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ICT in quality science teaching - learning

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Abstract
Present paper is an effort to study the influence of ICT integration in main course science subject. ICT, Information and communication technology refers to a technology employed in the forms of tools, equipment and application support which helps in the collection storage, retrieval, use, transmission, manipulation and dissemination of information as accurately and efficiently. It encourage students to work in groups, express their knowledge in multiple ways, solve problems and construct their knowledge. Teaching science with ICT is helpful in increasing student's retention, arousing curiosity, developing - interest, skills and high level of thinking. In the classroom it can bridge the gap between theory and practice by giving students the opportunity to practice what they have learned in controlled environment. We observed classrooms and conducted interviews with teachers and students about the integration of ICT with science teaching. The sample consisted of 10 science teachers and 30 students. Analysis of data revealed that use of ICT makes science teaching easy, interesting, stable and effective.

Keywords: ICT, Quality, Science teaching-learning

1. Introduction
In the present scientific and technological age the conventional method was not sufficient to arouse interest among the students and does not needs up to the intellectual, psychological and emotional needs of the students in the new millennium. The method of teaching needs to change. The traditional method of teaching is based on giving information as bits. It includes rote memorization of concepts, facts and principles which do not realize objectives of teaching. Teaching strategies play an important role in enhancing the learning abilities of the students. New interesting and innovative methods should be followed for effective teaching.
ICT generally refers to "computer and computing related activities", this term was introduced in 1992. According to UNESCO (2002) [6] information and communication technology (ICT) may be regarded as combination of 'information technology' with other related technology, specifically communication technology. The various kinds of ICT product available and having relevance to education such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counselling, interactive voice response system, audio cassettes and CD ROMs etc have been used in education for different purpose. According to United Nations Report (1999) [7] ICT covers internet service provision, telecommunication equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centres, commercial information providers, network-based information services and other related information and communication activities.
Nowadays the role of ICT in the education sector plays an important role, especially in the process of empowering the technology into the educational activities, ICT enabled classroom facilitate effective teaching as well as multisensory approach in teaching. Learners become interested in learning and it will increase the student's knowledge as well as retention of learned content. ICT can be used to develop active and mastery learning. In this learning situation, there is active participation on the part of the learner as opposed to passive learning listening to lectures. It can also stimulate the students mind and encourage learning through all senses because multimedia can combine so many media together. The interactive nature is considered to be the most important feature.
ICT holds greater promise in enhancing science learning as well as in improving the quality of science education. ICT enables students get a live vision of life's aspect and scientific factors. Any diagram can be explained in detail with 3D effect.

It helps the student to understand the lesson clearly. ICT ensures flexible learning. Learning through ICT is an active and engaged process, store, retrieves and transmits audio, video, graphics and textual information. These kinds of systems can have a powerful impact on the learner's problem solving abilities and can generate a positive effect.

Review of Literature

Passey, Rogers, Machell, and McHugh (2004) [4] concluded that, where ICT was clearly embedded in classroom activity, there was a positive impact on pupil attainment. Passey and Williams (2001) [5] noted that evidence from large-scale studies showed that the use of ICT can motivate pupils and result in a positive effect on attainment amongst those pupils who make relatively high use of ICT in their subject learning where as ICT has become a regular part of the classroom experience, there is evidence of positive impact on learning and pupil performance. In this connection, studies have found evidence that the visual nature of some technologies, particularly animations, simulations and moving imagery, engaged learners and enhanced conceptual understanding.

National Curriculum Framework-National Council for Educational Research Training, New Delhi (NCF-NCERT 2005) [2] states: Integration of Information and Communication Technologies (ICT) into schooling needs serious consideration. Teachers, educators, curriculum developers, evaluators and others will have to redefine their roles to tackle ICT rich environment and harness its full potential for the benefit of learners.

Central Board of Secondary Education (CBSE) introduced project work in its curriculum to empower the teachers to be technological sophisticated so that the curriculum transaction truly reflects the shift in educational paradigm as envisaged in NCF 2005 [2].

show that the quality of learning can be greatly enhanced through the integration of ICT in teaching. Research by Bransford (2000) [1] showed that ICT enhances the critical thinking skills, information handling skills, the level of conceptualization and the problem solving capacity. ICT plays a critical role of enhancing the quality of education.

Need and Significance of Study

In today's complex scenario, science education is still far from achieving the goal of equity enshrined in our Constitution. Science education in India, even at its best, develops competence but does not encourage inventiveness and creativity. For any qualitative change from the present situation, science education in India must undergo a Pragmatic shift.

ICT have the potential to accelerate, enrich and deepen skills to motivate and engage students, as well as strengthening teaching and helping school change. The present investigation is designed to seeks answers of queries such as- Is ICT is helpful in increasing quality of science teaching and learning? Does ICT makes science teaching affective? Does it make students more engage, attentive and active?

Objectives

1. To find out usefulness of ICT in teaching-learning for teachers and students in science.
2. To find out the effectiveness of ICT over existing (traditional) method of teaching learning in science.

Methodology of the Study

Self-developed tool were used for collection of data (ICT Awareness Questionnaire). The investigators prepared 14 questions related to ICT awareness; confidence, potential and training of teachers; usefulness of ICT for teachers as well as for students and effectiveness of ICT over traditional methods. The research design that was employed to conduct study was chosen for the reason that the researchers has found it's relevant to assess and describe the existing status of ICT in quality science teaching-learning.

Sample

In Ajmer city, we comprised 7 Government as well as private schools. Systematic random sampling method was used to select samples. The sample consisted of 10 science teachers and 30 students.

Data Gathering Instrument

Table 1: Dimensions of researchers developed tool

Sr. No	Dimensions	No. of items
1	Awareness about ICT	2
2	Confidence, Potential and Training of teachers	3
3	Usefulness of ICT for Teachers	4
4	Usefulness of ICT for Students	3
5	Effectiveness of ICT over traditional method of teaching	2

Table 2: Questionnaire

Questionnaire
1. Teachers are aware of ICT
2. Teachers are familiar with school ICT equipments
3. Teachers have personal confidence and competence for the use of ICT
4. Teachers know how to use ICT in effective teaching
5. Teachers are trained in using ICT in teaching learning process.
6. ICT support good practice in teaching the science subject
7. ICT makes science teaching effective
8. ICT allow teachers to teach effectively and efficiently.
9. Teachers use Power point Presentation, Educational videos etc wherever necessary in science teaching.
10. ICT makes students more active and attentive in class.
11. ICT helps students in understanding science ideas
12. ICT allows students to achieve high order of thinking that could not be achieved in traditional classroom teaching
13. Use of ICT in Teaching is better than traditional method of teaching.
14. Integration of ICT in science is laborious and time taking as compare to traditional teaching.

Analysis and Interpretation of Data

Data was gathered and responses of teachers are converted into percentage, the table is shown below:

Percentage of Teacher's Response According To The Different Dimensions

Table 3: Teacher's response

Dimensions Response	Awareness about ICT	Confidence, Potential and Training of Teachers	Usefulness of ICT for Teachers	Usefulness of ICT for Students	Effectiveness of ICT over Traditional Method of Teaching
YES	90	80	80	95	97
NO	10	20	20	5	3

The findings of the study are interesting.

Teachers-Teachers of present generation are aware of ICT. They generally use it for Power point Presentation and showing educational videos. Teachers agree that ICT provide access to huge range of resources that are of high quality and relevant to scientific learning. Teachers tend to use ICT with science teaching largely to support, enhance and compliment existing classroom practice. According to teachers integration of ICT in science teaching plays an important, central and core role in supporting development of scientific reasoning and critical analysis skills. ICT provides opportunities for the teachers to be creative in their teaching.

Students: We interact with students and ask questions, answers of students of different schools were approximately same. First we ask have you ever learn any topic on PC or Laptop, 100% students said that yes they did. Then we ask what is more interesting, learning in computer or in blackboard, 100% students said learning in computer is more interesting. Then we ask in what lesson you feel ICT is more beneficial, 80% said that in biology ICT is more beneficial and 20% said that it is more useful in explaining principles of physics. Then we ask what you like more, Power point presentation or Educational videos, 100% students said that they like educational videos more as it is more attention gaining and effective in learning. ICT has positive impact on the student's learning particularly in science subject. Students are more motivated to learn and have increased self-confidence. Integration of ICT in science prompts students to think about underlying concepts and relationships. Develops skills for critically analyzing the scientific information. ICT helps to reduce the social disparities between students since they work in team in order to achieve a given task.

Conclusion

Our study concluded that ICT is beneficial for both teachers and students, it increases the Quality of science teaching learning and so teachers have strong desire for the integration of ICT in science education.

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