ICT-An Aid for Better Education

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Abstract—*Information and communication technologies (ICTs)—which include radio and television, as well as newer digital technologies such as computers and the Internet—have been touted as potentially powerful enabling tools for educational change and reform. When used appropriately, different ICTs are said to help expand access to education, strengthen the relevance of education to the increasingly digital workplace, and raise educational quality by, among others, helping make teaching and learning into an engaging, active process connected to real life. The role of ICT can be seen in all the levels of education starting from very basic primary education to the higher level of education including research. Role of ICT can be appreciated at various levels like in enhancing teaching and learning process, enhancing the quality and accessibility of education and thus increasing the motivation to learn. However, effectiveness, cost, equity, and sustainability are four broad intertwined issues which must be addressed when considering the overall impact of the use of ICTs in education. In addition, the key challenges of ICTs integration into education systems are related to planning, infrastructure, learning content, capacity building and financing.*

1. INTRODUCTION

Information and communication technologies (ICT) have become common place entities in all aspects of life. Across the past twenty years the use of ICT has fundamentally changed the practices and procedures of nearly all forms of endeavour within business and governance. Within education, ICT has begun to have a presence but the impact has not been as extensive as in other fields. 21st century is the age of Information and Communication Technology (ICT). All over the world ICT is used in teaching and learning process. The teacher and learner must gain access to technology for improving learning outcomes. Educational reform includes successful designing and implementation of ICT in teaching and learning process, which is the key to success. The National curriculum framework 2005 (NCF 2005) has also highlighted the importance of ICT in school education. With this backdrop, major paradigm shift is imperative in education characterized by imparting instructions, collaborative learning, and multidisciplinary problem-solving and promoting critical thinking skills. The various kinds of ICT products available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counselling, interactive voice response system, audiocassettes and CD ROMs etc have been used in education for different purposes. In recent years, rapid technological and economic developments have brought about significant changes in societies and their associated labour markets, leading to the emergence of knowledge societies and economies. As part of the changes we are experiencing, companies are increasingly seeking employees who have the ability to utilize information and communication technologies (I.C.T) effectively in their everyday work and who have the skills to maximize the potential of I.C.T to enhance productivity in the workplace. The emergence of technology has been further applied to information, which has revolutionized the process of the transmission of information. At the height of the Internet boom of the 1990s, a fashionable saying was "the Internet changes everything." The ICT changed the way of imparting education in modern era. Considering the higher education in India has seen the massive growth in post-independence era. At the time of independence 17 universities and about 400 colleges was there in India and today 520 universities, nearly 22,000 colleges, over 10 million students, 0.45 million teachers and one of largest higher education system in the world. Our education system focuses on at creation of high quality and well trained human resources to fulfil the need of ever growing Indian economy, but on other hand it face challenges at operational level. Educational governing bodies like UGC, AICET, ICMR, ICAR, all possess difficulties to maintain proper coordination, administration, monitoring and[1] evaluation for improving the quality of education and also imparting the education.

2. SCOPE OF ICT IN EDUCATION

Discussed here is the scope of education at various level of education namely Primary, Secondary and Higher level of education including Research.

2.1 Primary Education

Information and Communication Technology (ICT) is important in primary education because it enables kids to search for the information they need and to organize what they have found. As children progress through the school system, they become increasingly responsible for their own learning. Many believe that ICT needs to be better integrated into curriculums so all schools produce computer literate, independent learners. ICT is a global phenomenon, and

children who are computer literate at an early stage of their lives might deal better with the modern world. A sound knowledge of ICT makes it much easier for children to find and organize information. An Office for Standards in Education (Ofsted) funded study (2009) that took place between 2005 and 2008 identified good practices in the teaching of ICT. ICT is important in primary schools because it can help kids to achieve better results in other subjects and to find what they need and use information in particular ways. It is important that children become familiar with ICT at an early age, because they will need those skills for the remainder of their education and in adult life.

2.2. Secondary Education:

Schools that are confident with technology are moving away from knowledge based curricula. Some Secondary schools have adopted programmes which focus on "Learning to learn" and "Enquiry based learning" which move learning away from simple subject knowledge to higher level thinking skills in all subjects. This is key to delivering what society and business want to see from our education system in the 21st century. It is not about excessive concentration on ICT skills per se, but allowing those skills to support the delivery of a much wider and more relevant curriculum. Role of ICT in School Education of India-Like India, all developing countries in the world, are using ICTs largely to increase access to and improve the relevance and quality of education. ICTs have demonstrated potential to increase the options, access, participation, and achievement for all students. Even though computers have been introduced in schools in India, the education system has largely not been influenced by the potential for pervasive change intrinsic to ICTs. Hence, a proposed increase in the spending on ICTs in school education from less than Rs 1,000 crore in the 10th Five-Year Plan to more than Rs 6,000 crore in the 11th Plan (working group draft report), by the Ministry of Human Resource Development (MHRD) could reflect an urgency to harness ICTs for systemic change in the education sector.

2.3. Higher Education

Higher education has undergone profound transformation due to recent technological advancements. Resultantly health profession students have a strong base to utilize information technology for their professional development. Studies over recent past reflect a striking change in pattern of technology usage amongst medical students expanding prospects exponentially by e-books, science apps, readymade power-point presentations, evidence based medicine, Wikipedia, etc. From engineers to doctors, from arts to communication courses, role of ICT has played an important role if expected to grow even further in the forthcoming years. The study done on Role of Information Communication Technology in Higher Education: Learners Perspective in Rural Medical Schools reveals that , Information Technology (IT) has had a positive impact on health care delivery systems worldwide, particularly in the areas of disease control, diagnosis, patient management and teaching. Internet, one of the key developments in this field, provides instant access to latest medical information . 45% students felt that learning with the help of internet and computers will be a preferred method in future due to availability of vast information, interactive and personalized media, environment and user friendliness which is more appealing for the current techno-savvy generation. This brings forth an important aspect that there should be more emphasis on computers as standard tools for learning with more use ICT in classrooms. There should be emphasis on expansion of computer-assisted learning which requires careful strategic planning, resource sharing, staff incentives, active promotion of multidisciplinary working, and effective quality control.

3. ROLE OF ICT IN IMPROVING EDUCATION

Discussed here is the role of education in making it more enhanced, easier, approachable and advanced:

3.1. Enhancing teaching methodologies and process of learning:

Mere learning ICT skills is not suffice, but using ICT to improve the teaching and learning is the key for pedagogy-technology integration. But the question is how we can combine these two. While delivering the class lectures, any innovative teacher needs to draw diagrams, show pictures, animate some objects to explain critical concepts, even play some video clipping of real time operation. All these multimedia applications can assure very productive, interesting, motivating, interactive and quality delivery of classroom instruction. Harris (2002) concludes that the benefits of ICT will be gained "…when confident teachers are willing to explore new opportunities for changing their classroom practices by using ICT. As such, multimedia courseware can be of great help to teachers to meet the challenges of such situation. With availability of user friendly authoring tools, it is now possible to develop multimedia courseware by any young teachers to support drill and practice to master basic skills, simulate complicated situations, produce individualized instruction with multimedia elements with built-in evaluation questions and scores.

3.2. Improving the quality and enhancing the accessibility of education

The last two decades have witnessed a revolution caused by the rapid development of Information and Communication Technology (ICT). Internet usage in home and work place has grown exponentially. ICT has the potential to remove the barriers that are causing the problems of low rate of education in any country. It can be used as a tool to overcome the issues of cost, less number of teachers, and poor quality of education as well as to overcome time and distance barriers. ICT increases the flexibility of delivery of education so that learners can access knowledge anytime and from anywhere.[3] It can influence the way students are taught and how they

learn as now the processes are learner driven and not by teachers. Cross and Adam (2007). Today ICTs—including laptops wirelessly connected to the Internet, personal digital assistants, low cost video cameras, and cell phones have become affordable, accessible and integrated in large sections of the society throughout the world. It can restructure organizations, promote collaboration, increase democratic participation of citizens, improve the transparency and responsiveness of governmental agencies, make education and health care more widely available, foster cultural creativity, and enhance the development in social integration. One of the most vital contributions of ICT in the field of education is-Easy Access to Learning. With the help of ICT, students can now browse through e-books, sample examination papers, previous year papers etc. ICT eliminating time barriers in education for learners as well as teacher. It eliminates geographical barriers as learners can log on from any place.

2.4. Motivation to learn

ICTs can enhance the quality of education in several ways, by increasing learner motivation and engagement, by facilitating the acquisition of basic skills, and by enhancing teacher training. ICTs are also transformational tools which, when used appropriately, can promote the shift to a learner centred environment. Learning approaches using contemporary ICTs provide many opportunities for constructivist learning through their provision and support for resource-based, student cantered settings and by enabling learning to be related to context and to practice. With a range of ICT equipment, motivational effect did not depend upon motivation related to a single form of ICT. Motivation under these circumstances was often determined by factors concerned with the form of software or learning resource, the hardware, and the teaching approach taken. The motivational profiles obtained from the quantitative survey [The Motivational Effect of ICT on Pupils by Don Passey and Colin Rogers, with Joan Machell and Gilly McHugh]demonstrate the existence of a highly positive set of motivational characteristics in the schools in this study. In summary, pupils are characterised, when focusing on working with ICT, by relatively high levels of learning goals and performance approach goals. The analysis of the quantitative data indicates that the forms of motivation arising from ICT use are concerned with learning, rather than a mere completion of tasks. Perceptions of learning within classrooms are particularly strong and show that pupils perceive their classrooms, when using ICT, to be focused very much on the process of learning.

4.   ICT DRIVEN LEARNING

When used appropriately, ICTs—especially computers and Internet technologies— enable new ways of teaching and learning rather than simply allow teachers and students to do what they have done before in a better way [4]:

4.1. Active learning

ICT-enhanced learning mobilizes tools for examination, calculation and analysis of information, thus providing a platform for student inquiry, analysis and construction of new information. Learners therefore learn as they do and, whenever appropriate, work on real-life problems in-depth, making learning less abstract and more relevant to the learner's life situation. In this way, and in contrast to memorization-based or rote learning, ICT-enhanced learning promotes increased learner engagement.

4.2 Creative Learning

ICT-supported learning promotes the manipulation of existing information and the creation of real-world products rather than the regurgitation of received information.

4.3 Evaluative learning

ICT-enhanced learning is student-directed and diagnostic. Unlike static, text- or print-based educational technologies, ICT-enhanced learning recognizes that there are many different learning pathways and many different articulations of knowledge.[5] ICTs allow learners to explore and discover rather than merely listen and remember.

4.4 Integrative learning

ICT-enhanced learning promotes a thematic, integrative approach to teaching and learning. This approach eliminates the artificial separation between the different disciplines and between theory and practice that characterizes the traditional classroom approach.

5.   LIMITATIONS

A rigorous analysis of the present state of the educational system shows that ICT-based interventions must take into account current institutional practices and arrangements. Specifically, drivers and barriers to ICT use need to be identified, including those related to curriculum and pedagogy, infrastructure, capacity-building, language and content, and financing. Limitations can be categorised in the following four categories:

5.1. Student related

Criminals, marketers, and other persons can easily get information from students when they are online. These could post danger to students' lives or may even lead to litigation against the school. To avoid this problem, students should be educated on the dangers of giving information to people online. Appropriate use of computer and the internet by students have significant positive effects on students' attitude and their achievement. Nonetheless, it is very common to observe limitations related to student behaviour. Students tend to misuse the technology for leisure time activities and have less time to learn and study. Therefore, the impact of

availability of ICT on student learning strongly depends on its specific uses.

5.2. Instructor related

Many observations reveal that teachers do not have clarity about how far technology can be beneficial for the facilitation and enhancement of learning. Of course, some teachers may have positive attitudes to the technology, but refrain from using it in teaching due to low self-efficacy, tendency to consider themselves not qualified to teach with technology. Also, it takes a lot of preparation time to effectively use the Net for education. In addition to designing Internet based lesson plans, we may have to surf the Internet to download lesson plans and adapt them to support the curriculum objectives or visit sites to select those appropriate for classes. Furthermore, many teachers may not have the required IT skills and feel uncomfortable, nor do they have trainings needed to use the technology in their teaching. Unless teachers develop some basic skills and willingness to experiment with students, ICT use in education is in a disadvantage. Hannafin and Savenye identify some of the reasons for this reluctance: poor software design, scepticism about the effectiveness of computers in improving learning outcomes[5], lack of administrative support, increased time and effort needed to learn the technology and how to use it for teaching, and the fear of losing their authority in the classroom as it becomes more learner-cantered. These are all issues that must be addressed by both pre-service teacher education and in-service teacher professional development programs if schools and other educational institutions are to fully exploit the potential of computers and the Internet as educational tools

5.3. Technology related:

Students in low-income communities may be disadvantaged. To reduce the effect that social or economic status may have, we should give Internet assignments that students can easily complete while in school. The high cost of the technology and maintenance of the facilities, high cost of spare parts, virus attack of software and the computer, interruptions of internet connections, and poor supply of electric power, etc are few of the limitations of ICT as far as technological aspects are concerned. [6]Also Over-reliance on ICT limits students' critical thinking and analytical skills, Students often have only a superficial understanding of the information they download, and Computer-based learning has negative physical side-effects such as vision problem.

5.4 Infrastructure related:

The infrastructure challenges that may exist are absence of appropriate buildings and rooms to house the technology, shortage of electric supply and telephone lines, and lack of the different types of ICTs. Because of this, one need to deal with infrastructure related challenges before the planning of ICTs

integration to education systems. With respect to challenges of capacity building, we have to develop competencies of teachers and school administrators for the successful integration of ICT in the education system. 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.[7] 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.

6. CONCLUSION

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. The adoption and use of ICTs in education have a positive impact on teaching, learning and research. ICT can affect the delivery of education and enable wider access to the same. In addition, it will increase flexibility so that learners can access the education regardless of time and geographical barriers. It can influence the way students are taught and how they learn. ICTs are making major differences in the teaching approaches and the ways students are learning. ICT-enhanced learning environment facilitates active, collaborative, creative, integrative, and evaluative learning as an advantage over the traditional method. In other words, ICT is becoming more appropriate in the realization and implementation of the emerging pedagogy of constructivism that gives greater responsibility of learning for students. However, there are certain limitations which should be overcome. It is very common to observe limitations related to student behaviour, teachers may not be able to adapt the technology, students in low-income communities may be disadvantaged due to higher cost of internet access. Nevertheless, it improves overall standard of education by reducing the gap in quality of education between schools in urban and rural areas, initiation of smart school with objectives to foster self-paced, self assessed, and self-directed learning through the applications of ICTs, and developing ICT policy for education and training.

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