms of multiple institutes using single source. There are many advantage of implementing online admission process for particular institute. It significantly reduces paperwork and institute can get benefits from the government or accreditation bodies for improving Institute Grade. Educational Institute can contribute in reducing global warming effects and thousands of trees can be saved due to saving in printing of admission forms, brochures, receipts etc.

• **E- Classroom**

a. Open educational resources

Across the globe there is increasing interest in different forms of school-based modes of teacher education and in using the tools offered by new information and communication technologies (ICT), including open educational resources (OERs), for large-scale provision (Moon, 2007). These initiatives not only increase capacity for teaching training systems but also offer opportunities to enhance the articulation between theory and practice and to support teachers more effectively in becoming reflective practitioners. Recent reports from the sub-Saharan African region indicate some ambitious experimentation but, as yet, few initiatives utilizing

educational technologies within the training process itself (Farrell et al., 2007). School-based teacher development programmes demand resources and reference materials to guide and grow teachers' classroom practices; these are frequently scarce in our country. But the recent advent of open content or open educational resources (OERs), a global intellectual resource of teaching materials, offers a significant breakthrough

b. Virtual Classroom

A Virtual Classroom is a private online meeting space for synchronous (real-time) learning activities. Virtual Classrooms typically include some or all of the following elements:

- text chat- People can type what they would like others to see in real time
- Shared whiteboard- A blank screen where people can share information, write comments, and draw pictures in real time.
- Presentation capability- Instructors have multiple options for presentation of content from audio/video/multimedia lectures, to self guided power points
- Audio- People can share information with a microphone and speakers
- Polling or survey tools- The ability to take a survey and publish the results possibly on the white board
- Breakout rooms- A way of breaking the session into or more sub rooms where people can listen to a guest speaker, ask questions, or just interact in a smaller setting.
- Web tours- Using tools included in many virtual classroom programs people can be taken on a virtual tour of a webpage or project through sharing of a program.

Virtual Classrooms are sometimes dedicated tools (like Elluminate, WebEx, Centra), and sometimes are part of a Course Management System such as Blackboard. BlackBoard's Virtual Classroom does not include some of the more sophisticated tools that Elluminate does, such as audio, polling, and web tours. There are a variety of different types of activities that can be found in a virtual classroom. There are several types of activities that can occur within the virtual classroom environment. Generally these topics can be split into two different categories, unsupervised activities and teacher led sessions.

• **E -Examination**

From the point of view of modern teaching that is heavily interfused with e-learning the question arises whether paper-pencil exams are the appropriate exam format for such teaching, or whether the disruptive change in format between e-learning oriented teaching and paper-pencil exams actually thwarts the prospects of success. In this context, computer-based examinations, so-called

E-Examinations, have in the past few years proven to be a central instrument to reduce the marking load of teaching staff as well as to enrich examinations with multi-media formats (Perkins, 2002).

a. Digitalized Questions

E-Examination is evaluation of answer booklet through electronic devices in the type of evaluation. The response is also on screen and question paper/question bank should be available on screen. The model answer of question paper/question bank should be available on screen serial no. of question, section of question short answer or long answer question are clearly uploaded or the device. The marks are also mentioned according to their section and question no. During evaluation the command are provided by developer of programme for totaling the marks, and through over the pages, and next answer books. For digitalization of question or question bank there is must uploading model. Answer by which its clear that what points are compulsory for mentioning is answer. For example – The question is what do you know about Muslim education? There is must mentioning in answer Bismillah ceremony, Maktab and Madarsa method of education, teacher students relation etc.

b. Online Examination

Online examination system is very useful for educational institute to prepare an exam, save the line that will take to check the paper and prepare mark sheets. It will help the institute to testing of students and develop their skills. The effective use of online exam system any examinational institute or training centers can be use it to develop their strategy for putting the exams, and for getting better results in less time. Online exam is being launched a need for a destination that is beneficial for both institution and students. With this site institutes can register and host online examination. Student can give exam and view their results. This site is an attempt to remove the existing flows in the manual system of conducting exams.

c. Learner Centered Examination through e-learning

E-learning has rapidly emerged over the past few decades as an effective alternative to traditional classroom-based education. Because it transcends geographical and time boundaries, e-learning has the potential to reach a much wider, even global, audience. It is also a very learner-centred form of education, and given its inherent need to archive teaching material, can be a useful platform for storing and sharing information (Zhang et al., 2004). Finally, despite the large initial start-up costs for e-learning, it has the potential for enormous cost-savings in the long term

Using e-Learning systems, course lecture contents such as that delivered in traditional classroom settings, can be saved to the 'knowledge server' to add the cumulative knowledge stored by teacher education institutions. Such content can then be used by students, as well as others who may be interested. Further, the quality of the

'knowledge server' will likely only get better with time, especially as more information and data is gathered and archived. Clearly, e-Learning goes beyond the limitations imposed by time and space (such is typical in traditional educational systems) to provide learning opportunities for all members of the general public. e-Learning also can enable one to enjoy high quality academic programs. Moreover, since e-Learning is based on self-regulated learning, educational institutions should evolve to become learner-centered educational entities

d. E Question Bank

This is a database to access different set of Question papers of all the courses offered by the University. This E-Question Bank database comprises of set of old question papers in all the subjects since thirty years till date. This is categorised as Undergraduate, Post Graduate, Higher Specialty and P.G.Diploma. Each of this has a 'Pop-Up' menu to choose the desired course. On selection for e.g. M.B.B.S will display a screen with a list of subjects and year.

• E-Assessment

Assessment is a systematic determination of a subject's merit worth and significance using criteria governed by a set of standards. It is the structured interpretation and giving of meaning to predict or actual impacts of proposals or results. It looks at original objectives and at what are either predicted or what was accomplished and how it was accomplished. So assessment can be formative that is taking place during the development of a concept or proposal or organization with the intention of improving the value or effectiveness. It is inherently a theoretically informed approach. It is a systematic, rigorous and meticulous application of scientific method to assess the design, implementation improvement or outcomes of a program of is a resource- intensive process, frequently requiring resources, such a evaluate expertise, labor, time and sizable budget.

E-Assessment is the use of information technology for any assessment related activity. E- Assessment embraces a wide range of Teacher/student activity ranging from the use of a word processor to on screen testing e-assessment is becoming widely used as a generic term to describe the use of computers within the assessment process. Specific types of e-assessment include computerized adoptive testing and computerized classification testing (Hennessy& Deaney, 2004).

An e-testing designed to focus on lower level associations comprises two components:-

- (1) An assessment engine
- (2) An item bank

An assessment engine comprises the hardware and software required to create and deliver a test most e-testing engines run on standard hardware so the key characteristic is the software functionality. The software does not include the questions themselves there are

provided by an item bank. Once created the engine uses the item bank to generate a test. Traditional paper-and-pencil testing is similar but the test is pulled from the bank at only on time. An e-assessment system designed to focus on more sophisticated forms of knowledge requires some sort of interactive activity and a system for inviting teacher/students to reason or solve problems around that activity.

a. Hand –held student response system

An area of E-assessment that has seen extensive growth in recent years is the use of hand held student response devices (often referred to us clickers on voting device) these allow a teacher to carry out whole-group assessments, polls and surveys quickly and easily. They use either radio or infrared to communicate with a central hub that is usually attached to a computer. In many institution these device may also be used in combination with on interactive whiteboard.

b. Computer –Based Assessment

Computer based assessment refers to assessment which is built around the use of a computer the use of a computer is always intrinsic to this type of assessment. This can relate to assessment of IT practical skills or more commonly the on screen presentation of knowledge test. The defining factor is that the computer is marking or assessing the responses provided from candidates. It can be performed on an equivalent electronic device such as a cell phone CBA system enable educators and trainers to author schedule delivered report on surveys, quizzes test and exams. They may be a stand-alone system or a part of a virtual learning environment, possibly accessed via the World Wide Web.

c. Computer mediated Assessment

It refers to any application of computer within the assessment process the role of the computer may be extrinsic or intrinsic. It is, therefore a synonym for e-assessment which also describes a wide range of computer related activities. Computer often play no part in the actual assessment of responses but merely facilitates the capture and transfer of responses between candidate and human assessor.

d. Online Assessment

On assessment refers to assessment activity which requires the use of the internet. In reality few high stakes assessment session are actually conducted online in real time, but the transfer of data prior to and after the assessment session is conducted via the internet.

e. OMR (optical mark recognition)

OMR, the technology of electronically extracting intended data from marked fields such as cheek boxes and fill-infields on printed forms. OMR technology scans a printed form and reads redefined positions and record where marks are made in the form. This technology is useful for application in which large numbers of hand-filled forms need to be processed quickly and with great accuracy, such

as survey, reply cards, question names and ballots. A common OMR application is the use of “bubble sheets” for multiple- choice tests. The student indicates the answer on the test by filling in the corresponding bubble and the form is fed through an optical mark reader. Optical mark recognition is the process of capturing human marked data from document forms such as surveys and tests. OMR is the scanning of paper to detect the presence or absence of a mark in a predetermined position. An OMR student marks their answer or the other personal information by darkening circles marked on a pre- printing sheet. After words the sheet is automatically graded by a scanning machine. Many traditional OMR devices work with dedicated scanner devices that shines a beam of light auto position on a page is then used to defeat the marked areas because they reflect less light than the blank area of the paper.

f. Bar code Reader

A bar code reader is an electronic device for reading printed barcode. it consists of a light source, a lens and a light sensor translating optical impulses into electrical ones. Additionally, nearly all barcode readers contain *decoder* circuitry analyzing the barcode's image data provided by the sensor and sending the barcode's content to the scanner's output port.

E- Grading

Grading

Grading in education is the process by applying standerized measurement of verifying level of achievement in a course. Grades can be assigned in tellers as a range (for example A to Z) as a percentage of a total number correct or as a number out of a possible total.

The Speak Model

The SPEAK is a model and tool for the self evaluation of learning in a group and community context. It is designed both to facilitate group discussion and self evaluation and to provide accumulative data for program me evaluation.

CONCLUSION

ICT in teacher education is the need of the hour. It has the potential to provide solution to many of the challenges teacher education faces today. The common fear that ICT shall replace a teacher is totally unfounded. Realization now seems to be slowly dawning on the teaching community that ICT is primarily to empower them and not to replace them. ICT is, therefore, not to be feared but to be embraced so as to empower our future generations by providing them high quality ICT- enabled teacher education program.

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