Research Paper   **EDUCATION**

Technology-Based Teaching of Environmental Concepts

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ABSTRACT The present study was undertaken with the aim of assessing the effectiveness of Computer Assisted Instruction in teaching environmental concepts to secondary students. A sample of 300 students from standard IX were selected from the rural and urban areas of Coimbatore. An achievement test was used for the collection of data. It was found that the group exposed to Computer Assisted Instruction scored better in the posttest than the group that was instructed through conventional teaching.

Introduction

Teachers of the present day should not only be trained in computer skills and software applications but should also be

confronted with the instructional methods that focus on integrating technology into the curricular framework that will bring about enhanced student learning. It is worth to note that the present day teacher in environmental education should be computer literate in order to provide a technologically sound environment in the classroom. An effort has been made in this study to find the effectiveness of CAI package in teaching environmental concepts to IX standard students.

Objectives of the Study

1. To prepare a Computer Assisted Instruction package on environmental concepts for IX standard students.
2. To develop an achievement test on environmental concepts for IX standard students.
3. To compare the effectiveness of the Computer Assisted Instruction package with the conventional method of teaching on the achievement of IX standard students.
4. To find out the impact of locality on the effectiveness of the Computer Assisted Instruction package.

Hypotheses Framed for the Study

1. There is no significant difference between the pretest and posttest scores of students instructed through Computer Assisted Instruction and Conventional teaching.
2. There is no significant difference between the pretest and posttest scores of students of rural schools instructed through the respective three methods.
3. There is no significant difference between the pretest and posttest scores of students of urban schools instructed through the respective three methods.

Preparation of the Computer Assisted Instruction Package

The package was formed bearing in mind the fact that students would master themselves in self-study of environmental concepts. The Computer Assisted Instruction package comprised of a "Powerpoint Presentation" that was a slide show on the computer interspersed with interactive sessions. The package contains logically sequenced frames. The package begins with an introduction on environmental concepts and an outline of concepts relating to environmental issues. An entry test to assess the existing level of knowledge on the concepts is given. It is followed by instructions on self-learning of the concepts. This is followed by a self study of the concepts.

Methodology

Pretest-Posttest and control group design was used for the present study. The investigator used purposive and stratified random sampling technique for selecting the sample for the present study. The data was drawn from students of three schools. A sample of 300 students was selected from Government, Government-Aided and Corporation schools in Coimbatore. There were 150 students in each of the experimental and control groups. The experimental group was exposed to instruction through a computer assisted instruction package on environmental concepts. The control group was instructed through conventional teaching.

Variables Selected for the Study

Achievement is influenced by many variables and the type of locality is a very important factor. An attempt was made in the present study to examine the effect of locality on achievement.

Tools used for the Study

A self-constructed achievement test of 50 marks was used for the collection of data. The purpose of the test was to assess the awareness of students on environmental issues before and after the treatments. Reliability and validity of the tool were established.

Findings of the Study

The effect of Computer Assisted Instruction was studied by comparing the corresponding means of pretest and posttest scores using the 't' test and the values are given in Table 1.

Table 1 shows the pretest and posttest scores of students from rural schools taught through different methods of instruction.

Table 1: Comparison of Pretest and Posttest Scores of Students of Rural Schools Taught Through Different Methods of Instruction

Method	Pretest			Posttest		't' value
	No.	Mean	S.D	Mean	S.D	
CAI	75	16.68	6.08	28.11	5.99	9.46**
Conventional	75	16.63	6.02	24.04	5.97	6.18**

** Significant at 0.01 percent level

CAI – Computer Assisted Instruction

The 't' value of the samples taken in schools in rural areas indicated a significant difference between the pretest and posttest scores at 0.01 level of confidence in the group instructed through CAI(9.46).There was significant difference between the pretest and posttest scores in the group taught through Conventional teaching (6.1801). CAI was more effective which is evident from a higher posttest mean score (28.11). Conventional teaching was losing its significance as it was evident from the posttest mean score (24.04) which was the lowest. The effectiveness of the CAI package can be attributed to the fact that it had made learning the concepts of environmental issues more experiential.

Hence, the hypothesis stated as: ***"There is no significant difference between the pretest and posttest scores of students of rural schools taught through Computer Assisted Instruction and Conventional teaching"*** is rejected.

The results are in congruence with the study of Efe et al. (2012) who found that the implementation of ICT-based teaching through the use of computers was more influential than the traditional method with respect to the participating students' environmental knowledge.

The pretest and posttest scores of students from urban schools taught through different methods of instruction are shown in Table 2.

Table 2 Comparison of Pretest and Posttest Scores of Students of Urban Schools Taught Through Different Methods of Instruction

Method	Pretest			Posttest		't' value
	No.	Mean	S.D	Mean	S.D	
CAI	75	16.04	5.71	28.15	5.94	14.69**
Conventional	75	16.06	5.54	26.15	6.18	12.15**

** Significant at 0.01 percent level

CAI – Computer Assisted Instruction

It was found that there was significant difference between the pretest and posttest scores of the group taught through CAI (14.69). There was also significant difference between the pretest and posttest scores in the group taught through conventional teaching (12.15). Conventional method was not that much effective when compared to the CAI-based teaching method. This was clear when the posttest mean scores of the groups instructed through the two methods were compared. Those who had received instruction through Conventional Teaching did not benefit much which is clear from the lowest posttest mean score (26.15). This may be due to the fact that the colourful slides on environmental concepts had made learning more enjoyable for the students and thus had improved their achievement. Students found Conventional teaching not to be exciting as it lacked variety, which was offered by the CAI package.

Hence, the hypothesis stated as: ***"There is no significant difference between the pretest and posttest scores of students of urban schools taught through Computer Assisted Instruction and Conventional teaching"*** is rejected.

This finding goes in line with that of Basaran and Gonen (2012) who in their study established the fact that there were statistically significant differences between both students' scores in the physics achievement test and their scores obtained from the check list of the students' gains in favour of experimental group. They therefore stressed the importance of the use of technology-based instructional methods.

Suggestions and Recommendations
1. Computer Assisted Instruction packages can be prepared for all the subjects where there is lack of teachers.
2. When compared to conventional learning, it is recommended that CAI can be used as an alternative method in classroom teaching.
3. More software packages for the whole syllabus in different subjects should be developed for Computer Assisted Instruction which may help students to learn at their own pace.
4. Educational institutions should be provided with Computer Assisted Instructional materials for teaching in secondary and higher secondary classes for different subjects.
5. Heads of the institutions and teachers should be oriented with effective use of technology-based methods of teaching through short term and refresher courses.
6. A Computer Assisted Instructional material for different subjects should be prepared to help the teachers while teaching in high and higher secondary schools of rural and urban areas.
7. Conferences and workshops may be organised to train the teachers, teacher trainees, teacher educators and computer experts to develop such instructional packages in an intended way.

Conclusion

The most important aim of education is to make the teaching-learning process an enjoyable one. The present system of education encourages the development of varied learning strategies so as to enhance the learning potential of the learner. A more organized and planned system of instruction is the need of the hour to fulfill this aim of education. The findings of the present study reveal that the students can perform better through Computer Assisted Instruction than the conventional method, in learning environmental concepts.

Suggestions for Future Research
1. An action research may be undertaken among the higher education students through various instructional 'methods'.
2. A comparative study could be carried out on the views of the learners and the teachers towards the use of computer assisted instruction and other instructional 'methods'.
3. The study may be replicated for various standards and for different content areas in other subjects.
4. Effectiveness of instructional materials for different levels may be tested.
5. Technology-based teaching methods can be undertaken in all subjects in the higher secondary level also.
6. Provision should be made by the educational authorities for providing laboratory facilities for schools in rural areas.

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