

Information Communication Technology (ICT) in Education: Advantages & Challenges

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Abstract

ICT have become commonplace entites in all aspects of life. During the past few years, Information & Communication Technology has changed our daily activities in many ways. This article discuses use of ICT in Education. Within education, education is a very socially oriented activity and quality education has traditionally been associated with strong teachers having high degrees of personal contact with learners. The use of ICT in education lends itself to more student-centered learning settings. The ICT has revolutionized teaching–learning process. One of the goals for integrating ICTs in education is to enhance teaching-learning practices there by improving quality of education. Considering that ICT plays an increasingly important role in society, especially if we take into account social, economic and cultural role of computers and Internet, it is clear that the time has come for the actual entry of ICT in the field of education. ICT based education is definitely the direction towards which the whole world is progressing.

Keywords: *ICT, Education, Teaching-Learning, Technology Integration, Barriers and Solutions of ICT use, Teachers' attitudes, beliefs on ICT use, Drawing, Worldwide, Knowledge, Research, Expreience, Agent, Change and Computer.*

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I. Introduction

Information and Communication Technology (ICT) includes computers, the Internet, and electronic delivery systems such as radios, televisions, and projectors among others, and is widely used in today's education field. Kent and Facer (2004) indicated that school is an important environment in which students participate in a wide range of computer activities, while the home serves as a complementary site for regular engagement in a narrower set of computer activities. Increasingly, ICT is being applied successfully in instruction, learning, and assessment. ICT is considered a powerful tool for educational change and reform. A number of previous studies have shown that an appropriate use of ICT can raise educational quality and connect learning to real-life situations.

ICT tends to expand access to education. Through ICT, learning can occur any time and anywhere. Online course materials, for example, can be accessible 24 hours a day, seven days a week. Teleconferencing classrooms allow both learner and teacher to interact simultaneously with ease and convenience. Based on ICT, learning and teaching no longer depend exclusively on printed materials. Multiple resources are abundant on the Internet, and knowledge can be acquired through video clips, audio sounds, visual presentation and so on. ICT therefore provides both learners and instructors with more educational affordances and possibilities.

ICTs are making dynamic changes in society. They are influencing all aspects of life. The influences are felt more and more at schools. Because ICTs provide both students and teachers with more opportunities in adapting learning and teaching to individual needs, society is forcing schools to aptly respond to this technical innovation.

The education has a vital role in building the society. Education determines the standard of society. The quality of education helps to empower the nation in all aspects by providing new thoughts, the ways of implementation of various technologies and so many such things.

The quality of education is the basic need of the society. There are a number of effective teaching & learning methodologies in practice. Technology is the most effective way to increase the student's knowledge. Here comes the role of ICT in the education sector! Being an academician, I cannot imagine education without ICT. Nowadays, ICT (specially an internet) plays an imminent role in the process of integrating technology into the educational activities.

Concept of ICT

ICT is an acronym that stands for “Information Communication Technologies”. Information and communication technologies are an umbrella term that includes all technologies for the manipulation and communication of information. ICT considers all the uses of digital technology that already exists to help individuals, business and organization. It is difficult to define ICT because it is difficult to keep up the changes they happen so fast.

ICT is concern with the storage, retrieval, manipulation, transmission or receipt of digital data. The definition taken from the guidance in the QCA schemes of work for ICT is

“ICTs are the computing and communication facilities and features that variously support teaching, learning and a range of activities in education.”

Information and communication technology (ICT) refers to the creation, gathering, processing, storage, presentation and determination of information and also the process and devices that enable all this to be done. Information manifests itself wherever and whenever we find or create any patterns. Information should be meaningful, surprising and new, in conformity and linked with previous knowledge, correction of previous knowledge, accurate, updated and action oriented. When ideas, emotions, experiences and information are exchanged between two or more persons it is referred as communication. Technology plays an important role in transforming data to information, to knowledge and into wisdom.

Information Communication Technologies (ICT) in this review article refers to the computer and internet connections used to handle and communicate information for learning purpose.

E learning:- is a learning program that makes use of an information network- such as the internet, an intranet (LAN) or extranet (WAN) whether wholly or in part, for course delivery, interaction and/or facilitation. Web-based learning is a subset of e learning and refers to learning using an internet browser such as the moodle, blackboard or internet explorer.

Blended Learning :- refers to learning models that combines the face-to-face classroom practice with e-learning solutions. For example, a teacher may facilitate student learning in class contact and uses the moodle (modular object oriented dynamic learning environment) to facilitate out of class learning.

Constructivism:- is a paradigm of learning that assumes learning as a process individuals “construct” meaning or new knowledge based on their prior knowledge and experience. Educators also call it the emerging pedagogy in contrast to the long existing behaviourist view of learning.

Learner- centred learning environment:- is a learning environment that pays attention to knowledge, skills, attitudes, and beliefs that learners bring with them to the learning process where its impetus is derived from a paradigm of learning called constructivism. In the context of this article, it means students personal engagement to the learning task using the computer and or the internet connection.

Use of ICT in Education

Modern society is becoming too intricate as well as education has become increasingly complex, with more and more information communicated to the student. In creating this new teaching-learning environment, ICT offers numerous contributions to increase the interaction and reception of information. ICT is being utilized in every part of life. Learning approaches using contemporary ICTs provide many opportunities for constructivist learning through their provision and support for resource based, student centered settings and by enabling learning to be related to context and to practice. Education even at school stage has to provide computer instruction. Profound technical knowledge and positive attitude towards this technology are the essential prerequisites for the successful citizens of the coming decades.

ICT in education is any information Technology that focuses on the acquisition, storage, manipulation, management, transmission or reception of data required for the educational purpose. As for example, the information about students’ records, their admission, updates of their curricular and co-curricular activities. ICT in education refers any educational technology that deals with the exchange of information or in other words communication in the teaching-learning process. It encompasses hardware approach like use of machine and materials software approach like use of methodologies and strategies of teaching-learning and system approach that uses the management technology that deals with the systematic organization of the hardware and the software. ICT enables teachers and students to construct rich multi-sensory, interactive environments with almost unlimited teaching and learning potential.

Advantages of ICT in Education

ICTs for education refers to the development of information and communications technology specifically for teaching/learning purposes, while the ICTs in education involves the adoption of general components of information and communication technologies in the teaching learning process. In this context, advantages of ICT in education can be listed down as follows:-

- Enhancing teaching and learning process.
- Enhancing the quality and accessibility of education.
- Enhancing learning Environment.
- Enhancing learning motivation.
- Enhancing the scholastic performance.
- Assist students in accessing digital information efficiently and effectively.
- Support student-centered and self-directed learning.
- Produce a creative learning environment.
- Promote collaborative learning in a distance-learning environment.
- Offer more opportunities to develop critical (higher-order) thinking skills.
- Improve teaching and learning quality.
- Support teaching by facilitating access to course content.

Factors Facilitating ICT in Education

The Main Factors Facilitating ICT Education are Following :-

Pedagogical objectives and goals:-

The research on educational innovation suggests that it is important for schools to share a reformed vision of teaching and learning in order to create sustainable change at the school and classroom levels. Present education system is moving away from a traditional system based on memorization and testing to support a more student centered approach to teaching and learning with ICT.

Leadership:-

The research literature also indicates that leadership at various levels of the system is important if an innovative project is to take root and grow at the classroom level.

Professional development and on-going support:-

For much the same reasons that supportive leadership is important in helping teachers innovate, ongoing professional development also appears to be a critical factor. In the context of education reform, the tools and teaching strategies are new to many of the teachers; therefore, both the quality of the professional development courses and the presence of ongoing support for teachers in their classrooms are important.

Experimentation, adaption and critical reflection:-

Research literature's perspective offers an interesting insight on the importance of experimentation for ICT integration and education reform. Findings reveal that the role a culture of experimentation plays in school-wide change and its relationship to leadership, pedagogical goals, and professional development.

ICT infrastructure:-

In most developing countries, ICT infrastructure also is commonly a limited resource in schools. With limited resources, it is often difficult for schools to provide sufficient access so students can use ICT during their classes.

Financing and sustainability:-

Costs and sustainability are ongoing challenges for all of these schools when attempting to bring in new, complex resources such as ICT. These schools attempt to do two things to manage sustainability of their ICT activities: first, they try to obtain resources from as many sources as possible, and second, they try to control the costs related to ICT activities.

Limitations of ICT in Education

ICT as a modern technology that simplifies and facilitates human activities is not only advantageous in many respects, but also has many limitations. Such As :-

Teacher-level barriers :-

It Includes -

- Lack of time-for both formal training and self-directed exploration,
- Preparing ICT resources for lesson,
- Lack of self-confidence in using ICT,
- Negative experiences with ICT in the past,

- Fear of embarrassment in front of pupils and colleagues, loss of status and an effective degrading of professional skills,
- Classroom management difficulties when using ICT, especially where pupil –to-computer ratios are poor,
- Lack of the knowledge necessary to enable teachers to resolve technical problems when they occur,
- Lack of personal change management skills,
- Perception that technology does not enhance learning,
- Lack of motivation to change long-standing pedagogical practices,
- Perception of computers as complicated and difficult to use.

School-level barriers :-

It Includes -

- Lack of ICT equipment and the cost of acquiring, using and maintaining ICT resources.
- Lack of access to ICT equipment due to organizational factors such as the deployment of computers in ICT suites rather than classrooms.
- Lack of technical support.
- Lack of administrative support.
- Lack of institutional support through leadership, planning and the involvement of teachers as well as managers in implementing change.
- Lack of training focusing on integrating technology in the classroom rather than simply teaching basic skills.

Attitudes:-

Attitudes towards ICT, therefore, can be barriers in themselves and can influence or be influenced by other barriers. Although attitudes partly depend on personality, the importance of previous computer experience is widely recognized. Negative experiences affect perceptions of the ease of use and relevance of ICT, reducing confidence and increasing anxiety. Computer anxiety and anxiety about change are key factors limiting teachers' use of technology.

Training:-

ICT training can help overcome barriers, yet many authors argue that it often fails to do so. While a lack of time and training are major obstacles, research suggests there are weakness in the design and delivery of many courses. By focusing on basic ICT skill, training fails to prepare teachers to integrate ICT in their pedagogy.

Challenges of ICTs Integration in Education

The Main Challenges of ICTs Integration in Education are Following :-

- In the first place, are appropriate rooms or buildings available to house the technology? In countries where there are many old school buildings, extensive retrofitting to ensure proper electrical wiring, heating/cooling and ventilation, and safety and security would be needed.
- Another basic requirement is the availability of electricity and telephony. In developing countries large areas are still without a reliable supply of electricity and the nearest telephones are miles away.
- Policymakers should also look at the ubiquity of different types of ICT in the country in general, and in the educational system (at all levels) in particular. For instance, a basic requirement for computer-based or online learning is access to computers in schools, communities, and households, as well as affordable Internet service.
- Leadership plays a key role in ICT integration in education. Many teacher- or student-initiated ICT projects have been undermined by lack of support from above. For ICT integration programs to be effective and sustainable, administrators themselves must be competent in the use of the technology, and they must have a broad understanding of the technical, curricular, administrative, financial, and social dimensions of ICT use in education.
- Whether provided by in-school staff or external service providers, or both, technical support specialists are essential to the continued viability of ICT use in a given school. While the technical support requirements of an institution depend ultimately on what and how technology is deployed and used, general competencies that are required would be in the installation, operation, and maintenance of technical equipment (including software), network administration, and network security. Without on-site technical support, much time and money may be lost due to technical breakdowns.

- English is the dominant language of the Internet. An estimated 80% of online content is in English. A large proportion of the educational software produced in the world market is in English. For developing countries in the Asia-Pacific where English language proficiency is not high, especially outside metropolitan areas, this represents a serious barrier to maximizing the educational benefits of the World Wide Web.
- One of the greatest challenges in ICT use in education is balancing educational goals with economic realities. ICTs in education programs require large capital investments and developing countries need to be prudent in making decisions about what models of ICT use will be introduced and to be conscious of maintaining economies of scale. Ultimately it is an issue of whether the value added of ICT use offsets the cost, relative to the cost of alternatives. Put another way, is ICT-based learning the most effective strategy for achieving the desired educational goals, and if so what is the modality and scale of implementation that can be supported given existing financial, human and other resources?

II. Conclusion

The role of ICTs in the education is recurring and unavoidable. Rapid changes in the technologies are indicating that the role of ICT in future will grow tremendously in the education. By observing current activities and practices in the education, we can say the development of ICTs within education has strongly affected on What is learned?, How it is learned?, When & where learning takes place, Who is learning and who is teaching. ICT for education refers to the development of information and communication technology specifically for teaching-learning process, while the ICTs in education involve the adoption of general components of information and communication technologies in the teaching-learning process. This paper has sought to explore the role of ICT in education as we progress in to the 21st century.

Ultimately, the use of ICT will enhance the learning experiences of students. Also it helps them to think independently and communicate creatively. It also helps students for building successful careers and lives, in an increasingly technological world.

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