

Role of ICT in Teaching Biology

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Abstract:

This study reveals that Education has been described as means to modify the behaviour. Biological science deals with study of living organism, their living environment and various interactions between living things and environment. The traditional content of biology has been replaced by modern discoveries in the fields of cell biology, basic genetics, bio-engineering and biotechnology. Biology as a subject has both theory and practical components. ICT has opened new avenues like, online learning, e-learning, virtual university, e-coaching, e-education, e-journal, etc. It has provided opportunity for the learner to use maximum senses to get the information. . Learning of biology can be made easier and more comfortable by integrating ICT tools in instructional strategies for teaching biology. The students of biology can make use of ICT for easy understanding. ICT can change traditional classroom into smart classroom and improve teaching-learning process in biology.

Keywords:

Professor, Research scholar, ICT; Biology; e-learning; e-coaching; e-education; e-journal

Introduction

According to Mahatma Gandhi, (1937) "By Education, I mean an all-round drawing out the best in child and man body, mind and spirit". Education is a dynamic force in the life of every individual influencing his physical, mental, emotional, social and ethical development. Education has been described as means to modify the behaviour. The Indian education commission (1964-1966) observed that education need to be science based and in coherence with Indian culture and values, which can provide the foundation and it can also act as an instrument for the nation's progress, security and welfare. The present century is marked by the explosion of scientific knowledge, which has resulted in

several educational innovations. Science education should produce informed citizens prepared to deal with social issues. Top science universities in India include St Stephen College in Delhi, Loyola College in Chennai, St. Xavier College in Kolkata and Mumbai, and Presidency College in Kolkata, among many others. Biological science deals with study of living organism, their living environment and various interactions between living things and environment. The relative popularity of biology reflects a changing emphasis of curriculum. The traditional content has been replaced by modern discoveries in the fields of cell biology, basic genetics, bio-engineering and biotechnology. This type of science related subjects are more important to their future studies. But, actual nature in our school system as well as college system give more importance to 'Rote memory' without understanding. This type of study helped only for examination purpose and not for future of the students. Some of the institutions educate to the students by using education technology. 'Educational technology' is the study and ethical practice of facilitating learning and improving performance by creating, using and

managing appropriate technological processes and resources.

Information and communication technology

Information Technology was limited only to the textual mode of transmission of information with ease and fast. But the information not only in textual form but in audio, video or any other media is also to be transmitted to the users. It has opened new avenues like, online learning, e-learning, virtual university, e-coaching, e-education, e-journal, etc. The ICT brings more rich material in the classrooms and libraries for the teachers and students. It has provided opportunity for the learner to use maximum senses to get the information. It has broken the monotony and provided variety in the teaching – learning process (Agashe, L, 1995).

The computers were never developed for improving quality of teaching – learning process. But researchers started using Computers for teaching purpose. It gave birth to Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI), Computer Based Instruction (CBI), etc. People started developing CAI for teaching

different subjects at School as well as Higher Education level. (Hayes et. al 1987)

The ICT being latest, it can be used both at school and higher education levels in the following areas:

- Teaching
- Diagnostic testing
- Remedial teaching
- Evaluation
- Psychological testing
- Development of virtual laboratory
- Online Tutoring
- Development of reasoning & thinking
- Instructional material development

Teachers also enhance their quality by use technology in teaching. Particularly Mathematics and Science teachers need to know exactly how ICT is used as a teaching and learning tool, for their own purposes and to help students to use them. This paper is about the integration of ICT as a tool in the biology classroom with the overall aim of increasing the effectiveness of teaching and improving students' learning.

PARTICIPATION OF INDIAN STUDENTS IN EDUCATION

STAGE OF EDUCATION	GROSS ENROLMENT RATIOS
Elementary	85%
Secondary	39%
Tertiary	9%

(Source: Department of Higher Education, 2007)

Need for integrating ICT in teaching learning process

- To use ICT as a tool for designing new learning environments for their own subject-specific purposes to help their future students to use ICT.
- To provide the student-teacher with the knowledge, skills and attitudes to better use technology in their research, communication, problem-solving, and continuing professional development.
- To critically apply the pedagogical principles of ICT integration in science education.
- To develop and facilitate ICT-based learning activities in the context of teaching Biology.

- To analyse and evaluate appropriate content and context for the use of ICT in Biology teaching.
- To use appropriate and varied communication and multimedia tools (emails, websites etc) in teaching and learning Biology.
- To use ICT efficiently in research, problem solving and project-based learning in Biology.
- To integrate ICT appropriately into Biology curriculum activities that will foster students ownership of their ICT-rich learning environment.

Role of ICT in biology teaching

ICT simplifies the part of teaching as a visual presentation. We learn 80% of the learning through visual. So, the visual presentations of the particular topic could be easily understood by the student teachers. It will be more effective of the student teachers gain knowledge of integrating ICT in their classroom instruction. The use of ICT in higher education level, the information can be delivered very easily and helps the students to understand the particular topic with proper visualisation and enjoy the new learning experiences.

ICT has the following advantages,

- Eliminate time barriers in education for learners as well as teachers
- Eliminate geographical barriers as learners can log on from any place
- Asynchronous interaction is made possible leading to thoughtful and creative interaction
- Enhanced group collaboration made possible via ICT
- New educational approaches can be applied.
- It can provide speedy dissemination of education to target groups
- It enhances the international dimension of educational services
- It allows for just in time and just enough education for employees in organizations
- It can also be used for non-formal education like health campaigns and literacy campaigns

Technology in the Biology classroom

There are various types of technologies currently used in traditional Biology classrooms. They are,

- **Computer in the classroom:**

Computer is a device improves teaching learning process easier. It is a essential tool for integrating ICT in the classroom. Here, teachers are able to demonstrate a new lesson, illustrate and show new websites.

- **Class website:**

It is easiest way to display project work and assignment for students. Once we designed this web page, we provide classroom works, homework assignments, famous quotations, games. Nowadays, children know how to use the computer and internet. So, most schools provide teacher webpages that can easily be viewed through the school website.

- **Class blogs and wikipedia:**

There are a variety of Web 2.0 tools are currently being used in the classroom. Wikipedia is a website to allow multiple members to edit a single document. Finally they create a truly collaborative and carefully edited file.

- **Wireless classroom microphones:**

Classrooms are very noisy in our

daily occurrence with the help of microphones for students' clear understanding. Children learn better when they hear the teacher clearly.

- **Mobile devices:**

Mobile devices like clickers or smartphone can be used to enhance the learning experience of the students in the classroom . Finally we may get feed-back from them.

- **Interactive Whiteboards:**

An interactive whiteboard has given opportunity to touch control of computer applications. These enhance the teaching-learning experience in the classroom through computer screen. This not only aids for visual learning, it is also interactive and the students can draw, write, or manipulate images on the interactive whiteboard.

- **Digital video:**

LCD projector like equipments equipped our teaching-learning process as proper as possible. DVD players also help us instead of LCD projector.

- **Online media:** Streamed video websites can be utilized to improve a classroom lesson by using internet

E.g. United Streaming, Teacher Tube.

- **Online study tools:** Tools that are motivate to studying by making studying more fun or individualized instruction for the student.

E.g. Study Cocoa

- **Digital Games:** Games like educational games and serious games has been growing significantly. The digital games are being provided as tools for the classroom and have given positive feedback, i.e. motivation for students.

There are many other tools being utilized depending upon the school boards like state or central and also funds available in the institution. These may include: digital cameras, video cameras, interactive whiteboard tools, document cameras, or LCD projectors.

- **Podcasts:** Podcasting is a relatively new invention that allows anybody to publish files to the Internet where individuals can subscribe and receive new files from people by a subscription.

Although podcasts are a new phenomenon in classrooms, especially on college campuses, studies have shown the differences in effectiveness between a live lecture versus podcast are minor in terms of the education of the student.

Criteria for implementation of ICT in Biology teaching

Some of the students felt that Biology as a tough subject, because of the theory part. Learning of Biology can be made easier and more comfortable by integrating ICT tools in instructional strategies for teaching Biology. For this, the teacher education programme should give more emphasis on ICT training for the student teachers to apply ICT in their instruction. The curriculum of the teacher education programme should be revised by incorporating the innovative technological equipments for the dissemination of knowledge. Future teachers should be

though with all these instructional technologies. So, that the learning process is made easier and students will be more benefited. Integrating ICT pedagogy will lead for quality higher education. The process of teaching- learning process should be modified according to the needs of the changing technology enabled education. ICT directly improves the quality of education and indirectly improves the economy of the country.

Conclusion

Our country needs development in all sectors, particularly in education.

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Because education is the cause for all changes in other parts of the development in the country. Especially, science education plays a vital role, in higher education sector. ICT is the best way to convey the information to the students in biology, because of the easy understanding and attractive experience to the students. ICT can change traditional classroom into smart classroom. So, ICT integrated instruction is the best way to improve the quality learning in higher education.

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