



Effectiveness of Computer Assisted Instruction in the Teaching of Physics

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Abstract:

In the competitive world of today, if we are aiming to make India the developed country, we must look upon the quality of education. When we want to achieve the quality in whole educational system, introduction of ICT is must. In this paper, a new view towards classroom instruction with the help of ICT has been discussed. For most of the students physics is a difficult subject, so different kinds of methods and techniques of teaching are used to simplify it. Teachers have to seek improved ways of teaching by developing new programmes and instructional strategies, conducting various experiments and undertaking innovative practices. The computer is now regarded as a super teaching machine, its use in education has been tried as an innovation & it has proved its teaching efficiency in many developed countries. Researcher have taken interest in this field and prepared a CAI programme for students of standard XI. Researcher selected two groups from standard XI of English medium school : Experimental group & Control group. By employing 'Two groups only post-test design' the effectiveness of the CAI programme was tested. Statistical analysis of collected data was done using t-test. The experimental group who received instruction through CAI programme gained significantly higher scores than the scores of students who studied through conventional method. This research is an attempt to show that CAI is an effective mode of instruction in Physics.

1. Introduction

In the competitive world of today, if we are aiming to make India the developed country, we must look upon the quality of education. When we want to achieve the quality in whole educational system, introduction of ICT is must. In this paper, a new view towards classroom instruction with the help of ICT has been discussed.

The Government of India in the Ministry of Education has started implementing a project of Computer Education in the country. It has been launched as a pilot project for introducing Computer Literacy & Studies in Schools (CLASS) in collaboration with the Department of Electronics. The computer is now regarded as a super teaching machine, its use in education has been tried as an innovation & it has proved its teaching efficiency in many developed countries. The computer has been helping the teacher in the following areas :

- (i) Evaluation of students performance and classifications of children according to abilities
- (ii) Preparation of time-table and schedules
- (iii) Allocation of learning materials according to individual needs and interests
- (iv) Maintenance of progress cards efficiently and confidentially
- (v) Providing information/data for guidance and reference
- (vi) Provision of direct interaction between pupils and subject-matter
- (vii) Engaging students in tutorial work
- (viii) Providing immediate feedback to students for better interaction and motivation.

2. Computer Assisted Instruction

Computer Assisted Instruction or briefly known as CAI is an interesting innovation in educational

technology. Its marvels have been demonstrated and seem to revolutionize the whole spectrum of education. It has better flexibility and more versatility than any of the teaching machine. It can cater to the individual needs of many students at a time and record all the responses of all the pupils with reliability. The time taken by individual student in responding to a question and extent of correctness in the same are also recorded by the computer. All this helps the educator in planning instruction and providing relevant materials.

The CAI can deal the problem of quality in education more effectively and more flexible kind of branching is possible on the part of the computer according to the student's performance. A learner can make progress at one's pace, receive and choose the material, sequencing and level of instruction freely. Since each learner's performance is automatically recorded and can be fed back to the teacher, learner's performance can be evaluated and education be provided according to the strategy that is best suited to the individual. The teacher can be relieved from the daily routine and monotonous drilling activities. It has been experimentally proved that any lesson in any subject can be programmed for CAI if the objective is clearly defined and learning materials are represented in words, visuals and experiments.

Statement of the Problem

“Effectiveness of Computer Assisted Instruction in the Teaching of Physics.”

Objectives

The present research was carried out with the following main objectives :

1. To compare the relative effectiveness of the CAI package & the traditional method in terms of scores obtained by students on the teacher made achievement test.
2. To know the relative effectiveness of CAI with reference to the sex of the students in Experimental Group.
3. To study the opinions of students of Experimental Group regarding effectiveness of Computer Assisted Instruction in Physics.

Hypothesis

The following null hypothesis were formulated to test the objectives :

1. There will be no significant difference between the mean scores obtained on the basis of post-test by the students of traditional group & Experimental group.
2. There will be no significant difference between the mean scores of boys & girls in Experimental group.
3. There will be no favourable opinions of the majority of students of Experimental group about the used Computer Assisted Instruction in Physics.

Rationale of the Study

In today's world, where social & technological changes are taking place rapidly, the teacher can no longer be the sole source of imparting information in the class-room. The modern teacher sees education as a process of interaction between the child and the environment. The environment can be brought into the classroom by the aid of media and not only by narration or the traditional method. So according to Dr. Marshall McLuhan : “Media is the Message”. The media is of greater importance, because the same piece of information when conveyed on the computer or television will appear different and have entirely a different effect on pupils. Hence it is important that this media is utilized in classroom teaching, rather than be ignored so that the pupil may obtain sensory stimulation as a part of the process of instruction and will lead to a miracle. The recent developments in computer technology has forced us, the teachers, to bring several changes in our teaching-learning processes in order to incorporate this technology into the classroom for better teaching and learning process. The best part of this technology is its usefulness in Physics or Science learning, because of its simulation

power along with animation and visualization ability. So to find out the effectiveness of teaching Physics with the help of the computer this research work was undertaken.

Population & Sample

The population for the present study comprises of all the students of std. XI of Science stream of English medium schools of Surat District. This is an experimental study & the purposive sampling technique is used for selecting the sample. Two groups each consisting of 30 students of Shardayatan School of Surat city were selected out of which there were 40 boys & 20 girls.

Design of the Study

The present study was experimental in nature. The research design was “Two groups only post-test” design.

Tools

The researcher prepared Computer Assisted Instruction programme in Physics on the unit “Laws of Motion”.

A teacher made achievement test was prepared & administered as a post-test on both the groups after the treatment phase. An opinionnaire was prepared to know the opinions of students of Experimental group towards CAI in Physics.

Procedure of Data Collection

Shardayatan School of Surat city was selected purposely for the experiment. The students were divided into two equal groups. The experimental group received instruction by CAI programme and the control group received the conventional instruction. The students were taught for three days. On the fourth day a post-test was administered & the scoring of the answer sheets were done. To study the opinions of the students of Experimental group towards CAI, an opinionnaire was given. The time taken for filling the opinionnaire was 10-15 minutes.

Statistical Techniques Used for Data Processing

The present study was experimental research. Hence for the analysis & interpretation of data the statistical technique ‘t’-test was employed. ‘t’-test was used to find out whether the mean scores of two groups differ significantly. For the analysis and interpretation of data obtained from opinionnaire percentage analysis was used.

Analysis & Interpretation of Data

The interpretation of the data was done by the researcher as follows :

- (1) ‘t’-test was used to check whether there is significant difference between the post-test scores of Experimental group & traditional group.
- (2) ‘t’-test was used to check whether there is significant difference between the post-test scores of girls & boys of Experimental group.

Table 1

Comparison of statistics obtained for post-test scores of Experimental group & traditional group

Statistics	Experimental group	Traditional group
Number of students	30	30
Mean	17.65	14
Standard Deviation	4.14	1.63
Standard Error of Mean	0.8125	
‘t’- value	4.492	
Level of significance	Significant	

Comparing the students of both groups in relation to score obtained the researcher concluded that students of experimental group scored higher than the students of traditional instruction group.

The obtained 't'-value was 4.492 which is significant at 0.01 level. So the null hypothesis that there will be no significant difference between the mean scores obtained on the basis of post-test by the students of traditional group & Experimental group was rejected. Thus, in other words, statistically there is significant difference between the mean scores of both the groups. From the result it is concluded that used CAI was found effective than traditional instruction.

Table 2

Comparison of statistics obtained for post-test scores of girls & boys of Experimental group

Statistics	Girls	Boys
Number of students	10	20
Mean	17.7	17.5
Standard Deviation	4.19	2.78
Standard Error of Mean	1.278	
't'-value	0.156	
Level of Significance	Not significant	

The obtained 't'-value was 0.156 which is less than 0.05 level value & 0.01 level value. Thus the null hypothesis that there will be no significant difference between the mean scores of boys & girls in Experimental group was accepted. In other words, statistically there is no significant between mean scores of girls & boys of Experimental group.

It means CAI for Physics, as a method was found equally effective for girls & boys of Experimental group.

Findings

In the present study the results of the t-test revealed that the mean scores of the CAI group were significantly higher than the traditional instruction group so far as achievement in Physics was concerned. At the end of the experiment the following findings emerged out :

1. The CAI programme proved to be more effective in terms of the achievement scores
2. of the students of standard XI for learning Physics.
3. The students who received instruction through the CAI programme scored significantly higher than the students who received traditional instruction.
4. CAI in Physics was found equally effective for girls & boys of Experimental group.
5. The CAI was qualitatively evaluated by the students of Experimental group with the help of an opinionnaire. Students revealed highly favorable opinion towards CAI. The majority of the students found the program knowledgeable, innovative and interesting. They were also ready to use such programs in future for other subjects also.

Conclusion

Present research was a humble attempt to check the effectiveness of Computer Assisted Instruction as an innovative approach in teaching of Physics. The researcher ventured to select the problem in a spirit of inquiry & in conclusion the researcher is fully satisfied that it has been a learning experience that was rewarding in itself. It will provide inspiration to apply such innovative approach in classroom teaching. By applying such innovative approaches students involvement in teaching & interest in learning can be increased and maintained.

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