

ICT (Information and Communication Technology): An effective tool in teaching and learning of Mathematics.

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Abstract: *In modern times, ICT in classroom Mathematics is the need of the hour. Mathematics is that branch of science which deals with numbers, shapes, quantity and structure. For improving teaching-learning process, performance and academic achievement, ICT needs to be promoted in school education, including Mathematics. With ICT, learning of different branches of Mathematics becomes easy and accessible. The objective of this study is to explore the role of ICT tools in Mathematics teaching in modern times.*

Key Words: *ICT, ICT integration, ICT in Mathematics Education, Teacher training and Teaching.*

1. INTRODUCTION:

Mathematics is a subject which always occupies an important position in school curriculum. All sciences and other disciplines like Psychology, Sociology, Philosophy, Epistemology, Pedagogy, Curriculum studies and Sciences are based on Mathematics directly and indirectly. Youssef, A. & Dahmani, M(2008)[1] observed "Nearby every part of our lives involves Mathematics. It has played an essential role in the development of modern technology-the tools, materials, techniques and sources of power that makes our lives and work easier". The National Education Commission (1964-66) recommended Mathematics as a compulsory subject in school level. In school education it works like a bridge between school and higher education.

Integration of ICT in teaching and learning mathematics is a great challenge for secondary students and teachers. Technology can be considered as a most effective way to increase the knowledge of the students in a better way. ICT plays an important role in developing the education system in school education. (Chao, 2015)[2]. ICT is systematic for collaborative and individual learning (Shunaq, 2002)[3]. ICT supports mathematics for composing, revising, editing, publishing, calculating, making connections, visualizing data, finding importance, varieties of notions, formulae, symbols, figures and graphs are available in mathematics which sometimes become very difficult to demonstrate on a white/green boards like 2 Dimensional & 3 Dimensional figures, charts and graphs. By using various applications, utilities and software of ICT a lot new stuff can be taught to the students. "Nowadays mathematical software package has improved; however technology is still marginally integrated into education at all levels". (Lavicza, 2008)[4]. "Traditional techniques like using chalk boards for teaching, using textbooks, listening lessons on radios, watching chapters on television are now gradually diminishing from the school education and advanced techniques are emerging in school education". (Cape Teaching and Leadership Institute, 2007)[5].

2. METHOD:

ICT Tools Used

There are various ICT tools available which can be used in the classroom. Tools include Radio, T.V, Internet, Mobile Phones, Calculator, Computer, Laptops, Tablets, Data Projectors, Printers, and Scanners, e-mails and many other software applications and hardware. All such devices are used in attaining education and training for students and teachers. During Covid-19, online classes are taken by students through laptop and Cell Phones. Geometry Pad is helpful for geometrical constructions, taking measurements and drawing different figures and shapes.

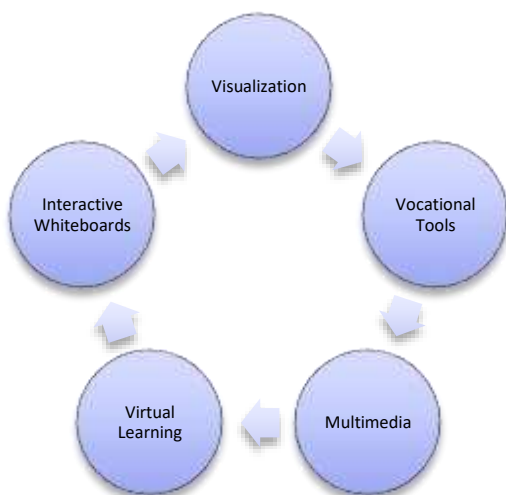


Figure 1

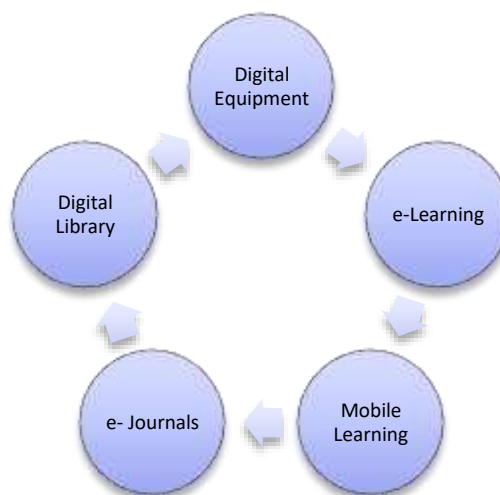


Figure 2

Various Technologies used in Mathematics Classroom.

ICT and its effects on students learning:

In today's world, ICT used in Classroom is believed to have a positive impact on student's success. Technology implemented in classes, interactive student involvement in the learning process is nurtured in learning process which gradually becomes attractive for the students. (Smaldino, Russell, Heinich & Molenda, 2005)[6]. ICT promotes greater collaboration among students and encourage communication and sharing of knowledge. It gives rapid and accurate feedback from students and their contribution towards positive motivation.

Major benefits of ICT are given below

- ✓ Teacher can extend his or her role beyond the classroom.
- ✓ Students may ask questions to the teachers via e-mails and receive answers without talking in front of large groups.
- ✓ Students can share their ideas with other students via e-mail.
- ✓ Students can spend less productive time developing strategies for solving complex problems and developing deep understanding of various mathematics topics.
- ✓ Students can use ICT as tool to perform complex calculations, plot graphs and help in solving mathematical problems.
- ✓ Digital information can be accessed and shared efficiently and effectively.
- ✓ ICT can create a more productive learning environment in students and teachers.
- ✓ Distance learning education system can be promoted through a collaborative medium of ICT.
- ✓ More opportunities and a wider range of learning skills can be obtained.
- ✓ Enhanced education and quality education can be acquired.
- ✓ It is also helpful in solving challenging trigonometric questions by drawing figures like given below.

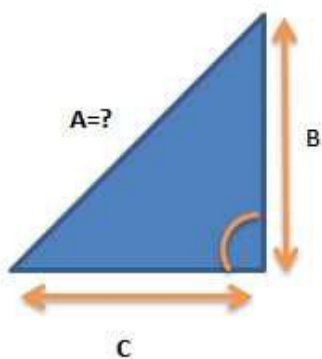


Figure 3

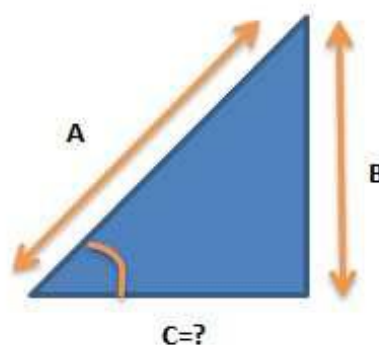


Figure 4

Figures showing role of ICT in Trigonometry

- ✓ It is useful in the study of sequences, functions, graphs.
- ✓ Can be used in co-ordinate geometry, probability and solving statistical applications also.

3. DISCUSSION:

ICT and teacher education

In the era of technology, the role of teacher has to be changed significantly from an instructor to a constructor; he needs to be a coach as well as a 'creator' in various learning situations. Many educational institutions have limited resources for buying textbooks, stationery, furniture and other useful classroom material. Few teachers also lack adequate qualifications and training to engage their students in proper learning. But nowadays the pace of technology and the emergence of a knowledge society have changed the traditional role of the teacher. In present scenario, teachers need to help their students in how to learn, how to grow in future, how to develop study skills, how to examine, evaluate, and how to access information. In future teachers will need to adapt new technology in teaching on mathematics classroom. A teacher should be able to integrate the use of ICT into teaching efficiently if he/she has acquired various competencies like creativity, flexibility, logistic skills, skills for project work, administrative and organizational skills as well as collaborative skills. The National Council of Teacher Education (NCTE) [7] in year 2000 has decided that, "Information and Communication Technology should be made as a compulsory part of B.Ed. courses". (Philipp, 2008)[8] has suggested the separating of learning structure from the issues of learning and teaching of mathematics which is counterproductive to the development of the content knowledge of the teacher. ICT & question based learning was found to be more effective by (Karami Attarn, 2013) [9] in enhancing the teachers and students knowledge content and other skills. Building up of positive attitude in use of ICT in learning process amid teachers preferably teaching mathematics was noticed by (Jabr, 2007) [10].

By these result can be said that educational technologies are highly supportable for several aspects of teachers.

4. ANALYSIS:

Key points to remember while teaching Mathematics in a classroom.

1. Create an effective environment.
2. Introduce the topic using multiple examples.
3. Encourage students for reasoning when solving problems.
4. Give summary and homework/assignments after finishing the class.
5. Raise the difficulty level slowly.
6. Create a proper and standardized testing pathway.
7. Observe, modify and reevaluate.
8. Encourage mathematics activity and games.
9. Emphasize 'Hands-on learning'.
10. Make the students to understand a particular concept.
11. Build excitement among the students and reward their progress.
12. And last but not the least, be patient.

5. FINDINGS:

Benefits and challenges of ICT

Benefits	Challenges
Efficiency is improved both in teaching and learning.	Insufficiency of trained teachers.
Personality development takes place rapidly.	Lack of integration of ICT into curriculum.
Increases motivation for study among students.	Poor internet connectivity or absence of internet in remote and rural areas.
Students participate more actively.	Power-cut problems in rural areas.
Wide range of updated learning material is open for access.	Problem of high cost instruments.
Enriched learning is provided through audio-visual and animated programs.	Availability of fewer funds in Government schools.
Enhances learning through interaction and collaboration.	Lack of technical support by the Government.

Table 1

6. RESULT:

It can be concluded that ICT supports mathematics teacher to improve their teaching learning tactics, update their subjective and pedagogical knowledge as well as other relevant skills. Students can benefit through stimulation and involvement in learning, gathering confidence in their mathematical capabilities, sharing and developing subjective ideas also. For improvement of the Teaching-Learning process, performance and academic achievement, ICT needs to be promoted at all the places of mathematics learning, beginning from school itself.

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