



ROLE OF ICT TO ENHANCE MATHEMATICS TEACHING AND TO RAISING EDUCATIONAL STANDARDS

Mathematics

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ABSTRACT

This paper synthesizes the research literature on teachers use of Information and Communication Technology (ICT) in primary and secondary schools. ICT emphasis on improving the quality of subject teaching and learning. In this article we focus on the internal factors of influence on teachers use, or lack of use, of technology in the classroom. Our discussion attends to perceptions and beliefs about ICT and their motivating effects, technological literacy and confidence levels, pedagogical expertise related to technology use, and the role in mathematics education. These factors are discussed in light of significant infrastructure and other external issues. We conclude by drawing out a number of pedagogical implications for initial ICT base education and Mathematics development to bring schooling within developing contexts into the 21st century.

KEYWORDS

Information and Communication Technology (ICT), Mathematics Teaching, Educational Standards

INTRODUCTION

Technology is the need of the day and one of the most discussed subjects of our everyday lives. Almost everyone recognizes of these words like Face book, WhatsApp, Twitter, Computers, Smart-phones and tablets. The traditional education delivery system has been a classroom setting with a teacher giving a lecture and students listening and writing notes. Interaction between the teacher and student has been viewed as an essential learning element within this arrangement. However, innovations in educational technology use of proposal as delivery mechanisms have challenged this paradigm. Advances in Information Technology (IT) are enabling little used educational delivery methods such as Distance Learning (DL) to gain new life. In addition, the advances in IT have ushered in a new paradigm, On-line Learning (OL). The result is that many universities have adopted distance and on-line education as the next logical step in educational delivery systems. These systems are being promoted as the educational pedagogy of the future. Technology becomes a more widespread part of the Mathematics education. Schools and colleges cannot ignore the impact of technology and the changing face of curriculum.

The Components of an ICT System. There are some components to any ICT system, these are:

- **Hardware:** the physical devices that are needed to enter the data, to process the data, and to display the information in the most appropriate format. The hardware will include a keyboard or scanning device to enter the data, a microprocessor to calculate the readings into the amounts due, and a printer to print off bills to send to customers.
- **Software:** the program that stores data such as names and addresses, and different rates and charges, that when readings are entered instruct the processor to produce the results of the calculations.
- **Public:** Public Share the source of the data, even systems that run automatically need the software programmers to set the data up.
- **Data:** Which is entered by people for processing; such as 25,000 gas meter readings, or 10,000 students' module results?
- **Procedures:** Procedures are the ways in which tasks should be done as directed by the management of an organisation. This will include how data is to be used, how systems are developed to suit the required outcome. All administration runs using pre-determined procedures.
- **Information:** the output of all the processing from the ICT system, bills are presented for the gas company's customers.

Effective ICT use in education increases all round development students. If ICTs are to be used effectively that adequate teachers to develop new skills, explore their integration into their existing teaching practices, develop critical thinking and utility base curriculum,. However, ICTs can be important tools to help meet such increased needs, by helping to provide access to more and better educational content, aid in routine administrative tasks, provide models and simulations of effective teaching practices, and enable

learner support networks, both in face to face and distance learning environments, and in real time or asynchronously.

Objectives of ICT Implementation in Education:

- Improvement in Mathematics learning.
- Increase achievement in different education.
- Reduce of illiteracy rate.
- Emphasis on female literacy.
- Expansion of provisions of basic education and training in other essential skills required by children.
- Increased acquisition by individuals and families of the knowledge, skills and values required for better living and sound and sustainable development.

Information and communication technologies (ICT) has emerged as one of the most important aspects of human life and it has affected every aspect of school working including administration, time table, lesson delivery, project work, evaluation, examination system etc. ICT have made teaching-learning process more relevant for the learner and connected to real life. The education system is the main source of human resource development.

Computer Aided Design (CAD): A CAD software package allows a designer to create technical drawings and schematics. There are two main types of packages - 2D (two dimensional) which concentrate on 'flat' drawings having width and height, for example, a garden design program. The other type of CAD package is 3D (three dimensional) which allow you to deal with depth as well, for example a kitchen design application. The benefits of using CAD are that fast and accurate drawings are produced as well as tests are carried out electronically without the need of physically carrying it out, being time and money consuming.

Computer Aided Manufacture (CAM): This means to use a computer to program, direct, and control production equipment in order to manufacture products. Its primary purpose is to create a faster production process and components and tooling with more detailed dimensions and material consistency, which in some cases, uses only the required amount of raw material (thus minimizing waste), while simultaneously reducing energy consumption. For example, on the production line of a car plant computers will control the robots that spot-weld the car body together or the robots that spray paint the car.

Computer Integrated Manufacturing (CIM): Computer-integrated manufacturing (CIM) is the manufacturing approach of using computers to control the entire production process, it is the total integration of computer aided design and computer aided manufacturing. The computers that design the products are linked directly to the computers that aid the manufacturing process.

Electronic Point of Sales (EPOS): It is a computerized stock control system employed by firms; it works by a laser at the checkout scanning a product's barcode. A computerized database then matches it to the

correct item and the stock level is reduced by one. It prevents the firms carrying too much or too less of stock and sends an automatic reorder to the suppliers eliminating the time consumed.

Electronic Funds Transfer Point of Sales (EFTPOS): This refers to the technology which enables you to pay for goods using a credit or debit card electronically. It also enables the shop to electronically contact the bank to check that your card is valid and hasn't been stolen and also that you have the funds in your account to pay for the goods. You insert your electronic debit / credit card into a terminal device and type in your PIN number or sign to verify that it is your card. Once payment has been authorized by the bank the money will be removed from your account and electronically paid into the firm's bank account.

ICT focus on the acquisition of knowledge, self-learning, generic and transferable skills in communication, entrepreneurship, management and technology that are the characteristics of the learning society of today. Teachers play a crucial role in the adoption and implementation of ICT in education; however, studies show that teachers lack the necessary ICT knowledge and skills. Information and Communication Technologies (ICTs) are generally accepted as a modern instrumental tool which enables the educators to modify the teaching methods they use in order to increase the students interest and it is a new medium, a new way of representing, communicating and working with information.

In Learning Process ICT as a Agent of Change: Conventional Learning Process:

In the process of conventional learning emphasis was given on contents. It follows the particular course structure / syllabus for many years. Accordingly the subject wise textbooks & reference books have been written. By using relevant material to the subject teachers supposed to teach through lectures and presentation. Teachers used their lesson plans, tutorials, different way of assessment to evaluate student performance etc.

Competent Course Structure / Syllabus:

It is the need of the day to improve quality & structure of the syllabi by enforcing competency & performance based approach towards it. To include advance technology and practical approach is also one of the important. One such curricula requires,

- 1) Access to information types & different forms.
- 2) Student-centered learning though information access.
- 3) Learning environment concentrated on information access & inquiry.
- 4) Real life examples.
- 5) Teachers as mentors rather than content experts.

The role of ICT in the education at secondary level chronic and unavoidable. It is challenge to integrate ICTs with schools, into their strategies and educational process. It should be implemented at national & international level. It will be helpful to improve quality and flexibility, the widening access to the field of tuition. ICT can be an effective tool in supporting teaching and learning. However, it is now firmly established that its introduction into schools does not by itself improve the quality of education or raise attainment.

Encouragingly, there is growing and widespread awareness that the pedagogical and technical expertise of the teacher is absolutely critical here. This problem is further exacerbated by growing poverty and lack of funding. Effectively introducing technology into schools is also largely dependent upon the availability and accessibility of ICT resources (e.g. hardware, software and communications infrastructure). Schools are increasingly being equipped with computers for teaching, learning and administrative purposes, connectivity is improving and students are enthusiastic about using computers for learning, despite the lack of equipment available. Some countries are developing digital content for use across the curriculum. Nevertheless, access and usage of ICT, like the electricity supply itself, remain rather sporadic.

IMPACT OF ICT ON LEARNER ACHIEVEMENT

The positive impact of ICT use in education

ICT has a positive impact on students learning, critical thinking and mathematics achievement. It is also widely acknowledged that ICT can be used to improve the quality of teaching and learning in the school system (Yusuf, 2000). ICT provides a lot of services for

students including educational programmes, inexpensive printing, technology equipment, rentals classroom media stations, etc. Lecturers and students get relevant materials needed through the Internet. Such quality materials are used in equipping the students and upgrading their knowledge in their field of study.

Impact on Pedagogy

When ICTs are used properly to complement a teacher's existing pedagogical philosophies. ICT provides knowledge based system that includes knowledge acquisition, knowledge incubation, knowledge strengthening and knowledge spreading. It is evident that information is a key resource which permeates teaching, learning, research and publishing. To this end, Robinson (1991) in Okeh & Opone (2007) stated that the use of new information technology can serve three main functions in the national educational growth. These are to: a. deliver all or part of the learning experiences to learners; b. supplement and extend content provided in different forms other than printed (hard copy); and c. provide a two-way channel of communication for exchange between tutors and students with their peers for feedback or for learning, problem solving, advice, debate, and reports.

Computer Aided Instruction improve student performance :

Computer Assisted Instruction (CAI), which refers generally to student self-study or tutorials on PCs, has been shown to slightly improve student test scores on some reading and mathematical skills. These improvement correlates to real improvement in student learning.

To achieve goals

ICTs are seen to be more effective when the learning goals are clear. Schools have entrenched ICT into the curriculum, and demonstrate high levels of effective and appropriate ICT use to support teaching and learning across a wide range of subject areas.

Traditional versus 'new' pedagogies and standardized testing

Traditional, transmission-type pedagogies are seen as more effective in preparation for standardized testing, which tends to measure the results of such teaching practices, than are more 'constructivist' pedagogical styles. Some studies have looked only for improvements in traditional teaching and learning processes and knowledge mastery instead of looking for new processes and knowledge related to the use of ICTs. It may be that more useful analyses of the impact of ICT can only emerge when the methods used to measure achievement and outcomes are more closely related to the learning activities and processes promoted by the use of ICTs.

ICTs are used differently in different school subjects

Uses of ICTs for simulations and modeling in science and math have been shown to be effective, as have word processing and communication software (e-mail) in the development of student language and communication skills. The relationships between in-class student computer use, out of class student computer use and student achievement are unclear. However, students in OECD countries reporting the greatest amount of computer use outside school are seen in some studies to have more achievement.

Develop learner confidence and behavior

Which Students use ICTs at home, and for personal use, also use them in school more frequently and with more confidence than students who have no home access. "Young people with a computer at home are less likely to play truant at ages 14 and 16 than those without computer access. For example, having access to a computer at home is associated with a 5.8 per cent reduction in the likelihood of playing truant at age 16." (Underwood, 2009)

ICT AS A CATALYST OF INNOVATION:

New technology is one of the most influential forces that is changing the role of both the teacher and student. The old instructional model was based on the scarceness of information pre-technology. Teachers and textbooks were the only answer to acquiring information and delivering knowledge to a generation of students with few other ways to obtain it. Technology is now reinventing the role of teachers both in and outside the classroom which has hinted at significantly improved schools and curriculums and better educated students. Although technology has taken hold in many of today's schools, the concept requires continued cultivation in order to grow and completely change the landscape for learning. Educational leaders, administrators, parents, decision makers, community members, and others must also

be willing to reconsider their roles in education in order to support the teachers in delivering a learning experience that meets the needs and expectations of a new generation of students. A range of studies have looked at why teachers choose to use ICT. These typically involve conducting case studies of classroom use in a particular setting or from a longitudinal perspective. They portray the use of ICT in teaching as being inherently advantageous. Only a few reports adopt a quantitative approach exploring access, and the reasons why teachers in schools choose to use ICT in their classrooms.

Mathematics teachers face ICT Barriers:

Identified a range of physical and cultural factors that affect ICT use by teachers, including lack of reliable access to electricity, limited technology infrastructure (especially internet access, bandwidth, hardware and software provision), language of instruction and available software; geographical factors such as country size, terrain and communications; demographic factors such as population size, density and dispersion.

Conclusion:

ICT is considered an important tool for developing understanding about mathematical concepts. The challenge for teachers is to use ICT in various ways that promote mathematical thinking and concept development of a student. This paper discusses how ICT impact on education system. Information and Communication Technology (ICT) is broadly used in education for collection of information, administration and analysis of data. It includes a multiplicity of tools, such as computers, CD-ROMs, projection TVs, word processors, image graphic software, email, and Internet-based communication technology. ICT utilizes a broad range of technologies that are applied in the process of collecting, storing, editing, retrieving and transfer of information in various forms. In India, there is serious need for increasing the learning abilities of the students with the help of ICT.

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