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Information and Communication Technology (ICT): A key for enhancing the Current Educational Scenario

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ABSTRACT

Information and Communication Technology (ICT) are increasingly becoming crucial part of the education system. ICT has changed the style of functioning of the educational system and its governance.

This study is considering the rapid spread of ICT applications has brought about markedly drastic technological, social and economic transformations. These changes have caused educational institutions, administrators, teachers to rethink their roles, teaching and vision for future. The sustainability of a nation in the era of knowledge economy depends on the effective educational system. Productivity is an economic concept where productivity is considered as the comparative analysis of input and outputs. In educational system, the inputs are teachers, students, classroom material, equipment of teaching, methods of teaching and outputs are quantity and quality of student learning. The proper integration of ICT with teaching/learning environment increases education and increased productivity. ICT provides various opportunities to educational learners and make teachers aware of their new roles & responsibilities in teaching and learning process. The growing use of ICT will change many of the strategies employed by both Teachers and Students in the learning process. The role of ICT the educational administration is recurring and unavoidable. ICT has enabled us to monitor and evaluate what is learned, how it is learned and when and where learning took place. It is also enable the educational management system to discharge various functions such as, conduction of exams, coordination between potential institutes, alumni network. ICT also work for non traditional students by providing internet based education to them anytime and anywhere and these internet technologies enables innovative ways of teaching. ICT plays a vital role in bringing about qualitative change in every aspect of our life in general and that of governance of education.

Key words: Higher Education, ICT, Teacher Education, ICT –as Pedagogy

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INTRODUCTION

Education is the backbone of a nation. Education system plays a major role in development of modern economies. Understanding how education system work and how it evolve over time has been one of the most important research agendas in recent years. The education system of any economy performs following main tasks: first, it handles the basic and higher education; second, it provides better opportunities of income; third it enhances the living standard and helps in social development.

Information, Knowledge, and Communication Technology plays vital role in imparting education in modern scenario. At the height of the Internet boom of the **1990**s, 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 fulfill the need of ever growing Indian economy, but on other hand it face challenges at operational

level. Educational governing bodies like **UGC, AICTE, ICMR, ICAR**, all possess difficulties to maintain proper coordination, administration, monitoring and evaluation for improving the quality of education and also imparting the education.

The role of Information and Communication Technology (ICT) plays a great role in strengthening the three traditional branches that make up the mission of higher education i.e teaching, research and service to the society. ICT changed the style of functioning of the educational system and its governance with the help of digital data, its storage, retrieval, manipulation and transmission. ICT works in three ways: - (i) communication and decision implementation, (ii) automating tedious task, and (iii) supporting new and existing tasks and processes.

Use of ICTs can process information, create knowledgebase and make them available wherever and whenever necessary. Information and Communication Technologies (ICTs) in most cases have tremendous success in providing services at reduced costs to the people's door steps. ICTs have the same to do for making the higher education available to all classes of people throughout the country at a lower cost. As a result, on one hand people will have the access right on higher education and on the other hand will gain the necessary knowledge, skills, and experiences to serve the nation and prosper accordingly.

In 21st century, one can hardly find a country where higher education through distance mode is not available. In fact it has been practiced since long before. But at present days, having revolution of ICTs, the higher education through distance mode has been more practical and well accepted by the all people around the globe. It is now being called Virtual learning. In developed country, people are getting more interested in learning through Virtual Campus than that of a Brick-and-Mortar Campus. Virtual Campus is nothing but ICT enabled campus, where students are attending their classes, discussing with teachers, accessing learning resources, seating exams, joining forums/clubs, submitting assignments etc. virtually having the facility of real-time interactions between teacher and students.

ICT is defined as new information-processing and information-transmitting technologies that include computer-related commodities and technologies such as broadcasting and wireless mobile telecommunications etc. Personal computer (PC) that connects Internet has become a vital tool for communication during the past few decades since its proliferation among the masses. It is observed that penetration of ICT is faster in developed nations rather than developing nations. The penetration of ICT can be linked to socio-economic conditions of a nation such as education, freedom for information exchange, promotion of basic telecommunications infrastructure and market. Therefore, the objective of the paper is to analyze, growth pattern of enrolment and the relationship between level of education and diffusion of ICT; focuses on Internet and personal computers (PCs). The paper builds on empirical data pertaining to the enrolment at primary, secondary and tertiary level and ICT in Brazil, China, India and USA.

ICTs stand for Information and Communication Technologies. According to Blurton, ICT is defined as "diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information". Technologies included in ICTs are: Radio and Television (broadcasting technology), Telephony, Computers, and the Internet.

E-Learning: Commonly associated with higher education, professional 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.

Open and distance learning: Open and distance learning is defined by the Commonwealth of Learning as "a way of providing learning opportunities that is characterized by the separation of teacher and learner in time or place, or both time and place; learning that is certified in some way by an institution or agency; the use of a variety of media, including print and electronic; two-way communications that allow learners and tutors to interact; the possibility of occasional face-to-face meetings; and a specialized division of labour in the production and delivery of courses."

The use of ICT has extended the scope of offering educational programmes at a distance. The off-campus delivery was an option for students who were unable to attend the classes regularly. Today, many students are able to make this choice through technology- facilitated learning settings. This make available the education everywhere, it is time and cost saving also. The major benefit of ICT implementation in education is it extending courses of choice to students of different backgrounds, cultures, perspectives.

Learners are free to participate in learning activities at their convenience through online technologies. Eminent teachers from different parts of the country and abroad can be utilized for teaching at their convenience through mobile technologies and seamless communication technologies that support 24x7 teaching and learning for instance NPTEL (National Programme on Technology Enhanced Learning, India,**2007)**, EKLAVYA Technologies Channel, India, **2007**,

Tata Sky Active education classrooms etc. All these above technologies are the fruitful result of ICT implementation in education sector which provide a new direction in modern education. All these education can be provided through Teleconferencing, Videoconferencing, Web-based conferencing, Audio conferencing and other ICT technologies.

Teleconferencing: refers to "interactive electronic communication among people located at two or more different places." There are four types of teleconferencing based on the nature and extent of interactivity and the sophistication of the technology:

1. Audio conferencing;
2. Audio-graphic conferencing;
3. Video conferencing; and
4. Web conferencing

Objectives of the Study

- ✓ To look at ICT-based higher education by the use of different technologies.
- ✓ To investigate the current status of ICT-based higher education and its useful implementation in imparting the education.

Methodology

The study is descriptive in nature and therefore the information presented is based on secondary data. Secondary information has been collected from various documents such as books, newsletters, reports, magazines, journals, daily newspaper, WWW, as well as from existing literature to understand the uses of ICTs for offering various levels of higher education in the countries.

Literature Review

ICT consists of IT as well as telephony, broadcast media, and all types of audio and video processing and transmission. Quality education in **(2018)** depends on the development of information technology in several provisions such as enlarging the motivation of learner, enrichment of basic skills and increasing teacher training in technology. An ICT plays a pivot role in education is not homogeneous**(2010);** ICT currently provides a growing range of tools to manipulate digital data, as well as access to the vast range and variety of content which underpins the information age, only some of which is designed to support learning. In **(2011)** an order which passed to harness the power of these technologies to serve science education which are essential for the studying group? This paper also helps us to investigate, how ICT tools can contribute to enhancing Cultural Heritage Education. It is an attempt to answer the question concerning whether ICT can really provide any added value to Cultural Heritage pedagogy, education and learning. By focusing on those Cultural Heritage artifacts that pertain to the field of arts and archeology, the paper assumes a methodological perspective and provides examples of some of the most innovative experiences in the field, thus driving the reader to reflect on the pedagogical impact that may derive from exploiting ICT potentialities. The present article represents importance of ICT reserve the major place in improving the educational system such as increasing motivation among the learners, obtaining attention among the learner and creating in depth understanding in their subject The expression was first used in **(1997)** in a report by Dennis Stevenson to the UK government and promoted by the new National Curriculum documents for the UK in **(2000)**.

Sometimes used with technologies in the plural. Originally, only information and communications technology (with communications in the plural) was considered correct since ICT refers to communications (in the sense of a method, technology, or system of sending and receiving information, specifically telephone lines, computers, and networks), not communication (the act of sending or receiving information by speaking, writing, phoning, emailing, etc. or a message containing such information), and the older form (information and communications technology) is still the only one recorded in professionally edited reference works (e.g. Oxford Dictionaries Online, Computer Desktop Encyclopaedia, Webopedia, and Encarta® World English Dictionary) and preferred by many style guides (e.g. Editorial Style Guide of the Republic of South Africa. Nevertheless, the form information and communication technology is becoming increasingly common and is now used in about half the books that can be searched using Google Books and is for example also used by the International Telecommunication Union.

The quality and quantity of the skilled manpower determine the competency of economic leadership of any world society in the global market. Education is necessary for any nation for its social and economic growth. There are a number of regulating agencies for higher education in India, which leads to duplication of procedures causing immense loss of time and resources. In concern with funding process in educational institutions takes lots of time due to manual verification. So here ICT have play a vital role by providing option like online payment.

The use of the term Technology has changed significantly over the last 200 years. Before the 20th century, the term was uncommon in English, and usually referred to the description or study of the useful arts. The term was often connected to technical education, as in the Massachusetts Institute of Technology (chartered in **1861**). "Technology" rose to prominence in the 20th century in connection with the second industrial revolution. The meanings of technology changed in the early 20th century when American social scientists, beginning with Thorstein Veblen, translated ideas from the German concept of Technik into "technology." In German and other European languages, a distinction exists between Technique and Technologies that is absent in English, as both terms are usually translated as "technology." By the (**1930**s), "technology" referred not to the study of the industrial arts, but to the industrial arts themselves.

ICTs are used as productivity tools or enrichment resources; this generally means that they support the traditional teacher-led mode of instruction in subject areas such as math, language, social studies, or science. Transformative applications of ICTs refer to non-traditional emerging uses where exposure to and distribution of ICTs fundamentally change the way education is conceived and delivered to students. ICTs are enablers that optimize student-centred instructive methods. They are used to develop broad, generic skills such as problem solving, independent and collaborative learning, and communication. They lead to more individualized instruction, less educational delivery, and an emphasis on problem-solving and cooperative learning situations.

Teachers assume the role of facilitators and skills developers. They help the students achieve a greater understanding of information by making use of new technologies. In the past, educational institutions have provided little choice for students in terms of the method and manner in which programs have been delivered. Students have typically been forced to accept what has been delivered and institutions have tended to be quite staid and traditional in terms of the delivery of their programs. The use of ICTs provides many options and choices and many institutions are now creating competitive edges for themselves through the choices they are offering students.

Description of ICT separately is Information, in its most restricted technical sense, is an ordered sequence of symbols. As a concept, however, information has many meanings. Moreover, the concept of information is closely related to notions of constraint, communication, control, data, form, instruction, knowledge, meaning, mental stimulus, pattern, perception, and representation.

Communication is a process whereby information is enclosed in a package and is channelled and imparted by a sender to a receiver via some medium. The receiver then decodes the message and gives the sender a feedback. All forms of communication require a sender, a message, and an intended recipient; however the receiver need not be present or aware of the sender's intent to communicate at the time of communication in order for the act of communication to occur. Communication requires that all parties have an area of communicative commonality. There are verbal means using language and there are nonverbal means, such as body language, sign language, paralanguage and eye contact, through media, i.e., pictures, graphics and sound, and writing.

In **1937**, the American sociologist Read Bain wrote that "Technology includes all tools, machines, utensils, weapons, instruments, housing, clothing, communicating and transporting devices and the skills by which we produce and use them." Bain's definition remains common among scholars today, especially social scientists. But equally prominent is the definition of technology as applied science, especially among Integration and application of these three techniques in education for enhancement of productivity of education is termed as effective educational technology and methodology of teaching. ICTs stand for information and communication technologies and are defined, for the purposes of this primer, as a “diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information.” These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephony. In recent years there has been a groundswell of interest in how computers and the

Internet can best be harnessed to improve the efficiency and effectiveness of education at all levels and in both formal and non-formal settings. But ICTs are more than just these technologies; older technologies such as the telephone, radio and television, although now given less attention, have a longer and richer history as instructional tools. For instance, radio and television have for over forty years been used for open and distance learning, although print remains the cheapest, most accessible and therefore most dominant delivery mechanism in both developed and developing countries. The use of computers and the Internet is still in its infancy in developing countries, if these are used at all, due to limited infrastructure and the attendant high costs of access. Moreover, different technologies are typically used in combination rather than as the sole delivery mechanism.

ICT in Teacher Education

Globalization and technological change—processes that have accelerated in tandem over the past fifteen years—have created a new global economy "powered by technology, fueled by information and driven by knowledge." The emergence of this new global economy has serious implications for the nature and purpose of educational institutions. As the half-life of information continues to shrink and access to information continues to grow exponentially, schools cannot remain mere venues for the transmission of a prescribed set of information from teacher to student over a fixed period of time. Rather, schools must promote "learning to learn," i.e., the acquisition of knowledge and skills that make possible continuous learning over the lifetime. The illiterate of the 21st century, according to futurist **Alvin Toffler**, "will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn." Concerns over educational relevance and quality coexist with the imperative of expanding educational opportunities to those made most vulnerable by globalization—developing countries in general; low-income groups, girls and women, and low-skilled workers in particular. Global changes also put pressure on all groups to constantly acquire and apply new skills. The International Labour Organization defines the requirements for education and training in the new global economy simply as "Basic Education for All", "Core Work Skills for All" and "Lifelong Learning for All". 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. However, the experience of introducing different ICTs in the classroom and other educational settings all over the world over the past several decades suggests that the full realization of the potential educational benefits of ICTs is not automatic. The effective integration of ICTs into the educational system is a complex, multifaceted process that involves not just technology—indeed, given enough initial capital, getting the technology is the easiest part!—but also curriculum and pedagogy, institutional readiness, teacher competencies, and long-term financing, among others.

ICT-Based Higher Education / Online Education

In recent time's factors have emerged which have strengthened and encouraged moves to adapt ICTs into classrooms and learning settings. There are a good number of western universities/institutions offering ICT-based higher education successfully with quality for decades.

ICT now changing the way of education in India and abroad, with the help of internet we can access anywhere anytime. Now in India also like western countries the higher education is becoming more advanced than before. The recent example is the commencement of online test for common admission test for management students. Other test like **GMAT, GRE, and GATE** are also held online as they are the higher level quality exams.

In Asia, the 44 radio and TV universities in China (including the China Central Radio and Television University), University Terbuka in Indonesia, and Indira Gandhi National Open University in India have made extensive use of radio and television, both for direct class teaching and for school broadcasting, to reach more of their respective large populations. Japan's University of the Air was broadcasting 160 television and 160 radio courses in **2000**. Each course consists of 15 to 45-minute lectures broadcast nationwide once a week for 15 weeks. Courses are aired over University-owned stations from 6 am to 12 noon. Students are also given supplemental print materials, face-to-face instruction, and online tutorials.

The Ministry of Education (MOE) has unveiled Singapore's third Master plan for ICT in Education, which is aimed at further transforming the learning environment for students. Speaking at the inaugural International Conference on

Teaching and Learning with Technology (ICTLT) in August, Dr Ng Eng Hen; Minister for Education and Second Minister for Defence, said "We want greater engagement of students to encourage more self-directed questioning and learning," he said. "An interactive environment using all our senses will provide greater clarity and enhance content transmission and retention."

Findings

ICT-based higher education is popular to those who want flexibility in the learning process so that one can do both study and work together.

The study reveals that respondents find ICT-based higher education in terms of technical support is quite adequate. Quality of higher education can be maintained through ICTs means in comparison with face to face conventional learning.

The outcome of each technology varies according to how it is used. Delivery of instruction and its reception by learners, online course materials, for example, may be accessed 24 hours a day, 7 days a week.

ICT-based education can be offered regardless of time and space. ICTs are a potentially powerful tool for extending educational opportunities, both formal and non-formal, each of the different ICTs—print, audio/video cassettes, radio and TV broadcasts, computers or the Internet.

Educational programming consists of a broad range of programme types—news programs, documentary programs, quiz shows, educational cartoons, etc.—that afford non-formal educational opportunities for all types of learners.

In a sense, any radio or TV programming with informational and educational value can be considered under this type. Some notable examples that have a global reach are the United States-based television show Sesame Street, the all-information television channels National Geographic and Discovery, and the radio program Voice of America.

Importance of Teacher with ICT

The most obvious advantage of using information technology in teaching and learning is the flexibility for learners to get access to computers. Now that computers have become common, learners can get access to the Internet and engage in study at any time, any place and at their own pace. This is the reason why distance learning has become so common nowadays. Another advantage of information technology is its versatility. Other than just sounds, computers can produce colourful graphics, which will greatly enhance the learning outcome as learners will retain the majority of what is taught through sights rather than sounds. Besides, compared with humans, computers have absolute superiority in generating attractive graphics.

In a nutshell, a picture is worth more than a thousand words. Besides, computers can provide instant feedback to learners when they are doing exercises or practicing.

In addition, it is difficult for a teacher to monitor the performance or progress of students during the lesson. Supervising more than forty students' activities through a central monitoring system is not as easy as it seems. There are always some naughty students in class who will not follow the instructions of teachers. In the end, teachers may have to be forced to walk around the classroom to supervise students. Next is the problem of interactions. Teaching and learning involve a lot of human interactions. This is especially so in language teaching and learning. One can hardly imagine learners can pick up a language entirely through the interactions with some cold machines like computers. Human interactions do not rely solely on the uttering of sounds. Other factors include subtle variations in facial expressions, gestures, postures, eye contacts, the number and type of people involved, the setting and so on. A machine can never cope with all these, whereas an experienced teacher can do so with ease. There is no doubt computers can provide instant feedback to learners. However, the type of feedback is limited to simple answers and pre-set comments. They are useful only for low-level questions. Questions that ask for more complex skills from students like note-taking, summarizing, giving comments and so on can never be handled by computers. To sum up, information technology can aid teachers in producing desirable learning outcomes.

ICT and Teacher Training

- Teachers are no longer dispensers of knowledge but proactive facilitators.
- Redefining the role of the teacher in the new information age.
- The quality of teachers as a predictor of student learning therefore the importance of teacher training is heightened-in this light what is the role of ICT as a tool facilitating teacher training Vikramshila Education Resource Society Shikshak Sammelan **2009**, ICT for Quality Education.

- Bringing teachers to ICT rather than taking ICT to teachers- relevance in developing nations.

Many teachers are reluctant to use ICTs, especially computers and the internet. Some of the reasons for this reluctance include:

- Poor software design,
- Skepticism about the effectiveness of computers in improving learning outcomes,
- Lack of administrative support,
- Increased time and effort needed to learn the technology and how to use it for teaching,
- The fear of losing their authority in the classroom as it becomes more learner-centered.

Conclusion

The ICT has become indispensable and will remain as such with the growth of higher education and the civilization in future. At the same time care must be taken by the governing authorities for proper control and licensing to ensure quality, accountability and certification in higher education. Information and communication technologies (ICTs) are a major factor in shaping the new global economy and producing rapid changes in society. Within the past decade, the new ICT tools have fundamentally changed the way people communicate and do business. They have produced significant transformations in industry, agriculture, medicine, business, engineering and other fields. They also have the potential to transform the nature of education-where and how learning takes place and the roles of students and teachers in the learning process.

Teacher education institutions may either assume a leadership role in the transformation of education or be left behind in the swirl of rapid technological change. For education to reap the full benefits of ICTs in learning, it is essential that pre-service and in-service teachers have basic ICT skills and competencies. Teacher education institutions and program must provide the leadership for pre-service and in-service teachers and model the new pedagogies and tools for learning. They must also provide leadership in determining how the new technologies can best be used in the context of the culture, needs, and economic conditions within their country. To accomplish these goals, teacher education institutions must work closely and effectively with teachers and administrators, national or state educational agencies, teacher unions, business and community organizations, politicians and other important stakeholders in the educational system. Teacher education institutions also need to develop strategies and plans to enhance the teaching-learning process within teacher education programs and to assure that all future teachers are well prepared to use the new tools for learning. This is intended to help policymakers in developing countries define a framework for the appropriate and effective use of ICTs in their educational systems by first providing a brief overview of the potential benefits of ICT use in education and the ways by which different ICTs have been used in education thus far. Second, it addresses the four broad issues in the use of ICTs in education—effectiveness, cost, equity, and sustainability.

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