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# ICT ENABLED TEACHING AND LEARNING

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**Abstract:** - This article explains how 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 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. ICT not only enhances the learning experience of student but also helps them develop the skill essential to participate effectively in the world of affairs. Knowledge of ICT and skills to use ICT has gained immense importance for today's teacher. The new learning environment developed by the ICT is called Interactive Learning Environment. ICT aims at transferring the old traditional paradigm of learning to the new paradigm of learning. Thus, we must accept the new paradigm and technology in teaching learning process. 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.

**Key Words:** communication, ICT, interactive learning, technology

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## 1. 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 Space 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.

## 2. CHANGE OF SCENARIO

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.

## 3. INTEGRATION OF ICT IN TEACHING LEARNING PROCESS

**TECHNOLOGY LITERACY** -Basic digital literacy skills to use technology, ability to select and use appropriate software available including internet in computer laboratories or with limited classroom facilities to complement standard curriculum objectives, assessment approaches, lesson plans and didactic teaching methods, able to use ICT to manage classroom data and support their own professional development.

**KNOWLEDGE DEEPENING-** Ability to manage information, structure problem tasks, integrate open ended software tools and subject specific applications with student centered teaching methods and collaborative methods and collaborative projects in support of students deep understanding of key concepts and their application to solve complex world real problems, use network resources to help students collaborate, access information, communicate with experts to analyze and solve their selected problems and use ICT to create and monitor individual group plans.

**KNOWLEDGE CREATION** -Design ICT-based learning resources and environments use ICT to support the development of knowledge creation and critical thinking skills of students, support students' continuous reflective learning, and create knowledge communities for students and colleagues.

**IMPACT IN CLASSROOM** -Opportunities to deploy innovative teaching methodologies and to deploy more interesting material that create an interest in the students, enable better management of classroom and students there by improving the productivity of the tutor as well as the taught, enables the teacher to concentrate on other tasks such as research and consultancy, enables optimum utilization and sharing of resources among institutions thereby reducing the cost of implementing ICT solution and to find appropriate online resources that can be used offline or converted to a paper based resource. Ex-NRICH website offers enrichment materials for mathematics to pupils of all ages.

#### 4. STEPS TAKEN TO INTEGRATE ICT

- Eleventh Five- Year Plan (2007-2012) importance of ICT in education has been emphasized.
- National Curriculum Framework”(2005) emphasized the judicious use of technology to increase the reach of educational program , facilitate management of the system as well as address specific learning needs and requirements.
- Government of India has set up a national task force on information technology and software development to universalize computer literacy.
- Intel Teach to future program is a world wide effort to integrate technology in classroom.

#### 4.1 ORGANIZING ACTIVITIES FOR LEARNERS THROUGH ICT

Through ICT students can experience various stages of learning, such as critical thinking, problem solving, guided instruction, extra connect, cooperative learning and group monitoring.

- Simulations-provide excellent opportunities for teachers to create settings where students are led through critical thinking stages.
- Guided instructions-allows students to submit pieces of a project step by step, allowing for a rich feedback interaction between students and instructor. A problem like Textra connect or lotus notes allow draft essays to be submitted and returned.
- Cooperative learning-websites provide ready sites for discussions, cooperative groups are designed and assigned to do the activities by monitoring these groups, and the instructor can introduce timely prompts to redirect the conversation, posing problems that challenge the quo.
- Acceleration-children can be accelerated within their own class working independently, often with some additional support.
- Extension-moving outside the syllabus normally not covered in the curriculum.
- Enrichment-extending students understanding and applying them to other situations and problems to develop higher level problem solving and communication skills.

#### 5. ICT USAGE IN TEACHING LEARNING MATHEMATICS

It is quite possible to use ICT in mathematics lessons in a way that mathematics curriculum supporting IT group, produced the ways in which ICT can provide opportunities for students learning mathematics. This will enable students to manipulate diagrams dynamically and encourage them to visualize the geometry as they generate their own mental images.

- Learning from feedback-the computer often provides fast and reliable feedback, which is non-judgmental and impartial. This can encourage students to make their own conjectures and to test out and modify their ideas.
- Observing patterns-the speed of computers and calculators enable student to produce many examples when exploring mathematical problems. This supports their observation of patterns and the making and justifying of generalizations.
- Seeing connections-the computer enables formulae, tables of numbers and graphs to be linked readily. Changing one representation and seeing changes in the other helps students to understand connections between them.
- Working with dynamic images-students can use computers to manipulate diagrams dynamically. This encourages them to visualize the geometry as they generate their own mental images.

- Exploring data-computers enable students to work with real data, which can be represented in variety of ways. This supports interpretation and analysis.
- Teaching the computer-when students design an algorithm to make the computer achieve a particular result, they are compelled to express their commands unambiguously and in the correct order; they make their thinking explicit as they refine their ideas.

### **5.1 ICT-AN AID IN MATHEMATICAL CONCEPT AND SKILL DEVELOPMENT**

- It enhanced power to deal with multiple representations via ICT- Ex. Symbolic, numerical and graphical representations of functions in algebra.
- It enhanced ability to visualize via ICT-Ex. Manipulations through software packages of 3-dimensional objects such as solids of revolution by calculus students as an aid in developing spatial visualization skills.
- It enhanced opportunity to construct mathematics knowledge via individual and group investigation using technologies-Ex. discovery of geometric properties by students via geometry software.
- It enhanced opportunity for individualized and customized diagnosis, remediation and evaluation- Ex. computer-aided instruction for algebra students having difficulty with factoring.

### **5.2 MATHEMATICAL PROBLEM SOLVING**

- It enhanced the ability to focus on the process of problem solving instead of the computational aspect-Ex. calculus students using a computer algebra system to perform numerical integration as one step in a multistep applied problem.
- It enhanced ability to solve realistic problems instead of being restricted to contrived problems having solutions-Ex. algebra students solving problem whose model is a cubic equation via the aid of graphing calculator.
- It enhanced opportunity for students to be introduced to interesting problems and associated mathematical subject matter much earlier than before possible-Ex. Students solving optimization problems via computer or calculator generated graphs or estimating probabilities via computer simulations.
- It increased opportunity to develop mathematical modeling skills-Ex. student's programming a computer to model a card hand using integers and thus calculate expected values of carnival games involving card hands.

### **5.3 MATHEMATICAL REASONING**

- It enhances ability to gather data in order to form conjectures and apply inductive reasoning-Ex. Use of calculator by students to find number patterns.
- It enhanced motivation to think logically in order to program a calculator or computer to perform desired tasks-Ex. students studying discrete mathematics programming a calculator to investigate the solution of a difference equation.

### **5.4 MATHEMATICAL COMMUNICATION**

- It enhanced motivation to communicate mathematics precisely in order to perform a desired tasks-Ex. Algebra students programming a computer to estimate the probability that a quadratic equation has real roots under varying conditions on the coefficients.
- It enhanced ability for the students to present mathematical ideas both orally and in writing-Ex. use of word processors to write reports which include mathematical symbols, tables and graphs and use of multimedia programs to communicate mathematical ideas.
- Generic software and open ended tasks that will engage students who are struggling but offer real opportunities for stretching the most able software such as logo, dynamic geometry software and

spreadsheets all have this potential but closed .Skill based software doesn't give the flexibility to encourage enrichment.

## 6. CONCLUSION

Emergence of information and communication technology has ushered a new era in our civilization in which digitalization has almost become a better alternative, because it has influenced every facet of human life including education. Transformation should take place in the way our teachers teach and students learn. The efforts of ICT is generally of sporadic nature in the education program .Teachers in India need to be prepared to face the challenges of 21st century for imparting the new age education; hence education program in India should integrate ICT component in such a way that teachers are enabled to face the new demands in their profession. Efforts must be made by the educationist to change the process of teaching-learning in order to prepare the students to adjust themselves to the society; this could definitely create a new learning environment and information rich society.

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