

Effectiveness of CAI in Teaching Learning Process

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Abstract

In the present article, an attempt has been made to highlight the application of educational technology (ET) in a broad sense. Education through technological devices plays a pivotal role in the overall development of the students.

Computer assisted instruction (CAI) is a part of ET. Effectiveness of CAI in learning of chemistry at senior secondary level and student's perception regarding the effectiveness of CAI in teaching process was studied. Two groups of students were taken (A) control group-taught through traditional method (B) experimental group-taught through CAI.

The effectiveness of CAI in learning of chemistry can be analyzed by rise or fall in post test scores as compared to pretest scores of the experimental group. Further, to analyze if the observed differences are significant or not, t-test was employed. It was inferred from the result that the use of CAI is effective in learning of chemistry in terms of academic achievements. At the same time, it enables better transaction of content through 3-D which makes the concept more tangible and which cannot be apprehended through 2-D pictures of textbooks or blackboards.

Questionnaire was used to know the perception of the students about the use of CAI in teaching and learning of chemistry. Through the analysis of questionnaire it was inferred that the majority of the students developed better understanding of the concept and structure from the 3-D view. Further, the majority of the students were in favor of using CAI in teaching of science subjects.

INTRODUCTION

Education is being considered as a process of communication and educational technology is a new approach to be the solution of the problems of teaching and learning. Educational technology makes available wide range of instructional media at the curriculum planning level. Educational technology is based on the child-centered approach. Educational technology is the application of scientific knowledge and learning and the conditions of learning to improve the effectiveness and efficiency of teaching and training. It is an applied body of knowledge. Seeks to take help of the laws and findings of psychology, sociology, engineering and some other basic social and physical science. ICT in education can be understood as the application of digital equipments to all aspects of teaching and learning. Thus, the components of ICT would be :-

- Radiobroadcasts
- Audio tapes, CDs, DVDs
- Television broadcasts
- Video cassettes, CDs and DVDs
- Computer based learning materials

- Teleconferencing
- Web conferencing

It has been felt that ICT hold huge possibilities for education at all levels and in all sectors, lot of research has been carried out since 1960s into the role of computer technology in teaching and learning. There is a growing interest, in developing ways of incorporating the “new technologies into school curriculum so that teacher may use their potential to the fullest.

Additionally, there is an increasing pre-occupation with the role that these technologies can play in education outside the formal setting within the community at large, for open and life long learning and for strengthening links between formal and non-formal sectors by breaking down traditional barriers to communication and the sharing of information resources. More recent focus is on the use of ICT in the pedagogy of different subjects.

Under the scenario of rapid and global development, educational system is facing new challengers.

It has palced greater demand on educational systems particularly the need to inculcate among student life long learning that is to seek new information, to think critically, to take initiatives and cope with challenges of a fast pacing world.

With communication technology and deluging information from all over, a single teacher lags to provide up to date and complete knowledge of his own subject besides this, the diversified needs of a heterogeneous classroom, physical and psychological barriers between students and teachers creates more demanding situation which needs to be taken care of.

The deluging information from all over and globalization has created greater demand of the pupils in process of learning at school. In today’s information and knowledge driven world, a whole new set of skills is required. A relevant education is more important today than ever, because today’s networked world, demands a work force that understood how to use technology as a tool to increase productivity and creativity. The vision thus lies not simply of ICT through adoption but integration them meaningfully to help the individuals “learning to learn” which will help them to adapt to inevitable changes of the fast growing world.

ICT can provide huge range of resources of high quality and relevance to learning. In some cases these resources fill the gap when there are no good conventional alternatives, in other cases they complement existing resources. The widened range of material with its texts, sounds, moving images increases the variety of ways in which it can be used for the benefit of heterogeneous needs of whole class. The means, teacher can go some way towards catering to the needs of students who learn best from varied stimuli.

Interactive technologies encourage active learning making students more responsible for learning. Student’s attention is gained for meaningful learning, through visual and interactive features of ICT thereby encouraging them to spend more time on learning task. The use of ICT in the pedagogy of different subjects is the more recent focus. Five basic mode of using ICT in teaching and learning include :-

- 1) Support mode
- 2) Exploration and control mode
- 3) Tutorial mode
- 4) Resource mode
- 5) Link mode

One of the mainstreams within the cybernetics tradition is computing in the form of CAI (Computer Assisted Instruction). Computer provides diversity in the learning situations and also develop interactive capabilities, greater understanding and greater enjoyment of the learning process. CAI is a computer based program that gives assistance to classroom teaching. A teacher has to select a suitable program, load it in computer and operator it. The CAI provides information, presents question and problem and provides hints if help is requested just as the student in the classroom poses any query to the teacher. A dialogue between a student and a teacher exists in this CAI system.

The knowledge of CAI, which is a part of educational technology, is utility oriented. This is evident from the fact that here emphasis is given to the student not to the teacher. Now the point under consideration whether the use of CAI can really increase the efficiency of subjects to be taught. In other words, how best can student learn through simple classroom teaching or with CAI.

To find out the effectiveness of CAI and student's perception regarding the effectiveness, this study was conducted.

MATERIAL AND METHODS

Under the present study , 2 sections of class XI (SC) enrolled in Jamia Senior Secondary School (evening shift) were randomly selected as control group & experimental group.

There were pretest and post tests designed for the study. These were constructed to assess whether the scores obtained on the test by the experimental and control group have any significant difference to be attributed to new teaching strategy.

Present content covered in test was based on the previous knowledge of the students in subject matter related to the organic chemistry. Post test content covered in test was based on topic covered during teaching of control and experimental groups.

Control group was taught the selected content of organic chemistry through charts, models and blackboard whereas experimental group was exposed to CAI. They were taught with the help of ICT tool (CD-ROM) having 3D figures, text, questions, explanation related to all content. Pretest was administered on student of control as well as experimental group prior to teaching through traditional and CAI. After teaching the groups, post test was administered on both the group at the same time.

Thus, data in the form of pretest and post test was collected. These results were compared for knowing the effectiveness of new teaching strategy.

After the treatment and subsequent post test, a questionnaire was administered on experimental group to know their perception regarding the effectiveness of CAI in teaching process.

To analyze the data obtained in the form of scores from the pretests and post tests: Mean, standard deviation (SD), t-test were employed and computed. This helped in making comparison between control group and experimental group and in knowing the effectiveness of the new teaching strategy.

RESULT AND DISCUSSION

The available data for the preset study compute the pretest and post test gained scores of both the experimental and control group. In each group, the post test score is measured comparatively higher than pre-test score. Even the post-test of experimental group is found to be high as compared to the post-test score of control. Table 1-exhibit that the estimated t-value of experimental group (8.49) is found to be high when compared with control group (5.06). The t-ratio is calculated to be (2.61) which is greater than the tabulated value at 0.05 level of significance (i.e.2.01) and therefore can be said significant at 0.05 level.

COMPARATIVE ESTIMATION OF T-VALUES OF VARIOUS GROUPS

Table-1

S.No	Group	Status of Test	T-value	Sig. level
1	Control Group	Pre-test Post-test	5.06	0.01
2	Experimental Group	Pre-test Post-test	8.49	0.01
3	Experimental & Control Group	Pre-test Post-test	2.61	0.05

The t-ratio thereby depicts the observed differences in mean scores of post-test scores of control group and experimental group is significant. Thus, it may be inferred that computer assisted learning instruction are effective in the learning of chemistry as compared to the conventional mode in terms of academic achievement.

PRECEPTION OF STUDENTS RELATED TO THE USE OF CAI

Form the analysis of the questionnaire, following information regarding the perception of the students about the use of CAI and its effectiveness in teaching learning process was obtained. The analyses of the questionnaire could be discussed under the following categories.

ACCESS AND USE OF COMPUTERS BY THE STUDENTS

All the students of Jamia Sr. Sec. School (2nd shift) have an access to the computers. They had computers either at school or school and home both. 60 per cent of the students had computers at home and school both and 40 percent have an access to computers only at school not at home.

Majority of the student about 60% used computers for chatting, games and movie very less number about 8% used it for searching content and 32% used it for general purpose. 64% of the students were in favor of working on school computers to understand chemistry subject well.

PERCEPTION OF THE STUDENT ABOUT THE USE OF CAI IN TEACHING AND LEARNING OF CHEMISTRY

For 60% of the students, concepts of chemistry delivered through computers were easy to understand and made a difference in their understanding than the simple teaching of chemistry.

During the teaching of chemistry, 72% of the students likes most the 3-D view of structure, 16% liked most the diagrams and figures. 8% liked most the explanation of the concepts and about 4% liked the questions that followed the text.

84% of the students were of the view that questions and their explanation after each topic helped them in clarifying their doubts and in knowing how much they are able to understand, on the whole to analyze their faults and correct themselves.

Interaction between teacher and students through computers increases as was perceived by about 56%.

EFFECTIVENESS OF CAI IN TEACHING & LEARNING PROCESS

72% of the students were of the view that teaching chemistry through computers had made classroom learning more effective and interesting. 68% students found difficult in understanding content mainly the complex concepts only through computers and suggested that it should be supplemented with the teacher's explanation using blackboard.

96% of the students were in favour of teaching science subjects through computers.

On the whole, we can interpret that majority of the students have an easy access to the computers, liked the most 3-D view of structures in clarifying the concepts of chemistry like structural representation of organic compounds and were in favor of using computers for classroom teaching of science subjects

FINDINGS OF THE STUDY

Some of the major findings revealed by present study are as follows:

- Effectiveness of traditional method in learning of chemistry in terms of academic achievement:- In the light of the results. It may be conceded that traditional method is deeply fabricated in learning of chemistry and is considered most economical for fleeting coverage of topics in our examination dominated educational system.
- Effectiveness of computer assisted instructions in learning of chemistry by the students:- Use of CAI is effective for learning of chemistry in terms of academic achievement.

It could be inferred from the results that use of CAI is effective in learning of chemistry in terms of academic achievement. CAI overcomes the physical barriers of classrooms as it enables the students to see the big screen with various visuals, auditory and text based effects. At the same time, it enables better transaction of content through 3-D mode which makes the concepts more tangible and which cannot be apprehended through 2-D pictures of textbooks or blackboard. Thereby, it can be safely concluded that use of CAI allures pupils through the multisensory approach assuming learning to be

significant which is highlighted in improved scores of students of experimental group on post test of academic achievement.

- Comparison of effectiveness of traditional method and CAI in learning of chemistry in terms of academic achievement.

Use of CAI is more effective than traditional method in learning of chemistry in terms of academic achievement.

It may be interpreted that use of CAI not only offers an alternative way of teaching and learning of chemistry, but also has learning benefits in terms of multisensory approach that serves different preferred styles of learning of pupils.

- Perception of the students about the use of CAI in teaching and learning of chemistry:-

Through the analysis of the questionnaire using percentages, figures, it was inferred that the majority of the students liked the 3-D view of structures in clarifying the concepts of chemistry. Further, majority of the students were in favor of using CAI in classroom teaching of science subjects.

CONCLUSION

Findings of the present study reflected that traditional method and CAI used in teaching of chemistry separately were effective in learning of chemistry by the students. This implies that any one of the approach may be followed for improving the performance of students.

However, a comparative account of the two approaches used for teaching and learning chemistry yielded that CAI was more effective in learning of chemistry than the traditional method.

This bring into light that CAI should be used in the teaching of chemistry to realize improvement in academic achievement of students in chemistry.

Further, questionnaire analyzed to know the perception of students regarding use of CAI and its effectiveness in teaching learning process, revealed that majority of students were in favor of CAI to be used in teaching learning process.

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