ICT AND TEACHING LEARNING OF MATHEMATICS

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“The quality of education is not to be measured by its length and breadth but only by its depth”

-Vinoba Bhave
Development in almost all areas of life is based on effective knowledge of science and mathematics. The mathematics education community is engaged in a constant quest to find out how children best learn mathematics.

If only we could discover precisely how the child best learn mathematics then we could work out exactly how to teach the child subject in the most effective way.

Many would say that this is an impossible dream. We can never achieve ultimate professional enlightenment, not only because every child and every teacher is different, but because the social and cultural contexts keep changing. Schools are force to responsive to changes in social, political and economic situations, and the impact of advances in science and technology cannot be underestimated.
For many years, teachers taught and students were responsible for learning the material.

It was the student’s responsibility to acquire the knowledge for success.

The primary concern of the teacher was to impart the knowledge.
Learner centered philosophy

- Student learning is the primary goal of the teacher as opposed to teaching.

- The teacher must motivate the students to learn, participate, critically think and successfully perform in tests.
Process of Learning

Learning is a process in which four components interact:

(1) the teacher,
(2) the student,
(3) curriculum content and goals,
(4) instructional materials and infrastructure
Teaching / Learning Materials

Materials

Teachers ← → Learners
Learning Modes

- Learning by Objectives
- Learning through Experience
- Learning by Example
- Learning by Discovery
- Learning to learn
The modern philosophy of education

ICT in education is a much needed vehicle of achieving the modern philosophy of education whereby a student can decide on:

- **WHAT** he learns
- **WHEN** he learns
- **WHERE** he learns, and
- **HOW** he learns
WHAT IS ICT?

ICTs stand for “Information and Communication Technologies”

“diverse set of technological tools and resources used to communicate, and to create, store, and manage information.”
CLASSIFICATION OF ICT

ICT

Analogue media (Old ICT)
- Radio
- Television

Digital media (New ICT)
- Computer
- Internet
WHY THERE IS NEED TO INTRODUCE ICT IN TEACHING-LEARNING PROCESS ????????????????????????
1. Evolution of Education Technology

IMPACT

TIME

Internet: Greatest impact
2. CHANGE IN THE NEED & INTEREST OF LEARNER

- Due to globalisation, libéralisation
- Computer technologies has become a daily part of our life.
- Necessary to get job
- To be connected with digital world
3. Improve quality of education

• By using multimedia and retaining the interest of learner
• Provide a flexible education and relatively low cost
• Active learning
4. Enhance reach for equal educational opportunities

• Providing equal and same education to all irrespective of their status and location
• All time availability
• Creating a mobile education system
• Example: through distance education
Characteristic of ICTs

Anytime

Effective Learning

For All

Anywhere
Potential Of ICTs

Access

Increase Efficiency

Quality Learning

Quality Teaching

Skill Formation

Lifelong Learning

Planning & Management

Community Linkages
TECHNICAL SKILL Versus THINKING SKILLS

The emphasis in schools is increasingly on learning how to learn, rather than just acquiring specific technical skills that keep changes anyway. Children must have the ability to cope with change and accept innovation.

Their ICT skills need to be integrated with their analytical abilities, creative capacity, cooperative work skills, problem-solving strategies and communication skills.

This means students need to develop good technical skills, literacy and numeracy, and awareness of their own thinking and problem-solving strategies (metacognition) and, most importantly, self-management skills.
ICT IN MATHS

• Computer software can bring mathematical rules to life
ICT IN MATHS

• ICT enhanced deeper understanding of mathematics

- EVEN ODD NUMBER
- SHAPES
- MISSING NUMBER
- MULTIPLICATION
- REFLECTION
ICT IN MATHS

• Technology enables teachers to provide multiple representations of content (images, graphs, diagrams, tables) and multiple options for expression (multimedia, power point)
ICT IN MATHS

• Computer software can bring mathematical rules to life
• ICT-based mathematical activities can become a source of general problem-solving strategies that can be applied across the curriculum.
• Students can use applets available on internet for performing mathematical problem
ICT IN MATHS

• Suitable statistical software tools to eliminate hours of calculation
• The availability of ICT has changed the nature of teaching and learning in mathematics
• using graphing plotter software, dynamic geometry packages and graphing calculators, rather than using pen and paper
ICT IN MATHS

• Various forms of algebraic software, (e.g. numeric integration, definite integration, free form algebra, factorising and expanding)

• Technology enables teachers to provide multiple representations of content (images, graphs, diagrams, tables) and multiple options for expression (multimedia, power point).
How can ICT improve the teaching of maths?

ICT can make whole-class mathematics teaching:

**Easier**
Materials and resources can be quickly prepared, stored and retrieved.
Work can be saved for later continuation or review.
Work can be displayed or printed out at any stage and easily shared.

**Better**
The medium allows the presentation and flexible manipulation of resources.
It engages pupil attention, enables differentiation and facilitates interaction.

**Different**
It allows the presentation of a wide range of resources (for example, websites), which may not be accessible in any other way.
Access to web-based resources can help teaching and learning of mathematics in several ways, including:

- exploring, describing and explaining number patterns;
  - practising and consolidating number skills;
  - exploring patterns in data;
- estimating and comparing measures of distance, angle, time and so on;
  - experimenting with properties of shapes and geometric patterns;
- developing mathematical vocabulary and problem-solving skills.
KEY RESEARCH EVIDENCE ABOUT ICT IN MATHEMATICS

The use of ICT in mathematics can have positive effects in the areas outlined below.

**General benefits:**

- 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)
- Using the technology to carry out the manual labour of computations or drawing, frees the student to focus on strategies, and encourages a process of trial and error (Jarrett, 1998; Ruthven and Hennessy, 2002)
- ICT-based tasks provide a focus for extended collaboration between pupils (Hudson, 1997)
- The interactive nature of multimedia software motivates pupils and leads to improved performance (Moseley et al., 1999)
KEY RESEARCH EVIDENCE ABOUT ICT IN MATHEMATICS

• Specific Benefits:-
  • Technology speeds up the graphing process, freeing pupils to analyse and reflect on the relationships between data (Hennessy et al., 2001)
  • ICT has been shown to produce learning gains in graph interpretation amongst pupils (Hennessy, 2000)
  • Logo encourages pupils to develop problem-solving skills and to act on feedback (Yelland, 2003)
  • Logo helps pupils to learn geometric concepts and related skills (Clements, 2000)
  • Computer algebra systems (CAS) can improve pupils’ skills in unaided algebra and its understanding (Hennessy et al., 2001)
FACTORS FOR EFFECTIVE USE OF ICT

- The most appropriate hardware, software, and support is available to teacher and pupils
- Pupils are equipped with ICT skills which are adequate to achieve the objectives set for them
- Teachers are aware of the range of software available, and select programs to support particular learning skills
FACTORS FOR EFFECTIVE USE OF ICT

• On and off-computer time is balanced in accordance with learning needs
• Pupils with special needs have equal access to ICT through access devices.
• There is appropriate mediation by the teacher between pupils and computers, so that where pupils are expected to become active learners, the teacher provides support rather than direction
• collaborate Computer companies with Education institute to provide training to in-service teachers
• Organizing workshops and seminars on “the Use of ICT in the teaching-learning process of mathematics”
• Schools should prepare a schedule for a regular access to computers by students for preparing projects and assignments related to mathematics.
“Technology will not have a significant impact on student learning until teachers change the way they teach.”

Larry Cuban, 1986
Thanks !