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**A COMPARATIVE STUDY ON THE
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A Comparative Study on the Contribution of ICT for Enhancing and Improving the Quality of Higher Education in India

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Abstract – Information and Communication Technology (ICT) can be utilized for the education sector. Education includes online, distance and part time education. There are unlimited applications of ICT in the real world. In his paper emphasis is on the education field. Traditional Non-formal education system process includes activities like admission, Personal Contact Programmes, Exam for any course in a University or Institution. In this process ICT can play a great role in all the activities by providing a lot of benefits to students, teachers, parents and Universities itself. ICT can be used for providing education to the people who are not able to come to school due to various constraints. ICT can play great role in formal and non-formal forms of education. The paper examines certain important issues related with the effective implementation of ICTs in all levels of education and provides suggestions to address certain challenges that would help in the implementation of ICTs in education and simultaneously increasing Quality of education.

The focus of the paper is on the benefits that ICT integration in education can provide, right from breaking time and distance barriers to facilitating collaboration and knowledge sharing among geographically distributed students. The findings reveal that it also facilitates sharing of best practices and knowledge across the world.

ICT increases the flexibility of delivery of education so that learners can access knowledge anytime and from anywhere. It can influence the way students are taught and how they learn as now the processes are learner driven and not by teachers. This in turn would better prepare the learners for lifelong learning as well as to contribute to the industry. It can improve the quality of learning and thus contribute to the economy. It provides several tangible and intangible benefits for all stakeholders involved in the economic growth of the country.

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INTRODUCTION

India, like any other knowledge economy, depends on the development of its educational sector. Higher education drives the competitiveness and employment generation in India. However, research findings have shown that the overall state of higher education is dismal in the country. There is a severe constraint on the availability of skilled labor (Agarwal, 2006). There exist socio-economic, cultural, time and geographical barriers for people who wish to pursue higher education. Innovative use of Information and Communication Technology can potentially solve this problem.

Education is the driving force of economic and social development in any country (Mehta and Kalra, 2006). Considering this, it is necessary to find ways to make

education of good quality, accessible and affordable to all, using the latest technology available. The last two decades have witnessed a revolution caused by the rapid development of Information and Communication Technology (ICT). ICT has changed the dynamics of various industries as well as influenced the way people interact and work in the society (Chandra and Patkar, 2007). 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.

India has a billion-plus population and a high proportion of the young and hence it has a large

formal education system. The demand for education in developing countries like India has skyrocketed as education is still regarded as an important bridge of social, economic and political mobility.

Use of ICT in education develops higher order skills such as collaborating across time and place and solving complex real world problems. It improves the perception and understanding of the world of the student. Thus, ICT can be used to prepare the workforce for the information society and the new global economy (Kozma, 2005).

IT has become a buzzword while talking about technology and its applications. IT is used in various business and management functions but not in the improving the quality of education. Quality of education has been issue of concern in the absence of standard parameters of to measure the quality. The hardware, software, the methods and know how required or used in acquiring, storing, processing and displaying data and information is collectively known as Information Technology (IT). Also on other hand, many developments and achievements took place in communication technology sector after and Second World War. Hardware, know how, programs and the methods used in ensuring that message is transmitted correctly, efficiently and cost effectively are collectively known as Communication Technology (CT). Both of these technologies became complementary to each other means progress in one alone is not much beneficial. Hence IT and CT started moving together and a new term was coined named as Information and communication Technology (ICT). Convergence of these two technologies gave birth to ICT . Education system includes formal and Non-formal forms of education at various levels of education. Teaching is imparting knowledge or skill whereas learning is skill acquisition and increased fluency. Usage of ICT is one of the way by which India's large population base can be effectively reached. Moreover in enhancing the quality and delivery of services through ICT-especially in case of developing relations with citizen-Government will be better positioned .Passive learning occurs when students use their senses to take in information from a lecture, reading assignment, or audiovisual. Traditional lecture is not an effective learning environment for many of our students because so many students do not participate actively during a traditional lecture. This is the mode of learning most commonly present in classrooms whereas active learning involves the student through participation and investment of energy in all three phases of the learning process (input, operations, and feedback). This type of learning is more apt to stimulate higher cognitive processes and critical thinking. In the past few years there has been a paradigm shift in curriculum where teacher acts as a facilitator in a student centered learning. In Student centered learning focus is on the student's needs, abilities, interests, and learning styles with the teacher as a facilitator of learning. Here students have to be active responsible participants in learning process. Teacher has key role in the whole process whereas in

case of ICT based education, various ICT tools are supplemented to make the teaching-learning process effective. With the help of blended learning, total time devoted to teaching can be decreased. A survey says that there was a sense of pride created and interest generated among the teachers and students for gaining ICT and its privileges. ICT has the potential to remove the barriers that are causing the problems of low rate of education in any country. ICT as a tool can overcome the issues of cost, less number of teachers, and poor quality of education as well as to overcome time and distance barriers .In this paper how learning through ICT can be made effective and easier for improving the quality of both formal and non-formal forms of education. Section 2 explains ICT tools, section 3 explains ICT application for quality improvement in formal and Non-formal education, section 4 shows ICT for Content development section 5 shows ICT and teachers Training whereas section 6 shows certain challenges and their solution for the implementation of ICT in the education sector.

Information and communication technology (ICT) is a force that has changed a lot of aspects of the life. If one compare fields such as education, banks, medicine, hotel and tourism, travel, business, law, and architecture, the impact of ICT across the past two or three decades has been massive The way these fields operate today is vastly different from the ways they operated in the past. But when one looks at education, there seems to have been an uncanny lack of influence and far less change than other fields have experienced. A number of people have attempted to explore this lack of activity and influence.

Use of ICT in education presents a unique opportunity to solve multitude of challenges quickly as well as at low rate. Here is an overview of advantages of an online system.

Improve Quality of Education

- Support collaboration among students, teachers and institutions
- A reliable grading system to measure and assign rank to Students, Teachers, Schools and Universities
- All round development of students
- Promote educational ideas
- Continuous improvement by feedback

Improve Accessibility

- Accessible anytime from anywhere to everyone

- Bring the books & other resource within reach of students
- Promote education in rural areas
- Provide online courses to students.
- 24x7 schooling system for those students who cannot attend regular schools during daytime

Reduce the cost of education

- Provide services at lower cost through online solutions
- Promote —learn yourselfll and —community learningll via online system, etc.
- Assist teachers for conducting exam and offer courses material
- ICT opens the doors for girls to get education from home for e.g. online learning if social & cultural reasons are preventing them.
- ICT promote vocational courses as well as self-paced learning for the adults
- ICT bring culturally diverse India on a common learning platform which is offered in all languages

ICT AND HIGHER EDUCATION

The major teaching and learning challenges facing higher education revolve around student diversity, which includes, amongst others, diversity in students' academic preparedness, language and schooling background.

Education is perhaps the most strategic area of intervention for the empowerment of girls and women in any society and the use of information and communication technologies (ICTs) as an educational tool in the promotion of women's advancement has immense potential. The application of ICTs as a tool for effective enhancement of learning, teaching and education management covers the entire spectrum of education from early childhood development, primary, secondary, tertiary, basic education and further education and training.

Integrating ICT in teaching and learning is high on the educational reform agenda. Often ICT is seen as indispensable tool to fully participate in the knowledge society. ICTs need to be seen as "an essential aspect of teaching's cultural toolkit in the twenty-first century, affording new and transformative models of development that extend the nature and reach of

teacher learning wherever it takes place". For developing countries like Vietnam, ICT can moreover be seen as a way to merge into a globalizing world. It is assumed that ICT brings revolutionary change in teaching methodologies. The innovation lies not per se in the introduction and use of ICT, but in its role as a contributor towards a student-centered form of teaching and learning.

The Information and Communication Technology (ICT) curriculum provides a broad perspective on the nature of technology, how to use and apply a variety of technologies, and the impact of ICT on self and society. Technology is about the ways things are done; the processes, tools and techniques that alter human activity. ICT is about the new ways in which people can communicate, inquire, make decisions and solve problems. It is the processes, tools and techniques for:

1. Gathering and identifying information
2. Classifying and organizing
3. Summarizing and synthesizing
4. Analyzing and evaluating
5. Speculating and predicting

Enhancing and upgrading the quality of education and instruction is a vital concern, predominantly at the time of the spreading out and development of education. ICTs can improve the quality of education in a number of ways: By augmenting student enthusiasm and commitment, by making possible the acquirement of fundamental skills and by improving teacher training. ICTs are also tools which enable and bring about transformation which, when used properly, can encourage the shift an environment which is learner-centered.

ICTs which can be in the form of videos, television and also computer multimedia software, that merges sound, transcripts and multicolored moving imagery, can be made use of so as to make available stimulating, thought provoking and reliable content that will keep the student interested in the learning process. The radio on the other hand through its interactive programs utilizes songs, sound effects, adaptations, satirical comedies and supplementary collections of performances so as to induce the students to listen and get drawn in to the training that is being provided.

ICT APPLICATION FOR QUALITY IMPROVEMENT IN FORMAL AND NON-FORMAL EDUCATION

ICT applications are becoming indispensable parts of contemporary culture, spreading across the globe through traditional and vocational education. In Indian scenario, mainly education system has three tiers primary (including nursery and preprimary), High school or secondary level (High and senior secondary levels) and the college or higher level (including college, university levels). In all these levels of education ICT can be utilized for better teaching learning process and improving quality of education. Using multimedia in education results in the increasing productivity and retention rates, because people remember 20% of what they see, 40% of what they see and hear, but about 75% of what they see and hear and do simultaneously. Interactive whiteboard helps teachers to structure their lessons, supports collaborative learning, can help to develop student's cognitive skills, enables ICT use to be more integrated into classroom. Government of India has announced 2010-2020 as decade of innovation. Reasoning and critical thinking skills are necessary for innovation. Foundation of these skills can be laid only at primary level of education. Students who enter school are very curious, creative, and capable of learning many things. At this level, statement (Picture is worth than thousands of words) is very much true in case of teaching –learning process. Befriending ICT in the initial stages of education will help young people come to terms with what lies ahead. Students studying at this level take much interest in cartoons. They understand more through animated pictures. Hence if the same environment is created in schools by using ICT for teaching kids at primary level may bring drastic changes in the education scenario. Nursery students can be taught by showing pictures, animals, fruits etc. With the help of ICT tools students at this level are able to grasp a lot by hearing voices or sounds and animated motion of various animals. Language learning is also taught at this level. To know a new language at this age is easier as compared to other levels. Multimedia projector & computer can be used to teach phonetics and pronunciation. Lessons, poems & lectures by eminent scholars stored in computers or other ICT tools can easily be shown to the students time and again anywhere. Such type of teaching and learning retains for long time in the minds of the children. At high school level subjects like History, Geography, Political science, Physics, Chemistry, Biology, Physical education etc are taught. Lessons in these subjects can easily be taught by showing small movie related with the subject to create interest among the students. Such type of movies and related multimedia material is easily available at academic repositories and from various related sites with the help of Internet. Internet is basic tool which can be utilized by teachers and students to find any information on any topic. This type teaching –learning makes the environment very interactive and is liked by students. Educational and practical CD's available in

the market make this task easier to implement. At college level various facilities like computers, Electronic Board, Edusat facility initiated by various state Governments, MM projector and other peripheral devices related with teaching learning process are easily available. Easy availability of 'Aakash' tablet will help in providing and getting more education for both teachers and students. Repositories are libraries where these digital resources are stored and provide teachers, students, and parents with information that is structured and organized to facilitate the finding and use of learning materials regardless of their source location. Various programs running on Edusat are also very helpful for the students. Soft skill program can help students in getting their placements in reputed Multi-National Companies (MNCs). State level quiz and seminar can also be conducted with the help of Edusat infrastructure and can be transmitted throughout all institutes. Edusat can be used for providing training to teachers on the latest subjects and technologies and can save lot of time and money of governments. In Haryana Edusat project is being implemented at school and college level and is being used for transmitting lectures according to syllabi. In Non-formal learning, learners can access information and learning materials from anywhere and at any time. It includes distance education and other open learning systems. There are various functions to be performed with the enrolment of students in any course of distance education in any University or institute. Functions include allotment of unique number (called reference number/roll number), providing books, providing information related with installment of fees and details thereof to name a few. Out of all these activities some of these may be performed well with the help of ICT Tools. In the distance education ICT can be used for better management of records by making a complete database of all the students in various courses. Once the students are enrolled, a unique number is generated called reference number and it is provided to the particular students. Short Message Service (SMS) of Mobile phone may be utilized for this purpose. Mobile phone is one major ICT tool and can be used for the purpose. Other information related the PCP, Exam dates can easily be sent to the students through SMS by Universities/ Institutes concerned. Moreover the enrolled students can be given username and password for using various online services and resources in the form of academic repositories maintained by institutes. All such instructional material may be uploaded at the University portal and CDs of those lectures may be provided to the students instead of printed or hard copy material. Online fees payment system can also be made on the portal of concerned University or Institute. Students will be saved from a lot of hardships they face in depositing fees, attending PCPs, taking exams and many more. Exam results in such cases may be provided online on the same day as same is happening in case of online exams and entrance tests. This would help to sort out the problem of the delay in declaration of results of various exams by various universities. But all this

must be the case for the Non-formal education system. Advantages of utilizing such tools include saving of lot of paper work and help the environment making it pollution free. This will also bring transparency in the whole system of functioning.

USING ICT IN EMPOWERING TEACHERS FOR QUALITY EDUCATION

Information and Communication Technologies consist of the hardware, software, networks, and media for collection, storage, processing, transmission and presentation of information (voice, data, text, images), as well as related services. E-Learning: Commonly associated with higher education and corporate training, e-learning encompasses learning at all levels, both formal and non-formal, that uses an information network—the Internet, an intranet (LAN) or extranet (WAN)— whether wholly or in part, for course delivery, interaction and/or facilitation. Others also term it as online learning.

Information and Communication Technology (ICT) can contribute to universal access to Education, equity in education, the delivery of quality learning and reaching, teachers' professional development and more efficient education management, governance and administration. Introducing ICT as a tool to support the education sector has initiated substantial discussions since the late 1990s. A decade ago the emphasis was on Technical and Vocational Education Training and training teachers.

Information and communication technologies (ICT) provide a variety of tools that can open up new possibilities in the classroom. They can particularly help tailor the educational process to individual students' needs, and they can also provide learners with the crucial digital competences needed in our knowledge-based economy. The introduction of ICT in the higher education has profound implications for the whole education process. ICT provides a technology that has the capacity to promote and encourage the transformation of education from a teacher directed enterprise towards student centered models.

Some of the important functions of ICT such as ICT as a change agent in learning process, the impact of ICT on place 'when' and 'where' to learn improve quality of education, enhancing educational management, its role in higher education are discussed below and shown in Fig. 1.

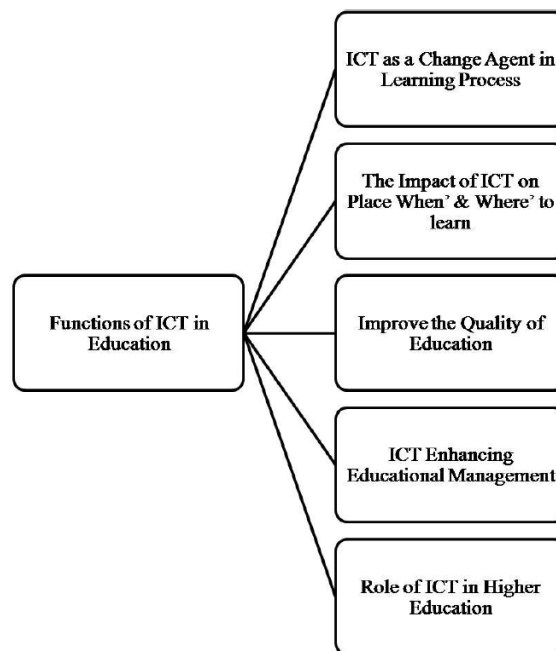


Fig. 1: Functions of ICT in Education.

Educators, who advocate technology integration in the learning process, believe that it will improve learning and better prepare students to effectively participate in the 21st century workplace. ICT encompasses the effective use of equipment and programs to access, retrieve, store, organize, manipulate and present data and information (Dabbagh, 2007). Improving the quality of education and training is a critical issue, particularly at a time of educational expansion. Videos, television and multimedia computer software that combine text, sound and colourful moving images can be used to provide challenging and authentic content that will engage the student in the learning process. Interactive radio likewise makes use of sound effects, songs, dramatizations, comic skits and other performance conventions to compel the students to listen and become involved in the lessons being delivered. The transmission of basic skills and concepts that are the foundations of higher order thinking skills and creativity can be facilitated by ICTs through drill and practice. It has also been used to improve access to and the quality of teacher training. For example: In Indira Gandhi National Open University, satellite-based one-way video-and two-way audio-conferencing was held in 1996, supplemented by print-materials and recorded video, to train 910 primary school teachers and facilitators from 20 district training institutes in Karnataka State. The teachers interacted with remote lecturers by telephone and fax." It also provides opportunities to learners to meet in a virtual space with other users, members and practitioner experts to discuss issues, answer questions and even participate in simulations

and management games without having to leave their office or home.

Computer software programs are being used in time tabling and school management to improve the use of staff time, student time and space, thus reducing costs significantly. It is noted that ICTs in schools can improve quality with less cost. Old ICTs are still cost-effective for provision of education to out-of-school children and youth in developing countries. New ICTs have a very large potential for teacher education in larger quantity and better quality. A combination of old ICTs to widen coverage and access and new ICTs to provide interactivity are supposed to be cost-effective for teacher education.

SOLUTIONS OF APPLYING ICT FOR LEARNING

Certain challenges also exist for the ICT based teaching learning. One of the great challenge for quality control in education is lack of standards for parameters to measure the quality of education. For the solution of this all the accreditation bodies like NAAC, NBA, AICTE, CBSE and other authorities must sit together and circulate a standard list of parameters to decide the quality of education. Development of ICT has changed the epic centre of knowledge and hence in many of the cases student is more informed than the teacher. Teachers lack adequate qualification and training and their lesson plans are most often outdated or irrelevant. Setting up the ICT devices can be very troublesome. It is expensive to afford it is hard for teachers to use with a lack of experience using ICT tools. These reasons destroy the available quality of education. ICT enabled distance education, to a great extent, can combat this problem. One of the important barriers is lack of trained teachers to exploit ICT proficiently. Most of the teachers are not willing to introduce new technologies to themselves first and subsequently to their students. There is resistant from teachers, basically from older teachers as compared to younger ones, to apply ICT in their subject.. Hence teachers need to update their knowledge and skills as per change in the curriculum and technologies. At present, ICT in school education is strictly limited to a handful of elite schools. Beyond that, it's just a computer lab that's held apart from the conventional educational process .Though computers came to Indian classrooms in the year 1984-85, the level of adoption of modern technology in the teaching and learning process has been limited and uneven. Various ICT tools must be available and it must be accessible at demand. Many schools have limited resources for buying books, stationery, furniture and other classroom materials. Role of private sector providing services in such sectors may be taken into account. Rural population may not be able to pay hefty amount to utilize such ICT resources for education. One of the major challenges in the implementation of ICT in education is the initial thinking that is based on the technology. ICT hardware and software are not designed as per educational purposes rather they are

designed for general purpose. One first thinks about the available technology and then a try is being made to apply it into education field, but if we look at in reverse way then possible outcomes may be more useful and may give good results. As per latest tradition only special subject like IT or ICT is available and that is also optional one there is need for to have basic knowledge of computers and IT to utilize various ICT tools to be used for teaching learning. Only computer teachers would not be able to carry this important mission of being agents of change. To sort out infrastructure problems for providing ICT education in schools one can split the screen in half vertically and at two sets of an application can be displayed and used by two users (students) simultaneously. Because one student may use the keyboard and another may use mouse, each student can work independently of the other. The survey done in 2007 in two highly ICT enabled states Gujrat and Karnatka says that Access to government school students to ICT tools outside schools is in general low. The access of private school students to such devices is comparably better. It also shows that one of the challenges to be met is also of digital divide in private and Government schools and moreover in rural and urban schools also. Major challenge for educators and trainers is how to develop learning materials for delivery on available ICT tools including mobile devices. The learning materials should be in manageable learning chunks and should make use of multimedia. There are many advantages of using learning objects in mobile delivery including: they can be re-used and changed without affecting other learning objects, and they can be stored in an electronic repository for remote access at any time. Barriers include costly supportive infrastructure, developing online material can be expensive and time consuming, quality, validity of online material, lack of flexibility in already prepared study material. A lot of information available online may dissuade student learning. Students can feel isolated in absence of classroom like environment. Computer Programmes at various levels of quality parameters can be used to control, manage and put strict discipline in the campuses through use of computer application for Curriculum development, Teaching and learning, Research and extension, Governance and leadership, infrastructural facilities and use of expert system in suggesting intelligent decisions to top management in policy making and other important areas in higher education.

CONCLUSION

Education has a vital role in building the society. Education determines standard of society. The quality education helps to empowering the nation in all aspects by providing new thoughts and the ways of implementation of various technologies. There are number of effective teaching & learning methodologies in practice. Technology is the most effective way to increase the student's knowledge.

Quality in education through ICT and its awareness among stakeholders will have positive impact on the society. ICT can be helpful in quality and standards of education by implementing it in various phases of education. ICT can be employed in formal and Non-formal types of education and would eventually make the learners employable and socially useful part of the society. By employing ICT in teacher training can save a lot of money of the Government. Moreover a lot of qualitative improvement can be seen as resource persons for the training can be best of the world. By employing ICT in administration can help in solving the problem of Absenteeism of students and teachers. Good quality content is one of the major issues and directly affects the standards of education and quality. By overcoming the certain challenges involved in the process of education can help a lot in this side. Conclusively a lot of quality improvement is possible after careful and planned implementation of ICT in education by various stakeholders.

To ensure that the opportunities and advantages are realized, it will be important as it is in every other walk of life to ensure that the educational research and development dollar is sustained so that education at large can learn from within and that experiences and activities in different institutions and sectors can inform and guide others without the continual need for reinvention of the wheel. Once again ICTs serve to provide the means for much of this activity to realize the potential it holds.

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