

Integration of Information and Communication Technology (ICT) in Teaching and Learning in India

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ABSTRACT:

The aim of the paper is the investigation about the pedagogy in using ICT in teaching and learning. This paper reviews various applications of ICT in teaching and learning. Advantages and disadvantages of using ICT, in teaching and learning in India are discussed. Problems and issues in the application of ICT in education are discussed. It is concluded that appropriate use of ICT can change the scenario of teaching drastically. Application of ICT can increase effectiveness of teaching and learning in education. In this paper I have also discussed about the future prospects and challenges in this regard.

KEYWORDS: Information and Communication Technology, pedagogy, education

INTRODUCTION:

New technologies are changing the world. The world is in the era of Information and Communication Technology. There are a number of definitions of Information and Communication Technology (ICT). Some of them are given below:

1. The term "information and communication technologies" (ICT) refers to forms of technology that are used to transmit, process, store, create, display, share or exchange information by electronic means. This broad definition of ICT includes such technologies as radio, television, video, DVD, telephone (both fixed line and mobile phones), satellite systems, and computer and network hardware and software, as well as the equipment and services associated with these technologies, such as videoconferencing, e-mail and blogs^[1].
2. Olugbenga and Adebayo (2010) has defined ICT as collection, retrieval, use and storage and communicating information through the use of computers and micro electronic system^[2].
3. ICT Stands for "Information and Communication Technologies." ICT refers to technologies that provide access to information through telecommunications. It is similar to Information Technology (IT), but focuses primarily on communication technologies. This includes the Internet, wireless networks, cell phones, and other communication mediums^[3].
4. ICT (information and communications technology - or technologies) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning. ICTs are often spoken of in a particular context, such as ICTs in education, health care, or libraries^[4].
5. Today Information and Communication Technology has influenced every aspect of our life. We are using ICT in banking, shopping, social networking, advertizing, research and development, e-governance, education etc. Today ICT has become an inevitable part of the core of education. The latest developments of ICT are playing an important role in education. A lot of researchers have carried out research work on impact of ICT on teaching and learning. There are a number of studies available on the role of ICT on teaching and learning. These studies are based on the data gathered from students and teachers. Sunday A. Adeyemo has investigated in Nigeria that information and communication technology have significant effect in improving the students' knowledge in physics^[5].

6. Various new models of education are evolving in response to the research and developments in new technologies. The innovation is being applied on a large scale in teaching and learning. ICT is changing the way of student learning. ICT can be used in research, communication, problem-solving, and professional development. According to Reform Studies (2005)^[6]

THE REASONS FOR BRINGING TECHNOLOGY INTO SCHOOLS ARE:

1. To support thinking process,
 2. Stimulate motivation and self esteem,
 3. Promote equality,
 4. Prepare students for the future,
 5. Support changes in school structure and
 6. Explore technology capabilities
7. Education is very important for the development of any nation. Education is an instrument for national development and ICT provide more strength to this instrument. So we can say that ICT is the key for development. There is a decline in the young people's interest for science studies. This is a serious problem. There are reports in support of this fact. Use of ICT can solve this problem by making the science education interesting. ICT can also play an important role in teaching and learning of science subjects. In basic science subjects experimental knowledge is equally important. We can use ICT for theoretical as well as experimental teaching. Some educational institutes are using ICT effectively for the purpose of teaching, learning and evaluation. Class rooms and laboratories are equipped with ICT and multimedia resources in these educational institutes. ICT holds management the opportunity to revolutionize pedagogical methods, expand access to quality science education and improve the management of education system^[7].

SOME USEFUL MULTIMEDIA RESOURCES:

The development of the technology makes it possible to use the smart phone, tablet and PC in various ways for teaching and learning process. Omeje and Ugwuanyi (2008) enlisted Information Technology equipment as radio, camera, television, tape recorder, video, fax, telephone, microprocessors, word processors, computers, and more recently the Internet. Internet, Wi-Fi and Bluetooth enabled devices, broadcasting devices, smart phone, tablet, laptop whatsapp, face book, tweeter, e-mail, voice recorder, television and projector are some useful multimedia resources which are used for educational purpose in different ways.

COMPUTER:

Computers are most important instrument required for ICT. Different type of computers are required for various applications. Computers are innovation that started outside the education system. Today we cannot ignore the importance of computer in our institutions.

TABLETS:

Tablets are the smart substitute of computers. In most of the educational applications tablets can be used in place of computers. Tablets are light weight devices and so are easy to carry. Battery backup of tablets is also better than computers.

CELL PHONES:

In most institutions the computers in the computer lab are not enough. It is expensive to provide a computer to each student at institutions. Solution of this problem is allowing students to bring and use their own electronic devices or gadgets from home to utilize the E-library and other resources to support learning. The best option is to use cell phones as educational tool. All smart phones can access internet and can be used as

a substitute of PC for a number of applications. Government should provide tablets to the students who cannot afford to purchase such devices. Cell phones can be used to share educational material through Bluetooth and internet. Cell phone can also be used for recording lectures. Cell phones can be used taking photographs of figures, text, chart, experimental set ups, etc. In laboratory cell phones can be used as stop clock, calculator, compass needle, logarithmic tables, trigonometric tables, dictionary, e-book reader, etc.

E-BOOKS:

Today E-books are the important educational tool based on ICT. The popularity and availability of E-books have increased rapidly. E-books can be made the affordable alternative to traditional printed books. E-books are less expensive than traditional printed books. E-books are easy to handle. Thousands of E-books can be saved in a small device. An e-book can be downloaded in a few minutes. Sharing of E-books is very easy. E-books can be updated easily with the change in syllabus.

INTERACTIVE WHITE BOARDS:

An interactive whiteboard combines a dry erase whiteboard with an LCD projector and is usually mounted on a wall or floor stand. A computer is connected with LCD projector. Anything that can be done on a computer monitor can be replicated on the interactive white board.

AUDIO AND VIDEO RECORDERS AND PLAYERS:

We are using audio and video recorders and players as entertainment devices for many years. These devices can be used very effectively to enhance teaching and learning. In India we have not properly used these devices for educational purpose.

EDUCATIONAL SOFTWARE:

Educational software can be used to understand difficult concepts and complex mechanism. Many important educational software and Apps are available free of cost on internet. If we are able to integrate ICT in education then we can utilize such type of resources.

INTERNET:

Internet is a sea of information. Teachers can provide information about important links and websites of any subject or discipline to the students. According to Akpan^[8] (2010) the reasons for connecting schools to Internet are:

- a) Bringing real-world relevance into the classroom – electronic networking expands the learning context by bringing the real world into the classroom. Students and teachers can establish interactions connection with anybody or any source.
- b) Helping students perceive knowledge as constructed.
- c) Providing students with an effective module of lifelong learning.
- d) Fostering social communication and critical thinking skills.
- e) Increasing the authenticity of learning environment.
- f) Finding role module for students.
- g) Assuring equity.

THE BENEFIT OF ICT IN TEACHING AND LEARNING:

ICT can be used to visualize a complex process in teaching. It is time consuming to draw figures, tables, graphs, etc. on blackboard by chalk. With the help of a projector, we can save the valuable time which can be utilized for explaining difficult concepts and complex mechanism. Teacher is able to send class activities, study material and assignments through E-mail or SMS. Teacher and student can communicate

Anytime through Internet Application Of ICT in Teaching And Learning Has a Lot of Benefits. Some of Them Are:

1. Taking advantage of on-line books, articles and other study materials.
2. Better graphic presentation.
3. Interactive teaching and learning.
4. Increased communication between teacher and students through internet.
5. Computer based experimental sets in the physics laboratory.
6. Teacher can give instructions and notices to students very easily and quickly.
7. Teacher can provide study material, books, notes, etc. to students any time at a very little cost.
8. Sometimes costly experimental set ups are required to provide the practical knowledge of any topic in science subjects. ICT provides the solution of this problem by:
 - Broadcasting of the experiments performed at the laboratories which have any special facility.
 - Sharing of the experimental facilities through video conferencing.
9. ICT can be used for development of critical spirit.
10. Distance education and online courses can be made more effective by using Information and Communication Technology.
11. Increasing the effectiveness of teaching and improving students' learning.
12. ICT can be used for laboratory experiments modeling and computational activities.
13. 3-D video and animation can be used to visualize the concepts of physics.
14. Laboratory exercises can be explained with the help of simulation.
15. Graphical representations and animations can be used for better understanding very easily.

CHALLENGES:

We are not still using traditional technologies, such as audio recorders and players for educational purpose. It will be difficult to use the latest technologies. There are some issues about ICT that need to be investigated. Some of them are:

1. LACK OF INFRASTRUCTURE:

Computers, high speed internet and Continuous supply of electricity are the basic requirement for integration of ICT in education. Supply of electricity is not sufficient. Availability of internet connection and proper speed of internet is a matter of concern. 3G and 4G technology of internet is not available everywhere in India.

2. LACK OF TRAINING OF TEACHERS AND STUDENTS :

Today role of a teacher has been changed. The integration of ICT as a tool in the teaching and learning depends to a large extent on teacher's familiarity and ability of using ICT. Basic skills to use ICT as a tool for own subject-specific purposes are necessary. Knowledge of appropriate educational software, application, and websites are necessary requirement for a teacher to use ICT effectively in teaching and learning. Most of the teachers and students are not familiar with the use of ICT. So proper training is required to the teachers and students.

3. INADEQUATE FUNDING:

Proper funding is required for this purpose. The heavy investment is needed for the integration of ICT in education. In a developing country like India it is not easy to invest the heavy amount on the infrastructure required for Information Technology based teaching learning method. Training of students for smart use of ICT is also very important. Financial condition of the students is such that they cannot purchase the computer or smart phone which is very necessary to utilize all the benefits of smart class.

CONCLUSION AND RECOMMENDATIONS:

Teaching and learning can be enhanced by using ICT. ICT play and will continue to play a significant role in advancing knowledge in the modern world. It has been proved that appropriate use of ICT and other multimedia resources can change the scenario of education dramatically in positive direction. There are a number of studies available in support of this theory. By providing the basic knowledge we can ensure that the ICT facilities are positively accepted not only by teachers but also by their students. Now a days teaching approaches are shifting from teacher-centered to student-centered. Most of the teachers believe that ICT is a very effective tool in teaching but they do not use it due to some reasons. The constraints in using ICT should be removed. Christodoulos Tasouris has investigated Physics teachers' beliefs about the use of ICT in Cyprus which has indicated that although Physics teachers consider ICT as an enriching teaching and learning tool, a range of limiting factors limit them either to impede the use of ICT or even to avoid it at all^[9]. The focus of this paper was to evaluate the role of Information and Communication Technology on teaching and learning of physics. The research in the field of using ICT in teaching and learning Physics can be useful for policy making. It is considered very important to make the following recommendations based on the above discussion.

1. Government should provide laptop to all teachers.
2. Government should provide tablets to the students who cannot afford to purchase.
3. Institutes should be provided grant to develop infrastructure necessary to use ICT. Classrooms should be equipped with projector and computer having internet connection.
4. Institutes should provide internet facility to students through. However there should be a system to check the activities of students on internet.
5. There should be continuous power supply to all educational institutes.
6. Proper training should be provided to students teachers and non-teaching staff of all educational institutes to use ICT. For this purpose training courses, conferences, seminars and workshops should be organized.
7. Institutes should facilitate their library with E-resources like : INFLIBNET and DELNET.
8. Specific software, programmes, packages, applications, websites, etc. should be developed by experts for all subjects.
9. Qualifying and foundation courses on ICT should be included in curriculum.
10. ICT should be used to increase the effectiveness of Online and distance learning programme.

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