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AN ANALYSIS UPON EFFECTIVENESS USE OF ICT IN TEACHING AND LEARNING AT SCHOOL LEVEL

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An Analysis upon Effectiveness Use of ICT in Teaching and Learning at School Level

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Abstract – This study is aimed to identify the relationship between the Information and Communication Technology (ICT) use in teaching and learning towards the achievement of school students. The purpose of this study was to investigate the effects of information and communication technology (ICT) on school from students' perspectives.

The purpose of this paper aims to bring together the findings and key points from a review of significant part of the available literature associated with ICTs for Education and ICTs in Education. This review set out to identify and evaluate relevant strategies in national and international research and initiatives related to measuring and demonstrating the effective use of ICT for education with regard to the teaching learning process; ICT and quality and accessibility of education; ICT and learning motivation, ICT and learning environment, and ICT to enhance the scholastic performance.

Information and communication technologies (ICT) have become commonplace 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. 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-centred learning settings. But with the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important and this importance will continue to grow and develop in the 21st century. In this paper, a literature review regarding the use of ICTs in education was provided. Effective use of ICT for Education along with ICT use in the teaching learning process; quality and accessibility of education; learning motivation Learning environment. Besides, an overview of the ICT and scholastic performance.

- x -

INTRODUCTION

The aim of teaching-learning process is to enable the students to earn livelihoods for them as well as to become useful member of society. In primitive societies, this adjustment meant conformity with the things as they were. The success of this process depends on the degree of interaction and communication between the teachers and learners (Woolfolk, 2004). The teaching and learning are closely interlinked and each learner has the right to choose his own path instead of being made to fit in the stereo typed education system, which demands individual attention, initiative and self-education among the learners. Modern approaches encourage the learners to work independently, free to set their own goals, plan their activities and share their opinions with teachers freely.

The use of ICT has brought tremendous progress in the field of education in developed and developing countries and it has also brought revolution in teaching-learning process by changing the roles of teachers and learners. In developed countries ICT is being used successfully, but in developing countries, its use is limited due to the cost and scarce resources. Information Communication Technology (ICT) is the major factor in shaping the new global economy and producing rapid changes in society. Its scope and coverage is unprecedented in human civilization due to the access to information, communication, knowledge and entertainment. The new ICT tools have changed the ways the people used to communicate resulting in significant transformation in industry, agriculture, medicine, business, engineering, and other fields. ICT has the potential to transform the nature of education,

teaching methods, and the role of students and teachers in the learning process.

The new technologies challenge the conventional concept of both teaching and learning methods, and materials and by re-configuring how teachers and learners access knowledge. To meet this challenge schools must embrace the ICT tools for teaching and learning to move towards transforming the traditional paradigm of teaching.

Educational technology has made high progress in the last few decades. In India implementation of ICT in schools is at its initial stages. Teachers need to enhance their basic knowledge and skills in ICT as well. To enhance the use of computers in schools and to achieve the required educational goals, computers can be installed in individual classrooms, in central computer labs, libraries, and teachers planning room, or moved from room to room on mobile carts, depending on the requirements and resources available in the schools (Pandey, 2001). Technology includes not only tools and machines, but also their impact on processes and systems, on society, and on the way people think, perceive and define their world. Over the past few decades, a particular dimension of technology has come to permeate nearly all aspects of human life. The information technologies, comprising computers and their peripherals, computer software, the Internet and electronic multimedia, are becoming part of our daily existence at an ever-increasing rate. This reality also forms the need to integrate information technology into curricula for the various subjects (Mishra, 2005). Since there are changes in the views of the nature of science and the role of science education, the increasing prevalence of Information and Communication Technologies also offers a challenge to the teaching and learning of science and to the models of scientific practice teachers and learners might encounter. ICT for example, offer a range of different tools for use in school science activity, including;

i. Tools for data capture, processing and interpretation-data logging systems, databases and spreadsheets, graphing tools and modeling environments.

ii. Multimedia software for simulation of processing and carrying out virtual experiments.

iii. Information systems.

iv. Publishing and presentations tools.

v. Digital recording equipment.

vi. Computer projection technology.

vii. Computer controlled microscope.

These forms of ICT can enhance both practical and theoretical aspects of science teaching and learning. Although computer literacy and awareness are increasing, but still, the quality of professional competence and skills in this area are still lacking. Teachers have also found computers extremely valuable as an aid to valuable demonstration, for use in the classroom situation, as it is possible to prepare still and animated demonstrations.

These uses are, however, examples of how a new technology is often at first treated in a traditional way. The excitement and the challenge of the computer and the methods of IT are such that they cannot be contained in the traditional ways of education. Computers are the potential extension of self, and as such cry out for "Hands-on" experiences (Hills, 2002).

One of the major roles in the adoption and implementation of ICT in education is performed by the teachers, since they are the integral part of teaching and learning process. For example, teacher's lack of ICT knowledge and skills to be a major obstacle to the implementation, and consequently pointed to the need for further training of teachers in this field. If education is to provide an adequate preparation for the future, schools must empower learners to become more active and more responsible for arranging their own learning process (Palgrum and Nancy, 2003).

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

Jigneshkumar Madhubhai Patel[1]* Dr. Sanjay Kathad[2]

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.

The term Information and Communication Technology (ICT) is a broad and comprehensive expression. It is not restricted to the computers or the internet alone. It ranges from the use of FM radio to satellite for communication. Opines that ICTs are the fundamental building blocks of the present day society. The contemporary society is highly influenced by ICTs in every aspect of life, including education. The effects are experienced more in the field of education since it has the potential for teachers to transform the teaching methodology to meet individual needs. Today, schools are under pressure to adapt to this technological innovation. ICT provide remarkable opportunities for developing countries to enrich their educational system since it can help in acquiring and assimilating knowledge.

The importance of ICT has been recognized by educational institutions worldwide. Asserts that ICT has influenced the way people function today, both personally and professionally, which demands change in the educational arena. Schools that train their students in yesterday's skills and outdated technologies are not meeting the needs of tomorrow's world. Such children will not fit into tomorrow's professional requirements. According to ITU (Telecommunications Standardization Sector), ICTs can act as a facilitator in promoting learning skills, when implemented and utilized effectively. Effective use of ICT is crucial to countries that are progressing towards information or knowledge-based society.

ICT is a pivotal tool in spreading quality education. According to Kofi Annan, the former General Secretary of the United Nations, ICT helps to achieve the aim of Universal Primary Education by 2015; since it can take learning beyond the four walls of the classroom. This implies the vital role played by ICT in the educational sector. The application of information and communication technologies in education has been divided into two main categories: ICTs for Education and ICTs in Education. ICT for education identifies the development of information and communications technology especially for teaching-learning purposes while the ICTs in education includes the adoption of basic elements of information and communication technologies in the teaching-learning process. ICT provides great flexibility in education to ensure that learners are able to access knowledge anytime and from anywhere. It also affects the way knowledge is imparted and how students learn.

ICT INTEGRATION ENHANCE TEACHING AND LEARNING

The application of ICT is creating significant changes in the teaching and learning process. The traditional approach in teaching has stressed on content. For decades course materials were designed around textbooks. Teachers taught the content through lecture method and the activities were designed to enforce the content knowledge. Present day teachers need to create relevant and intriguing learning experiences for their student's. Technology provides a remarkable role in making education inclusive since it has the potential to improve educational performance of students. Furthermore, utilization of ICT facilitates learner-centered approach rather than conventional teacher-centered pedagogy. The present day curricula promote aptitude and performance of the learners, emphasizing on the application of the information rather than factual knowledge. ICT facilitates the dissemination of knowledge based on the contemporary curricula. As a result, incorporating ICT in teaching helps both teachers and students since it has the potential to impart quality education if it is used effectively.

ICT-enhanced learning stimulates augmented learner involvement. The constructivist method views learning as realistic and learner-centered. ICT is an effective tool in constructivist approach of learning, where teachers can layout simulated and tailor-made learning conditions to students,. In this regard, applying educational technology as a constructivist device can help students to display their ideas, express their knowledge, examine, exploit, and process information, in a collaborative learning environment (,. For instance, software applications

Jigneshkumar Madhubhai Patel[1]* Dr. Sanjay Kathad[2]

like databases and excel sheets foster inquiry-based learning activities. Multimedia is a powerful tool that assists thinking activities of learners and also helps them to share and express their knowledge. These software applications help students in understanding the concept by doing. It also facilitates in developing an independent approach towards problem -solving. In that sense computers help students in developing high order thinking,. Also went in the same direction by stating that ICT integration helps in Constructivist learning where students interact with other learners, the teacher, sources of information, and technology. Such an atmosphere provides the learner with direction and settings to build their knowledge and skills. It also gives a rich collaborative learning condition providing the learner to mull over different perspectives in dealing with issues and solve problems, .ICT also facilities collaborative learning. Points out that "the flexible time-space accounted for by the integration of ICT into teaching and learning processes contributes to increasing the interaction and reception of information. Such possibilities propose changes in the communication models and the teaching and learning methods used by teachers, giving way to new scenarios which favour both individual and collaborative learning‖.

Teachers play a crucial role in integrating ICT. The present day teachers should know not only the content of their subject but also the pedagogy to impart the knowledge effectively by integrating technology. According to in order to integrate ICT in teaching teachers must recognize the usefulness of technology, they should believe that the application of technology does not disrupt the classroom climate. Moreover, they should also have the confidence to manage technology. Nevertheless, research studies indicate that majority of the teachers do not take advantage of the potential of ICT to promote the quality of learning, even though they have a favorable attitude towards it , , , . , Aver that the ICT's potential can be exploited only if confident teachers are ready to make use of the opportunities for transforming their classroom practices by utilizing ICT effectively. Thus, "ICTs are exerting impacts on pedagogical approaches in the classrooms. Their contribution to changes in teaching practices, school innovation, and community services is considerable"

METHODOLOGY

The study aimed at investigating the comparative effects of the use of Information and Communication Technology (ICT) with the traditional method of teaching at secondary level. The dependent variable in the study was the achievement in the academic scores of the students, whereas the independent variable was the teaching strategy.

Sample - A sample consisted of one hundred and twenty students studying in class IX at two selected public and private sectors. The selected schools have the same syllabi at secondary level and had computer lab facilities. Students of every sample school were divided into two groups, experimental group and control group. Both the groups were equated at their scores in the final examination of class VIII. The students of experimental group were exposed to teaching through ICT, whereas the students of control groups were taught through traditional method of teaching.

Research Instrument - In order to measure academic achievements of the sample students in various subjects a teacher made post-test was administered immediately after completing the experiment/teaching to both the groups, in all the schools at the same time and data collected was the scores of students achieved in the post- test.

Test was prepared by the researchers with the consultation of experienced teachers at secondary level, from the topics taught to both the groups by making the chart of specification, and by considering the technique of paper setting for different understandings, i.e. 15% for difficulty, 75% for average, and15% for easy levels. The test contained 50 items as a whole, including multiple choices, true / false, match the columns, fill in the blanks, short questions-answers and problem solving. Time duration for the test was fixed as one and a half hour, which was considered appropriate for the completion of the test for both the groups.

Reliability of Test - The reliability of the post-test scores obtained by the sample students was tested by using split-half (oddeven) method. Spearman-Brown Prophecy formula was applied to find out the co-efficient of reliability from the comparable value of the post-test at 0.5 levels of significance, and was found to be 0.75 which was acceptable.

Experimental Group - The students of experiment group received the treatment of independent variable, i.e. use of information and communication technology (ICT). This group consisted of one computer for two students, all computers connected with Internet and loaded with software having different program related to the topics under study through the main server.

DATA ANALYSIS

At the end of the experiment, i.e. after six weeks, post-test was administered for both the groups at sample schools. The scores achieved by the students of both the groups of sample schools were recorded separately, and were treated as academic achievements of the students for statistical analysis, to accomplish the objectives of the study.

Jigneshkumar Madhubhai Patel[1]* Dr. Sanjay Kathad[2]

Group	N	Df	Mean	SD	SE$_D$	t-Value
Experimental	30	29	23	7	1.3	0.584*
Control	30	29	22	7		

*Not Significant   Table value at 0.05=2.78

Table 1. Significance of difference between the mean scores of students of public sector of experimental and control groups on previous examination.

Table 1 shows that the value of t (0.584) was found lesser than the table value of t (2.78) at 0.05 levels. Therefore, that there was no significant difference between the mean scores of students of public sector of experimental and control groups on previous achievements test. Hence, both the groups were treated statistically equal.

Group	N	Df	Mean	SD	SE$_D$	t-Value
Experimental	30	29	29	4.7	0.89	0.43*
Control	30	29	28	4.7		

*Not Significant   Table value at 0.05=2.78

Table 2. Significance of difference between the mean scores of students of private sector of experimental and control groups on previous examination.

Table 2 shows that the calculated value of t (0.43) was found lesser than the table value (2.78) at 0.5 levels. Hence, that there was no significant difference between the mean score of students of private sector of experimental and control groups on previous achievement testing. Therefore, both the groups were treated statistically equal.

Group	N	Df	Mean	SD	SE$_D$	t-Value
Experimental	30	29	31	8.34	2.95	1.80*
Control	30	29	26	13.57		

*Not Significant   Table value at 0.05=2.78

Table 3. Comparison of the mean scores of students of public sector of experimental and control groups on post-test.

Table 3 shows that the value of t (1.80) is lesser than the table value (2.78) at α 0.05 level. Hence, the null hypothesis is accepted and concluded that ICT as a teaching strategy is not effective for the students of public sector contrast to traditional method of teaching at secondary level. This does not supports the findings of Williams & Jonassen (1996) that students who have gone through the treatment of ICT achieved better scores in academics as compared to others without the use of technology.

Group	N	Df	Mean	SD	SE$_D$	t-Value
Experimental	30	28	41	5		
Control	30	28	35	6	1.24	3.30*

*Significant   Table value at 0.05=2.78

Table 4. Comparison of the mean scores of students of private sector of experimental and control groups on post-test.

Table 4 shows that the calculated value of t (3.30) is greater than the table value (2.78) at 0.05 levels. Hence, the null hypothesis is rejected and concluded that ICT as a teaching strategy is effective for the students of Private sector in contrast to traditional method of teaching at secondary level.

CONCLUSION

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.

ICT will become a powerful agent in transforming several educational practices. Persistent application and development of ICTs in the education system will have a strong influence on teaching learning process, accessibility of education, motivating learners, creating a congenial learning environment and improving academic performance. ICT integration in education has a positive impact on both teaching and learning process. Technology makes a lot of difference in the delivery of lessons or even education at large. ICT has the potential for a wider accessibility to educational resources. Furthermore, it enhances flexibility, so that, students can have access to learning irrespective of time and geographical limitations. It can also have an impact on the way students are taught in the classroom and the way they learn. It helps to motivate the learners by creating a rich learning environment by providing new opportunities for both teachers and students.

Jigneshkumar Madhubhai Patel[1]* Dr. Sanjay Kathad[2]

Application of ICT as a teaching strategy was found effective as compared to traditional method of teaching. So to enhance its use in other disciplines of education, the Integration of ICT might be introduced in all other subjects of the curricula taught at secondary and higher secondary levels. Computer software programs and on-line tutoring for all the disciplines taught at SSC and HSSC level might be developed locally to meet the demand of students.

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