



## A STUDY OF BIOLOGICAL SCIENCE IN INFORMATION AND COMMUNICATION TECHNOLOGIES TO IX STANDARD STUDENTS

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### **Abstract:**

The use of Information and Communication Technologies (ICT) in education is seen as a way to produce a more educated knowledge-based work force. Recent developments in technology have changed the world outside as well as inside the classroom making it quite eye-catching and interesting for the students to know and to learn. Developments in the application and dissemination of knowledge and information technology have had changing demands on education. The infusion of Information and Communication Technology (ICT) into teaching and learning and for that matter into actual and virtual classroom has generated much interest in educational research in recent years. ICT have the potential of proving an alternative and more effective teaching and learning tool in education. Evidence emanating from research literature suggests that ICT has a powerful and significant impact on education both in terms of students’ affective and cognitive outcomes in learning biological science of their choice. It has tended to make learning joyful and lasting in very many ways.

### **Introduction:**

The UNESCO World Education Report (1998) notes that the new technologies challenge traditional conceptions both of teaching and learning and by reconfiguring how teachers and learners gain access to knowledge have the potential to transform teaching and learning processes. ICT provide an array of powerful tools that may help in transforming the present isolated, teacher-centered and text-bound classrooms into rich, student-focused interactive knowledge environments. ICTs are a diverse set of technological tools and resources used to communicate, and to create, disseminate, store and manage information.

Communication and Information are at the very heart of the educational process, in formal and non-formal settings, in programmes provided by governmental agencies, public and private educational institutions, Biological science. Skilled people in the 21st century need to understand how to use technology tools. Including computers, networking and other technologies, plus audio, video, and other media and multimedia tools which enable people to perform effectively at work and in their daily lives, using such tools as spread sheets for calculation, budgeting and building scenarios, graphic and multimedia programme for presentations data bases for research and networks for communicating with others.

“If I were asked under what sky the human mind has most fully developed some of its choicest gifts, has most deeply pondered on the greatest problems of life, and has found solutions, I should point to India.” Max Muller ICTs offer great potentials and advantages in enhancing students’ learning as revealed by Lopez (2003), among others. Information and communication technologies offer a constructivist approach to learning through the provision of interactive learning experiences. Open University network, led by Indira Gandhi National Open University (IGNOU) since its inauguration in 1985, is an ambitious attempt to provide “Education for all”. Most courses of IGNOU use printed text, accompanied by audiotapes, videotapes and other technology. Some courses use teleconferencing, lessons on TV, radio, CDs, web-based content, and interactive radio counselling, and learning centres located throughout India to provide supplementary learning aids and support services to Information and Communication Technologies (ICTs) have had significant impact on the traditional school system. They have provided innovative opportunities for teaching and learning, and they have engendered advances in research about how people learn, thereby bringing about rethinking in the structure of education (Lopez, 2003). Diffusion is the process by which an innovation is communicated through several channels over time, among members of a social system. Rogers provides insight, through his ‘diffusion of innovation theory’, regarding diffusion patterns of innovative initiatives within schools. He defines this process as containing four components:

- ✓ Diffusion in the process by which an innovation is Biological science art of nature.
- ✓ Communicated through several channels over time, among members of a social system.
- ✓ The innovation in itself: an idea, practice, or object that is perceived as novel by an individual or a group of individuals.

- ✓ Communication channels: the means by which communication passes from one individual to another.
- ✓ Time: includes the decision process regarding the innovation, the adoption time by an individual and/or the group, and the adoption rate of the innovation.

### **ICT in Biological Science to the Teacher:**

According to Fullan (1991), “Educational change depends on what teachers do and think. It is as simple and as complex as that.” In classrooms today, the role of the teacher needs to change from the traditional role of prescriber or to that of orchestrator of learning – which necessitates the designing of ICT integrated classrooms promoting higher order cognitive skills.

Teachers are rich resources in the implementation of any innovation, for they bring with them rich practical know-hows of the classroom, for example, the Japanese lesson study approach has shown that classroom-based material developed jointly by teachers and external consultants provide resources that can be practically used in the biological science lessons (Carl Linnaeus published a basic taxonomy for the natural world in 1735)

Teaching is becoming one of the most challenging professions in our society where knowledge is expanding rapidly and much of it is available to students as well as teachers at the same time Darwin theorized that species flourish or die when subjected to the processes of natural selection or selective breeding. Genetic drift was embraced as an additional mechanism of evolutionary development in the modern synthesis of the theory. As new concepts of learning have evolved, teachers are expected to facilitate learning and make it meaningful to individual learners rather than just to provide knowledge and skills. Modern developments of innovative technologies have provided new possibilities to teaching profession, but at the same time, have placed more demands on teachers to learn how to use these new technologies in their teaching.

ICT has highlighted some significant changes in the teacher’s role:

- ✓ Change in relationship with pupils.
- ✓ Change in role of facilitators and managers who support learning.
- ✓ Change in the content and scope of teaching.
- ✓ Changing Locus of control from teachers to learner
- ✓ ICT do not meet the task to the attachment or supplement to teachers preparation, but they offer the infinite access to information which is accessible without effort due to internet (Gilmore, 1995).

Although today, access to new technology is provided in most schools the process of technology integration into every day teaching is still very low, and the full potential of computers and software for biological science teaching and learning is far from being tapped. Among the various reasons for this phenomenon, expressed probably the most crucial concerns of in principles and standards for biological science.

The effective use of technology in the biological science classroom depends on the teacher. Technology is not a panacea. As with any teaching tool, it can be used well or poorly. Teachers should use technology to enhance their students’ learning opportunities by selecting or creating biological tasks that take advantage of what technology can do effectively and well-graphing, visualizing and Mr. Ravikumar, Biology Teacher, Saraswathi Matric School, Santha Veur, Sriperumbudur. Examined the teacher’s role in classrooms with computers and argued that teachers need to teach the process of learning rather than its products. The conventional learning skills such as locating, collating and summarizing information and identifying connections and contradictions within a body of information, all need to be explicitly moved to the centre of the curriculum. The developments of such skills need to be supported using appropriate forms of software. This requires the explicit teaching of ways of organizing cooperative activities involving computers whether in face-to-face groups around a single natural science and living things or through cooperation at a distance via conferencing or email. Biological science

At the heart of is Biological science art of nature. Teachers need to provide their students with many opportunities to reason through their emotional thought; Opportunities in which very young students make distinctions between irrelevant and relevant information and attributes, and justify relationships between sets can contribute to their ability to reason logically. -S. Chapin, the Partners in Change Handbook.

- ✓ From molecules to cells of error-correcting codes is applied to CD players and to computers.
- ✓ The stunning pictures of faraway planets sent by Voyager II could not have had their crispness and quality without such mathematics.
- ✓ Voyagers’ journey to the planets could not have been calculated without the biology of differential equations.
- ✓ Whenever it is said that advances are made with supercomputers, there has to be a Biological theory which instructs the computer what is to be done, so allowing it to apply its capacity for speed and accuracy.
- ✓ The physical sciences (Chemistry, Physics, Oceanography, and Astronomy) require mathematics for the development of their theories.
- ✓ In ecology, biology is used when studying the laws of population change.
- ✓ Natural science provides the theory and methodology for the analysis of wide varieties of data.

- ✓ Travel by aeroplane would not be possible without the mathematics of airflow and of control systems.
- ✓ Body scanners are the expression of subtle, discovered in the 20th century which makes it possible to construct an image of the inside of an object from information on a number of single X-ray views of it. Thus, biology is often said to be involved in matters of life and death.

#### **Delimitations of the Study:**

- The present study was confined to:
- ✓ 68 students of class IX
  - ✓ M. M. Public School, Sriperumpurdur (TK)
  - ✓ Sub- topics: ICT in biological science.
  - ✓ Power Point Programme saved to CD-ROM. The Power Point presentation includes text, animated pictures and video clips with sound.

#### **Design of the Study:**

A design is used to structure the research to show all the major parts of the research project- the sample or groups, measures, treatments or programmes, and method of assignments. Winer (1971) compares the design of an experiment to an architect's plan for the structure of a building. The designer of experiments performs a role similar to that of the architect. The prospective owner of a building gives his basic requirements to the architect, who then, exercising his ingenuity, prepares a plan or a blue -print outlining the final shape of the structure. Similarly, the designer of the experiment has to do planning of the experiment so that the experiment, on completion, fulfils the objectives of research.

In the present study, students in the ICT group were taught using a power point programme saved to CD-ROM. The power point presentations included animated pictures and video clips. Students in the traditional group were taught using the chalkboard, textbooks, models and charts. Experimental classes housed a ceiling mounted LCD projector that was connected to a computer and a document camera and classroom projector projected onto an interactive white- board. The power point presentation was presented on the ceiling-mounted LCD projector. The presentation expanded each lesson, of that 40 lessons delivered in this process, by providing extra examples and examples from the homework. Students were able to solve example problems and then instantly see the answer on a large screen in the classroom. This provided them immediate feedback.

In the present study, pre-test post-test control group quasi -experimental, design was employed with a purposive sample in the form of intact sections of class IX of the same school. The study included a control group (34 Students) and an experimental group (34 Students). The experimental group was taught through ICT used teaching and the control group through the traditional method. The design involved three operational stages as identification stage, treatment stage and post-testing stage. The first stage involved pre-testing of all the students of both groups on achievement in mathematics, socioeconomic status, and intelligence. The second stage involved the experimental treatment, which consisted of ten subunits of IX grade mathematics, taught through ICT used teaching and through traditional teaching to control group. The third stage dealt with post testing of the control and experimental group using the achievement test in mathematics.

#### **SAMPLE**

A sample is a finite part of a statistical population whose properties are studied to gain information about the whole (Webster, 1985). When dealing with people, it can be defined as the set of respondents (people) selected from a larger population for the purpose of a survey. In majority of the studies, it is just not feasible to collect data from each and every subject. In addition, to work on a sample saves time, labour and money.

Sampling makes it possible to draw valid generalization by studying a relatively small proportion of the population selected for observation and analysis. In the present investigation, Sriperumpurdur (TK), district of Kanchipuram was the field of study. The sample of the study comprised pupils studying in two sections of the IX class of M.M. public School, Kumar, situated in Kanchipuram district. One section formed the control group and the other section formed the experimental group.

#### **Role of ICT in Biological Science Learning:**

Francis crick greatest biologist, "Every normal child is capable of learning Biological science" has put greater responsibility on dispensers of knowledge and producers of knowledge of Biological education, which they cannot escape by passing the buck of the poor Biological science ability of the students.

In the present scientific and technological age, since the conventional teaching methods are not sufficient to arouse interest among the students and don not meet up to the intellectual, psychological and emotional needs of the students in the new millennium, the methods of teaching biology need to be changed. The integration of technology into teaching and learning of biology has also not escaped the attention of educators. As a discipline, Biological science too is very much influenced by the rapid development of Information and Communication Technology (ICT) and mathematics educators have been looking at ways to integrate ICT into the curriculum over the last decade (Becta, 2003). The key benefits ICT promotes greater collaboration among students and encourages communication and sharing of knowledge. ICT gives rapid and accurate feedback to students and this contributes towards positive motivation. It also allows them to focus on strategies and interpretations, answers rather than spend time on tedious computational calculations.

Traditionally, Biological scienceteacher's lecture and their students learn by listening. Students develop a narrow set of skills which quickly fade. Research in Biological science education suggests that more than knowledge of content is required to be successful in Biological science. James Watsons suggested that a learner's ability to master of biology contents is shaped by the learner's attitude towards the content. More active approaches to ICT learning show that students can indeed develop deep understanding that does not fade over time. Researchers claim that in comparison to conventional methods of teaching, computer-mediated instruction.

#### **Emerging Role of Teacher Education:**

The set of 40 lessons, demonstrated and transacted through power point presentations duly enriched and supplementary a heavy dose of technological interventions like CD ROMS ,graphics, pictures ,animated presentations etc. in the classroom, as part of the study, not only indicated the vast horizons of information and technology that can be exploited for educational purposes but also for boosting the quality of human life in a knowledge oriented society that the contemporary generation seeks to create and at least dream of through the process of education, supported by the humane face of technology.

Quite in the past, stray efforts have been made to orient and educate teachers on a country wide scale through Satellite communication in programmes like SOPT (Special Orientation of Primary Teachers) and PMOST (Programme for Mass Orientation of Teachers) by Apex level national institution like NCERT for qualitative improvement of school education through technology –based professional development of teachers. The NCERT; CLASS project and the concept of Smart Schools to address the same cult of computer and information technology for quality schooling and of late , the launching of EDUSAT, a Satellite exclusively meant for Education is a landmark development in the field of exploiting potential, information of technology for quality schooling and sustainable growing of school education in particular and of teacher education in general .The central institute of Educational Technology in the NCERT is also squarely engaged in backing and presenting up the use of information and technology in its typical way to promote the cause of quality schooling and teacher education by producing a whole lot of technology based instructional materials for teachers ,teacher educators and school education in specific. Another Apex level national organisation popularly known as NCTE (National Council for Teacher Education) has also focused its attention on exploiting information and technology to promote technology-based instructions in Teacher Education to sustain its quality and standards in Teacher Education institutions through organizing workshops for teacher educators, teacher, teacher trainees to make them use ICT in their teaching –learning processes and practices, besides giving them on –the- spot training in computer technology as such based on a set of CD ROMS produced and freely distributed to all recognized Teacher Education institution for this purpose

In short, cyber technology seems to be gradually growing a loft to provide anchorage to prop up the process of schooling in quite a big way. It is high time for the teachers ,teacher educators and the teaching – learning community to make the best use of technological inputs ,as available ,to improve the quality of schooling at all levels and in turn raise the quality of life of the people in knowledge society.

#### **Suggestion for Further Research:**

- ✓ The study could be replicated to explore how ICT affects the students of various abilities on cognitive, emotional and motivational dimensions.
- ✓ There is need to compare ICT used teaching method with other methods of instructions at different grade levels.
- ✓ The study could be replicated on a large sample for validation and for a longer duration to examine the effects on non-cognitive variable like social skills or some personality variables which take more time to bring about a change.
- ✓ There is need to study the integrated effect of ICT used method with other institutional treatments.
- ✓ Research is needed to study the effect of ICT on special groups of children such as gifted. The learning disabled and other mildly handicapped students.
- ✓ Power point programme can be developed for other classes and research may be conducted to study the impact of power point programme on students' learning in various subjects/levels, i.e; for subjects other than Mathematics and for various levels as well, as also to determine the extent to which it could be used with in the exiting conditions and parameters in schools and other educational institutions.

#### **Conclusion:**

The study provides potential inputs for teacher education. Given the current widespread use of ICT at all levels and for all subjects, it is imperative that pre-service teachers should learn the new technology. Besides pre-service training of teachers in the making, in-service training may also be given to the existing teachers to refurbish their acumen for teaching that is teaching effectively and meaningfully.

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