Enabling ICT integration in mathematics learning for the learner

Jayveer Singh
Central Institute of Education Technology, NCERT, New Delhi, India
Email:jayveern50@gmail.com

Abstract- *Mathematics, to most be complex and difficult subject in social scenario, past of the learner consider this subject as boring and burdening. Technology is an important component of all the teaching, facilitating, educating and learning processes involved in Mathematics. This is especially true if we seek "holistic transformation of Mathematics in a digital era". The integration of ICT in learning mathematics and its concepts (Theorems, postulate, derivations, formulas, and ideas) has added complexity to the fundamental knowledge of mathematics. ICT create platform for assessing mathematical ideas and information through web-resource. As searching, locating, selecting, extending, and authenticating etc. enabling ICT Integration in mathematics and other subject we can used for storage, transform, enhance, enrich, explore, research, and retrieve of the knowledge. The help of ICT-tools we enabling to transfer mathematical content and its concepts in a joyful way.*

Key World: Enabling, ICT (Information Communication and Technology), Integration, Mathematics, Learners, etc.

Introduction

Information and communication technology (ICT), including hardware and personal digital devices, software, and systems that manage, store, process, create, produce and communicate information, has become an important part of everyday life. The most prominent, recent and modern tool for teaching, educating, and facilitating is Information Communication and Technology (ICT) (Laborde and Starasser, 2010). There are several benefits of using ICT in teaching, educating, facilitating, and learning Mathematics. ICT has the potential to transform the nature of education; improving teachers design work, enhancing the roles of learners, teachers and educators in the learning process and helping to create a collaborative Learning environment (Khan, Hossain, Hasan and Clement, 2012) ICT (Information Communication and Technology) help us to teach mathematical facts, skills and concepts more effectively. ICT help increase learners' knowledge, give them an opportunity to practice and reinforce some mathematical skills or improve their mathematical understanding. ICT (Information Communication and Technology) defined as a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information (Gunton, 1993, Victoria, 2002). Information communication and Technology enables mathematics teachers to provide multiple representations of content (images, graphs, diagrams, tables) and multiple

options for expression (multimedia, PowerPoint). New dimensions, such as distance learning, computer-assisted learning, intelligent computer-assisted instruction, learner-centered software, and brain theory**.**

Mathematics Learning Through ICT

The range of technological tools and resources used to communicate, to create, to disseminate, to store, to transfer and to manage information. Integration Use of ICT in support and enhancement of attainment of mathematical objectives engaging the learner in meaningful learning. Mathematics teachers who use ICT are likely to develop more positive attitudes towards their work when they use ICT in teaching and facilitating mathematics, and he/she is likely to help maintain interest in a wider range of learners. The interactive and multimedia features can be used to help learner grapple with more challenging concepts such as 3D in mathematics. The National Centre for Excellence in Teaching Mathematics (NCETM) in England makes use of computers in a number of ways; interactive tutorials, hypermedia, simulations and even educational games NCETM, (1996). Integration of Information, Communication, and Technology (ICT) in education refer to the use of computer-based communication that incorporates into daily classroom instructional process. ICT is basically an umbrella term that encompasses all communication technologies such as the internet, wireless networks, cell phone, digital television computer (SWAYAM and SWAYAM Prabha or MOOCs,) and network hardware and software.

Enabling Mathematics Learning with ICT

Changes brought by the integration of ICT in the teaching and learning of mathematics can be seen at two levels: ICT for learning mathematics, and new strategy for teaching Mathematics with ICT. When a teacher uses ICT for learning mathematics, s/he can still design the teaching in an old-fashion way of face-to-face classical teaching, thus ICT is a mere technological tool which can assist learner to learn, to practices, to do exercises on certain concepts in mathematics. In this context, As Pustari (2014) states, mathematical software's have been the most ICT used in the teaching and learning of mathematics, e.g., Geogebra, Autograph, Maple, Mathematica, Math Lab, Wolfram Alpha, Desmos graphing calculator, O-Lab, Microsoft Mathematics, etc., whether it is a free software or paid ones. Inspiring mathematics learning with laptop or tablet touch technologies is offered by software like Dream Box Learning Math and GeoGebra, while Fluid Math helps students more easily visualize and work with equations and functions. ICT can be used in various ways where it helps both teachers and learners to learn about mathematics areas. Technology-based teaching and learning offer various interesting ways of mathematics learning.

Enabling ICT Integration in Teaching and Learning Mathematics

1. Enable learners to development of knowledge, understanding and skills about ICT integration with mathematics.
2. The enabling role of ICT in teaching, learning, facilitating, and educating Mathematics.

3. The integration of ICT can support a range of teaching, learning, facilitating, and educating mathematics approaches
4. Enhance Mathematics learning opportunities through accessing to a range of resources, stimulates materials, and learning tools of Mathematics.
5. Provide increased opportunities for learner's engagement and motivation.
6. Equip learners with the Mathematical knowledge and skills.
7. Support and development of effective Mathematics research.
8. Promote critical, problem solving, and creative thinking skills in Mathematics.
9. Increase teachers, Educators, Facilitators, and Learners efficiency.
10. Develop awareness related online Mathematical activity.
11. Increase opportunities to work collaboratively, locally, nationally, and globally.

The Development of ICT Integrating skills of Mathematics

1. Development of ICT integrated Mathematics formulas and functions.
2. Generate Mathematical ideas, plans, and processes to create solutions.
3. Represent and model of Mathematical ideas, information, and thinking in a variety of ways.
4. Apply Mathematical understanding across a range of contexts.
5. Use a range of Mathematical tools effectively and appropriately investigate and solve Mathematics problems.
6. Manage Mathematical Understanding and operate ICT ethically. And
7. Develop confidence in the use of ICT

Enabling ICT Integration in Mathematics

When planning, teachers, educators, facilitators of mathematics may consider the application of a range of ICT tools and resources to support teaching, learning, facilitating, educating, and assessing. Teachers/Educators/facilitator will identify tools and resources for use by learners based on specific learning needs, such as:

- multimedia creation tools, including cameras, microphones and audio editing programs
- Mathematical programming tools
- game-based Mathematical learning and game development opportunities
- Online collaboration tools, including blogs and wikis
- web 2.0 and web 3.0 tools
- GPS, geo-tagging, geographic information systems
- simulations electronic portfolios
- Productivity tools, including word processing, databases, spreadsheets, graphic editing
- Interactive manipulative, such as interactive geometry applications
- Contextualized learning experiences, including robotics, 3D modeling, virtual learning environments (including field trips), and web quests.

Approaches of ICT Integrating with Mathematics

1. Creating of e-Mathematical Content (as PDF, Games, Puzzles, animations, etc.)
2. Processing of e-Mathematical Content (as PDF, PPT, Games, Audio-Videos Lectures, etc.)
3. Storage of e-Mathematical (as PDF, Pictures, Audios, Videos, Games, Puzzles, animations, etc.)
4. Displaying of e-Mathematics (as PDF, Pictures, Videos, etc.)
5. Transformation of e-Mathematics (as Matlab, O-lab, Geogebra, MS-mathematics, PPT, etc.)
6. Transmission of e-Mathematics (Internet, teleconferencing, video-conferencing Mobile-conferencing, online-offline software's as O-lab, Doordarshan, DDH-Network, Swayam Prabha, Kishore-Manch, and educational televisions, etc.)
7. Exchange of e-mathematics (e-mail, Bluetooth, cellophane, SMS, Pen Drive and other addition data storage devices, etc.)

Key Benefit of ICT Integration in Mathematics

ICT-based tools provide pupils with an advanced communication capability, allowing them to use graphics, images and text together, to demonstrate their understanding of mathematical concepts (Jarrett, 1998). Some key Benefit of ICT integration in mathematics as follows:

- Promoting learning by doing and problem solving approaches
- Enables self-paced learning
- Provides access to wide range of up-to-date learning mathematics material.
- Enriches learning through a combination of audio-video, text-images, animation, and gaming.
- Enhances learning mathematics through interaction and collaboration.
- Provides a web-based platform that engages learner. As epathshala, Swayam, O-lab, Geogebra, matlab, online mathematics gaming,
- Provides social media mathematics video assessing as YouTube, Instagram, telegram, twitter, Facebook, etc.
- Provides scaffolding learning mathematics
- Increasing learner independence
- Provides Collaborative and Cooperative learning
- Exploring and representing mathematical content dynamically and many ways/forms.

Conclusion

Technology is an important component of all the teaching, facilitating, educating and learning processes involved in Mathematics. This is especially true if we seek "holistic transformation of Mathematics in a digital era". ICT in mathematics can enhance, enrich and extend learner's learning. We should to developed pedagogical and ICT integration in teaching and facilitating-learning mathematics. ICT create platform for accessing mathematical ideas and information

through web-resource. As searching, locating, selecting, and authenticating etc. Information communication and Technology (ICT) is seen as an important tool that will support and enhance mathematics and its application in recent time. The integration of ICT in mathematics enhance capabilities in teaching, educating, facilitating, transforming, learning, elaborating, and assessing. ICT support the knowledge of integration process of teaching, learning, facilitating, and educating. Integration of ICT in mathematics, enhance the knowledge, skill, understanding, attitude and positive behavior of learners.

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