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ROLE OF ICT IN TEACHING AND LEARNING OF MATHEMATICS

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Abstract

The present conceptual research focused on the study is to discuss the role of the application of ICT tools in Mathematics teaching and learning. Teaching - Learning and conversation technologies (ICT) are an important part of daily life, including the teaching-learning process. Mathematics is considered the queen of all sciences. For a long time, the role of mathematics was reduced to the purely academic domain. But at present education system, the role of mathematics is not limited to the purely academic domain. It has entered the field of technology and industry. The present paper focused on the study of Role of Information and Communication Technology (ICT) in teaching and learning of Mathematics with prime objectives are (i) To understand the innovative best practices through ICT in Teaching-Learning of Mathematics. (ii) To discuss the role of ICT in Teaching-Learning of Mathematics. The methodology of the research is a different type involving an interpretative, conversation, observation and study secondary sources, like books, articles, journals, thesis, university news, expert opinion, and websites, etc.

Keywords: *ICT, Teaching-Learning, Mathematics*

Introduction:

Generally most of the mathematical concepts are in abstract form. So to understand those concepts we use (provide) concrete experiences to the children at primary level. But it is not possible to explain all concepts like space, plane, volume etc… In such cases and to teach all concepts in mathematics use ICT. Through ICT we can communicate effectively, with the help of multimedia features of all mathematical concepts. So, today we are known about the Role of ICT in teaching and learning of Mathematics. ICT stands for Information and Communication Technology. ICT helps to store, process, disseminate, retrieve and transmit information with the aid of technological medium. Today constructivist approach of learning is practiced that help learners to develop their own understanding of subjects based on their

previous experiences. In such a scenario, learners need to be supplied with multiple sources (preferably digital in nature) as a supplement to build their own knowledge and experiences of learning. ICT access helps learners to obtain latest information/ knowledge in different subjects. Teachers and Learners can access various online repositories, online libraries, online books, etc. Thus, ICT provides opportunity for extra reading and rectifying abstractness of concepts. ICT integrated education prepares Teachers and Learners to develop adequate skills and all-round development.

Meaning and Definition of ICT:

The abbreviation ICT stands for Information and Communication Technology. According to (Ajayi, (2008)), It is defined as a diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information. Then (Voogt & Pelgrum, 2005; Watson, 2006) explained ICT as being divided into two main approaches in education such as; ICT for education and ICT in education. ICT for education implies the development of information and communication technology for learning and teaching purpose while ICT in education involves the adoption of general components of information and communication technology in practical use in teaching and learning processes.

Characteristics of Information Technology:

- ✓ Acquisition, Storage, manipulation, man agement, transmission or reception of data or information.
- ✓ Real time access to information.
- ✓ Easy availability of updated data
- ✓ Connecting Geographically dispersed regions
- ✓ Wider range of communication media

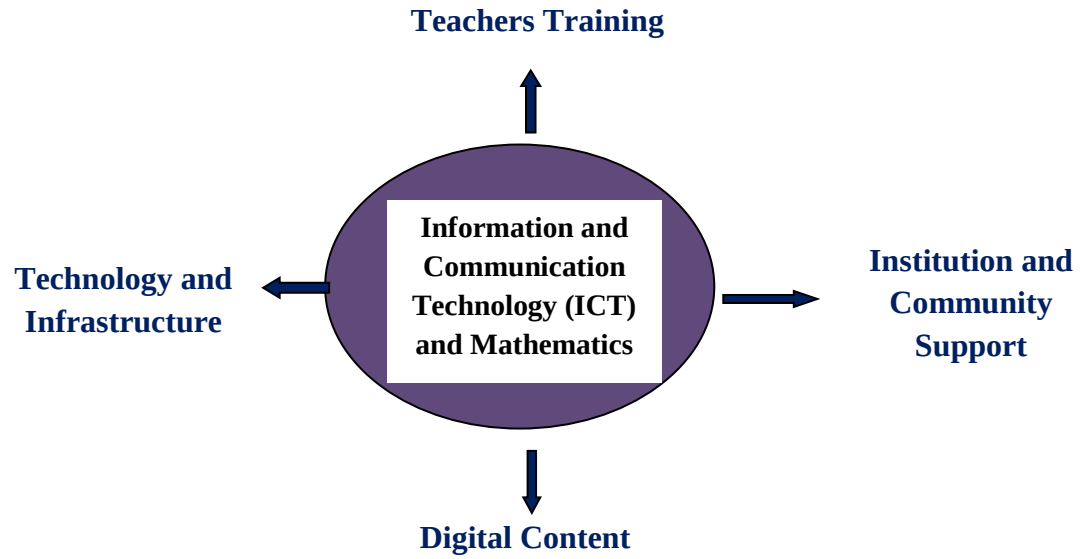
Objectives of the Study:

(i) To understand the innovative best practices through ICT in Teaching-Learning of Mathematics.

(ii) To discuss the role of ICT in Teaching-Learning of Mathematics.

Information and Communication Technology (ICT) and Mathematics:

Globalization and technological changes have created a new global economy powered by technology, fueled by information and driven by knowledge. The emergence of this new global economy has serious implications for the nature and purpose of educational institutions. As the access to information continues to grow rapidly, schools cannot be contented with the limited knowledge to be transmitted in a fixed period of time.



ICT-based education is about using computer and technology as tools to enrich learning in Mathematics. They have to become compatible to the ever expanding knowledge and also be equipped with the technology to deal with this knowledge. Information and communication technologies (ICTs) — which include radio and television, as well as newer digital technologies such as computers and the Internet — have been proven as potentially powerful tools for educational change and reform. When used appropriately, different ICTs can help expand access to education, strengthen the relevance of education to the increasingly digital workplace, and raise educational quality by helping make teaching and learning into an active process connected to real life.

Teaching and Learning and Mathematics:

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. 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 the Learner's Role of Mathematics:

From	To
Passive Learner	Active Learner
Reproducer of Knowledge	Producer of Knowledge
Dependent Learner	Autonomous Learner
Solitary Learner	Collaborative Learner

Changes in the Teaching- Learning Strategies of Mathematics:

From	To
Memorizing Facts	Inquiry Based
Rigid Delivery	Open & Flexible Delivery
Fixed Time & Space	Any Time Any Where
Face to Face Communication	No need of Face to Face Communication

These concepts and application of ICT in learning and teaching demand a new learning environment to effectively harness the power of ICT to improve teaching-learning of Mathematics. ICT has the potential to transform the nature of education like where, when, how and the way learning takes place. It will facilitate the emergence of responsible knowledgeable society emphasizing life-long learning with meaningful and enjoyable teaching and learning experiences; the move from reproductive model of teaching and learning to an independent, autonomous learning model that promotes initiatives, creativity and critical thinking with independent research. Learners are expected to collect, select, analyze, organize, extend, transform and present knowledge using ICT in authentic and active learning paradigm of Mathematics. Teachers are expected to create a new flexible and open learning environment with interactive, experimental and multimedia based delivery system. ICT helps for Mathematics teachers and learners to communicate and collaborate without boundaries, make learners autonomous and allow teachers to bring the whole world into classroom activities, especially the concept of on-line programs.

Components of ICT for Teaching and Learning of Mathematics:

a) Video conferencing:

It is a two way communication system. It is also called teleconferencing, it's the use of television video and sound technology (webcam) between people in different locations. It can be used to give and receive lectures irrespective of the location of teachers or learners.

b) World Wide Web:

The World Wide Web, known as www, w3 or simply the web, is one of the several internet resources developed to help, publish, organize and provide access to information on the Internet. The web was first developed by Tim Berners Lee I 1989 while working at CERN

C) Blog and Wikis:

Blogs and wikis are fundamentally web2.0 and their global proliferation have enormous implication for libraries and also in teaching and learning process. Blogs may indeed be a greater milestone in the history of publishing than web pages. They enable the rapid production and consumption of web based publications. Blogs contains posts some time similar to journal entries, from a person or a group. The post are dated and listed in reverse chronological order. People can comment on posts as well as provide links to related sites, photos and blogs. Wiki is an online collaborative writing tool. According to (Richardson, 2006) a wiki is a collaborative web space where anyone can add content and anyone can edit content. That has already been published Wikis are designed to help groups collaborate, share and build online content and are especially useful for learners who are separated by time and place.

D) Social Media:

Social media are perhaps the most promising and embracing technology. They enable messaging, blogging streaming media and tagging .Some most commonly used social media are My Space. Facebook, Delicious, Frappr and Flickr networks that have enjoyed massive popularity in web 2.0. It is based on web2.0 technology. My Space and Face book enable users to communicate with each other, Del.icio.us enables users to share web resources and Flickr enables the sharing of pictures. Frappr is a bit of a blended network, using maps, chat rooms and pictures to connect individual.

Role of Teacher:

Teachers plays a vital role in the success of any program at the school. If the teachers are not fully comfortable and confident with the new approach to teaching, then there will be a limited impact on the teaching- learning process. Teachers has to be developed their mind set to integrate the latest technology in the Mathematics classroom teaching. Teachers should also know the right attitude and values, besides being proficient in skills related to teaching. Teacher is responsible for creating the warm environment in the class .He prepares the learning opportunities that helps the students in using the lessons of communication technology. Consequently , it is crucial that all the teachers should be prepared to provide their students

with these opportunities. Teachers training programme helps the teachers to acquire the basic skills and competencies to become a good teacher. ICT acts as the gateway to acquire more information which helps the teacher to become update.

Outcomes:

ICT playing very significant role in Teaching-Learning. Following are the outcomes of using the ICT in Teaching-Learning of Mathematics.

1. Mathematics background teachers have a more favorable attitude than Arts/Social Science background teachers towards Information and Communication Technology (ICT).
2. Assist seniors in accessing digital information efficiently and effectively.
3. Support undergraduate-centered and self-directed learning.
4. For educational enhancement through ICT Produce a creative learning environment of Mathematics.
4. Promote collaborative learning in a distance learning situation for Mathematics.
5. Offer more opportunities to advance critical (higher-order) thinking skills for Mathematics.
6. Through ICT for Mathematics, better education, including collecting quality.
7. Support teaching by facilitating entrance to course content.
8. Most of the teachers have a favorable attitude towards ICT.

Implications:

1. The use of ICT in Mathematics helps in developing critical and scientific thinking among the students and the teachers. It motivates the learner to participate in learning activities at any time and from anywhere.
2. ICT in Mathematics helps in exchange and shares ideas among teachers for professional growth.
3. ICT has also used to improve access and the quality of Mathematics teacher training. ICT tools enhance teaching, and facilitate learning using multimodal courseware, Integrate ICT using pedagogical innovations to develop higher-order thinking skills among learners.
4. ICT tools such as radio, T.V., Internet, computer, laptop, tablets, and many other hardware and software applications can be appropriated in the teaching-learning process. These tools can give benefits in the areas of content, curriculum, instruction, and assessment.
5. In India, mainly education has three levels that are primary or elementary level, secondary and senior secondary level, and higher level. The quality of all these levels can be adjusted by the use of ICT tools and techniques.

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