

Role of ICT in Teaching and Learning

Dr. Upasana
Department of Mathematics
Dayanand Mahila Mahavidyalaya, Kurukshetra, India
Email: upasnaahuja30@gmail.com

Abstract: Human beings ability to acquire knowledge and to impart this knowledge on others is one of the distinctive features. Development of Information and Communication Technology is characterizing the Information Age. Access to Information, new forms of communication and on-line services in commerce, entertainment, culture and education are some of the outcomes of ICT. Information and Technology finds its applications in many fields of education. In Mathematics, it impacts the training of the students with main focus on the easier adoption of mathematical concepts, procedures, easier identification of problem situations. With these impacts the ICT is strongly emphasized to enhance the teaching of mathematics but this integration seems to be somewhat difficult than expected. This paper gives the review of the role of ICT in various educational programs.

Keywords: ICT, Mathematics, Teaching and Learning, Education Programs.

I. Introduction:

Information and Communication Technology refer to the collection of resources which are used to access the information and sets up new forms of communication. Generation, Distribution, collection and administration of the information is done in ICT. ICT consists of the services and the media for the collection of the information, storage, further processing, transmission and the presentation in all the forms as text, voice, image, video etc. ICT consists of two components: ICT infrastructure and the services. ICT infrastructure refers to the physical telecommunication network and the services refer to the protocols that are used in the ICT.

This is this era of the technology where the development of the technology has a great impact on the education. This is integrated in both teaching and learning practice. There are several ways to use the computers and related technology in class. The use of technology in the education has a strong impact on the learning process, so it is advised to use that. Many fields of the education are strongly connected with the technology. Technology and Mathematics forms the strong connection. In most of the countries, the Mathematics is considered as compulsory subject at all levels of education. Due to high importance of this subject, Governments ensures the high quality of the knowledge and skills provided.[1]. This is done to enable the citizens to gain Mathematical skills, insights, values which provide the problem-solving attitude in daily lives. Syllabus are modified at various stages to meet the global standards.

II. Components of the ICT System:

Various components of ICT are as follows:

Hardware: Hardware consists of the input and output devices as the keyboard or scanning devices to enter the data, printer to display the output. The microprocessor based processing device is also included. The hardware device are mainly needed for the entering, processing and displaying the data in proper format[2].

Software: Software refers to the programs and the instructions that are applied while processing the data that was collected through the hardware device.

Data: Data can be of any form i.e text, image, video, voice etc. This data is entered through the input device that is used for further processing.

Procedures: Procedures refers to the protocols or the ways in which the task should be done. These are the set of rules which are to be followed for data processing.

Information: Information is the important component of the ICT. Raw form of information is referred to as Data.

III. Technology as tools of Teaching:

Various technologies are used in traditional classrooms. Some of the technologies are as Slide Projector, Television, Radio, Overhead Projector, Audio Tape, Video Tape. Use of computer in the classroom is an important asset. Computer in the classrooms helps the teachers to demonstrate new lessons and present new material. Microphones helps the students to hear the teachers more clearly avoiding the noisy classrooms. Learning will be better with the microphones. Smart phones can be used to enhance the experience of the classroom by providing the feedback. Whiteboards are the interactive mediums that helps students to draw, manipulate the images. These are the aids in the visual leaning. Many study tools are being provided online that make the study more interesting. Projectors help the teachers to demonstrate the lectures in interactive manner that makes the learning more effective. ICT finds applications in various fields. Fig.1 below shows some of the ICT applications.

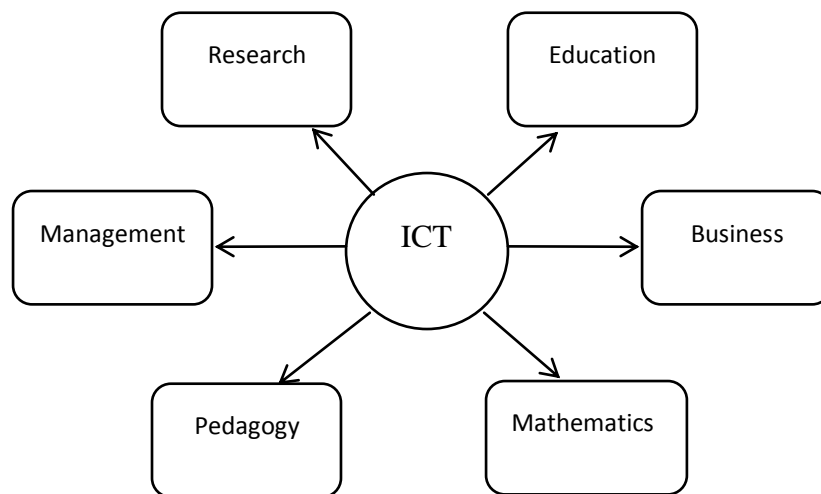


Fig.1 Applications of ICT

ICT in Education:

ICT has become the important tool in the modern society. Many countries have included ICT understanding as part of core education[3]. Mastering the skills of ICT is considered very important for understanding it. But that integration of ICT in education has many challenges because it transforms learning and teaching process[6]. ICT is integrated in learning activities on basis of understanding and informatics methods[3]. In late 1970s, when the first computers were introduced in the schools, the concept of introduction of the computer in education was put forward. The term IT was used to refer the computers and other peripheral devices such as floppy disk drivers, scanners, printers and digital cameras. In field of education the ICT refers to the Information and Communication Technologies that enables to receive, communicate or exchange information with others.

ICT in Research:

ICT is widely used in the research activities. Role of ICT is grown in both developing and developed countries. It has many impacts on the research as complex calculations on large data set is easy these days due to increase in bandwidth and computing power. Research is not concentrated to just one city and is spread across the world because of the communication links available. Digital libraries provide access to all the academic resources that are useful for the research. The best use of ICT in research is in data processing. ICT in research makes use of online databases and research libraries. This provide the online access to thousands of latest research reports and articles.

ICT in Mathematics:

Mathematics is considered the complex and difficult subject. Integration of ICT in mathematics helps to find the key findings and resources that causes the significant changes in mathematics teaching. Teaching and learning in mathematics is changed due to ICT integration. Calculator have made the complex functions easy. Many devices are available that are used to collect the data and manipulate the data. Use of computers, calculators, charts and graphs, geometric shapes are some of the applications of the ICT. Main contribution of ICT is in problem solving tasks and exploring the patterns and relationships in mathematics. Many available research evidence are there that show the impact of ICT in learning and teaching the maths[4].

Modern mathematics teaching requires a dynamic teaching to enhance the skills and abilities of the students. Combination of application of modern teaching aids, forms and methods are part of ICT in mathematics. The main hurdle of ICT in mathematics is involvement of ICT in mathematics from the first to fifth grade[5] as processing content of topics of integers, geometry affect the training of students for easier adoption of concepts and procedures. This empowers the students to identify and resolve the problem situations in daily lives.

ICT in Pedagogy:

The integration of ICT with a new pedagogy changes the role of teachers and increases the learning, self-regulation and collaboration of the students. ICT is used to complement teacher's existing pedagogical philosophies. It provides the knowledge bases system that includes the knowledge acquisition, strengthening and spreading. As information is the key resource in learning and teaching. Main functions of ICT in national educational growth is to deliver all learning experiences to the learners, provide the content in different forms, provide two-way communication between students and tutors[7].

IV. ICT Benefits for teachers:

These days many online resources are available which can improve the teaching. Many applications can be used by the teachers to enhance the traditional way of teaching and engage students upto their interest. Internet provides access to wide range of information that can be used by the teachers[8]. Online lessons and assessments are available which help teachers in saving time which can be utilized for helping the students who are struggling with the subject.

V. ICT Benefits for students:

Students can be benefited with the ICT as modern learning is about collaboration of communication, skills in the learning in more effective and presentable form. Presentations, learning from online sources serve as visual aid in learning. ICT helps to concentrate more on the specific topic or discussion [9]. Use of projectors in learning make the study more interactive. Digital videos help to develop and retain the required skills more effectively [8].

VI. Conclusion:

ICT is an important tool in modern education. Integration of ICT in teaching and learning will improve the educational process. But this is also the challenge for the teachers to use ICT in that way which will be beneficial for students due to lack of knowledge of implementation and availability of ICT tools etc. Various tools of ICT as computers, projectors, internet-based communications are broadly used in education for collection of information and analysis of data. This is helpful for both teachers and students that acts as key component in modern education and research these days.

VII. References:

1. Debra N. A. Hayes "ICT and learning: Lessons from Australian classrooms" Computers & Education Volume 49, Issue 2 September, 2007
2. Anisha, Reena Rani "Role of ICT to Enhance Mathematics Teaching and to Raising Educational Standards" International Journal of Scientific Research Volume-6 | Issue-9 | September-2017 | ISSN No 2277 - 8179
3. Anderson, J. E. (2002). Information and Communication Technology in Education - A Curriculum for Schools and Programme of Teacher Development. UNESCO 2002
4. Becta. (2003). Using Web-Based Resources In Primary Mathematics. Retrieved June 10, 2017, from Becta ICT Research: <http://webarchive.nationalarchives.gov.uk/20130401151715/http://www.education.gov.uk/publications/eOrderingDownload/15014MIG2799.pdf>
5. Wood, R., & Ashfield, J. (2008). The use of the interactive whiteboard for creative teaching and learning in literacy and mathematics: a case study. British journal of educational technology, 39(1), 84-96
6. Du Toit, J. (2015). Teacher training and usage of ICT in education. New directions for the UIS global data collection in the post-2015 context. UNESCO Institute for Statistics, Retrieved, 16
7. Okeh O. D. & Opono, M. C. (2007). Information and Communication Technology (ICT): A veritable tool for national Educational Growth, Journal of Academics, 2(3), 234-246
8. Renu Bala, Rimpi Rani "Role of ICT in Research" International Conference on Recent Research and Innovations in Sciences, Management, Education and Technology, March 2018
9. Sara Hennessy, Kenneth Ruthven, Sue Brindley "Teacher perspectives on integrating ICT into subject teaching: commitment, constraints, caution, and change" Journal of Curriculum Studies, Volume 37, 2005 - Issue 2