

EFFECTIVENESS OF COMPUTER ASSISTED INSTRUCTION PROGRAM IN ENVIRONMENTAL SCIENCE AT SECONDARY LEVEL

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ABSTRACT

All students vary in Psychological experiences and abilities. In a learning situation the individual is surrounded by a host of potential stimuli. Each learning strategy, method or approaches allow only few stimuli among these to interact with. Computer assisted instruction is a method which provide a particular type of learning environment to the learner. Thus, the interaction is inevitable. Therefore the present study was done on the topic effectiveness of Computer Assisted Instruction program in Environmental Science at Secondary level. Primary objectives of the study were (1) To develop a CAI program on selected units of course content in environmental science subject for class IX. (2) To assess difference between Pretest and Posttest of control group in attainment of environmental science concepts through CAI program. (3) To assess difference between Pretest and Posttest of experimental group in attainment of environmental science concepts through CAI program. (4) To assess difference between posttest of experimental and control group in attainment of environmental science concepts through CAI program. Method used for this study was Experimental study method which was applied on a sample of 120 students of IX class of Sriganganagar district of Rajasthan state. The whole sample was divided into two groups i.e. control (teaching done through traditional method) and experimental group (teaching done through CAI). Data collection was done by conducting self made achievement tests in both groups. Different statistical techniques like Mean, standard deviation, standard error, t-value and ANCOVA were applied to find accurate result. Main findings of this study were (1) It was possible to develop CAI program on environmental science subject for class IX. (2) Academic achievement of control group (where traditional method was applied) in environmental science was higher in posttest than pretest. The t-value showed the significant difference in achievement of control group in post test than pretest. (3) Academic achievement of experimental group (where CAI was applied) in environmental science was higher in posttest than pretest. The t-value showed the significant difference in achievement of experimental group in post test than pretest. (4) Academic achievement of posttest of Experimental group was higher than the control group. It means CAI found to be more effective than traditional teaching.

INTRODUCTION

The rapid growth in science and technology has strongly influenced the field of Education. The development of applications and evaluation of new techniques and aids in the field of education has given birth to the concept of educational technology. In the age of "Information" and 'Computer Literacy', Computers have found their way into the classroom faster than most of us thought would be possible. There is no denying the fact that computer as a teaching tool has made its impact not only on science, mathematics, space science but in all curriculum areas including fine arts, architect, fashion designing, social sciences etc. Teachers are overcoming the misconceptions that computers

are applicable to mathematics, science or business classes. Computers can be used effectively in learning of most of the subjects. Computers provide more freedom to teachers and students to make mistakes without the fear of ridicule or personal embarrassment. CAI system encourages self-paced-learning rather than merely transferring information's. Thus, the Educational objectives can be achieved in a more effective and elegant fashion. The role of the computer in CAI are to teach subject through preferably a dialogue, to evaluate student response and provide remedial teaching, to generate instructional material depending on the level of the student, to stimulate systems of interest and to store student's record.

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Teacher is playing a very important role during teaching - learning process and always trying to acquire cent percent learning. It is very difficult task for a teacher to take care of each and every student and impossible for a teacher to teach every individual according to their own pace of learning. Computer assisted instruction is highly effective and individualized instruction to solve these problems. Many educators resisted the machines and their programs because they felt the machines might displace teachers or impart instruction in an undesirable, mechanistic fashion. Skinner answered critics by saying that the machines would improve teacher-student instructions because the teacher would be freed of 'routine instructional presentation', drill and testing duties. The teacher would thus have more time to interact with students in the capacity of an advisor or friend. Teacher is now easily find out necessary and current information through computer which increases quality of teaching-learning process. Teacher is gaining revolutionary change in their thoughts through information technology to make their lessons for teaching more effectively and interesting and to realize responsibility of teachers to find out necessary and current information's for their students from internet through computers to make their teaching-learning process live, effective, interactive and interesting.

RATIONALE OF THE STUDY

Computer assisted instruction (CAI) is a natural outgrowth of the application of Programmed Instruction and computer technology. The aim of CAI is to provide individualized instruction to meet the special needs of each learner according to their pace. It needs some efficient and flexible device that can store a gigantic amount of organized information and use selected portion to meet the needs of individual learner. A Computer is such a device which can cater to the needs of individual learner. But even then the rate of learning depends upon the learner's characteristics. Moreover, each strategy has its own principles motivational and structural components. But the motivational factors depend upon the individual. The computer assisted instruction provides special type of learning environment and teaches successfully the written & visual type of content. So, it is important to analyze the learner's performance from

computer assisted instruction with reference to learner's variables like Extraversion, Learning & thinking styles, intelligence, Sex etc. Thus, the role of learner's variables may be helpful in exploring the effectiveness of computer assisted instruction in Science.

OBJECTIVES OF THE STUDY

1. To develop a CAI program on selected units of course content in science subject for class IX.
2. To assess difference between Pretest and Post test of control group in attainment of science concepts through CAI program.
3. To assess difference between Pretest and Post test of group in attainment of science concepts through CAI program.
4. To assess difference between pretest and post test of experimental and control group in attainment of science concepts through CAI program.

HYPOTHESES OF THE STUDY

1. There is significant difference between pretest and post test of control group in attainment of science concepts through CAI program.
2. There is significant difference between pretest and post test of experimental group in attainment of science concepts through CAI program.
3. There is significant difference between pretest and post test of experimental group and control group in attainment of science concepts through CAI program.

DELIMITATIONS OF THE STUDY

Keeping in view the constraints, certain delimitations need to be imposed for conducting the study-

1. The present study is limited to students of Sriganganagar district of Rajasthan.
2. The present study is limited to students of secondary level.
3. English medium students have been taken, as the program will be developed in English language only.
4. CAI Program develops only in environment science subject.
5. Only 10 selected concepts from environment science subject have been taken.

METHOD OF STUDY

In this study the investigator used experimental study method.

SAMPLE

The researcher chose four English medium schools (two for control and two for experimental group) of SriGanganagar District of Rajasthan state. All English medium schools were selected randomly and all students (boys and girls) studying in class IX of selected schools were taken as a cluster.

Table 1
Sample Table

Experimental Group	Control Group	Total
60	60	120

TOOL USED

The following tools were used for the study-

1. Computer assisted instruction program (CAI) based on Science Concepts for class IX in English language. (self made)
2. Pre-test and post-test (self made).

RESULTS**Table 2**

Difference between pretest and post test of control group in attainment of science concepts through CAI program.

Sr. No.	Category	N	Mean	S.D.	T-Value
1	Pretest	60	74.02	12.85	37.88
2	Posttest	60	146.6	7.42	

As per the table, the Mean and S.D. of pretest scores of control group in science are 74.02 & 12.85 and of posttest are 146.6 & 7.42 respectively. The calculated value of 't' is 37.88 which is greater than the table value of 't' for degree of freedom 118 at .01 and .05 level of significance i.e. 2.358 and 1.658 respectively. This shows the significant difference between pretest and post test of control group in attainment of science concepts.

Table 3

Difference between pretest and posttest of experimental group in attainment of science concepts through CAI program.

Sr. No.	Category	N	Mean	S.D.	T-Value
1	Pretest	60	81.45	15.49	13.19
2	Posttest	60	168.82	48.88	

As per the table, the Mean and S.D. of pretest scores of control group in science are 81.45 & 15.49 and of posttest are 168.82 & 48.88 respectively. The calculated value of 't' is 13.19 which is greater than the table value of 't' for degree of freedom 118 at .01 and .05 level of significance i.e. 2.358 and 1.658 respectively.

Table 4

Difference between pretest and posttest of experimental group and control group in attainment of science concepts through CAI

The objective was to compare adjusted mean scores of achievement tests of experimental group and control group by considering pretests as covariate. The data was analyzed with the help of One Way ANCOVA by considering pre test as covariate. Here the adjusted mean and the homogeneity of regression assumption was tested. Results obtained are given in Table.

Dependent Variable		
Sample		
A	B	Total
N		
60	60	120
Observed Means		
169.0833	146.6	157.8417
Adjusted Means		
170.0386	145.6448	157.8417
Aggregate Correlation within Samples: CV vs DV		
r = -0.09		r ² = 0.01

ANCOVA SUMMARY

Source	SS	df	MS	F	p
adjusted means	16367.14	1	16367.14	12.17	0.000685
adjusted error	157313.82	117	1344.56		
adjusted total	173680.96	118			

*Significant at .01 and 0.05 level

Test for homogeneity of regressions

Source	SS	Df	MS	F	p
between regressions	1362.98	1	1362.98	1.01	0.316995
Remainder	155950.84	116	1344.4		
adjusted error	157313.82	117			

Result shows that there is significant difference between experimental and control group. Teaching through CAI is rather more effective than traditional or contemporary teaching. ANCOVA signifies the given result.

STATISTICAL TECHNIQUES

To fulfill the above objectives, the main statistical techniques are used-

1. Frequency analysis
2. Percentage analysis
3. Mean, SD, SE and 't'-Test
4. ANCOVA

CONCLUSION

- (1) It was possible to develop CAI program on environmental science subject for class IX.
- (2) Academic achievement of control group (where traditional method was applied) in environmental science was higher in posttest than pretest. The t-value showed the significant difference in achievement of control group in post test than pretest.
- (3) Academic achievement of experimental group (where CAI was applied) in environmental science was higher in posttest than pretest. The t-value showed the significant difference in achievement of experimental group in post test than pretest.
- (4) Academic achievement of posttest of Experimental group was higher than the control group. The result was found through ANCOVA

SUGGESTIONS

1. Research and experiments in education and in teaching a particular subject should be

promoted through the provisions of research facilities in teacher education institutions. All staff concerned with teacher education should be made aware of the findings of research in the field with which they are concerned.

2. The present study opens up many avenues for more similar studies on a wider sample on all available modern instructional strategies for valid generalizations.
3. A comparative study on the effectiveness of CAI and Co-operative learning in different subjects may be adopted.
4. Self learning packages required for different instructional strategies may be prepared and subjected to assessment.

BIBLIOGRAPHY

Adams, Dennis; Carlson, Helen & Hamm, Mary (1990). Cooperative learning and educational media. Englewood Cliffs, N J: Educational Technology Publications.

Alessi, Stephen M.; Trollip, Stanley R. (1991). Computer-based instruction: methods and development (2nd ed.). Engtewood Cliffs, NJ: Prentice Hall.

Aganual, Ras hmi (2000). Educational technological and conceptual understanding. New Delhi: Anmol Publications Pvt. Ltd.

Alessi, Stephen M.; Trollip, Stanley R. (1991). Computer-based instruction: methods and development (2nd ed.). Engtewood Cliffs, NJ: Prentice Hall.

Bentley, Trevor (1992). Training to' meet the technology challenge. London: The McGraw-Hill Training Series.

Berg man, Robert E. (1 990). Managing interactive video/multimedia projects. Englewood Cliffs, NJ: Educational Technology Publications.

Campbell, L., Campbell, B., & Dickinson, D. (1 999). Teaching and learning through multiple intelligences (2"d ed.). Boston: Allyn & Bacon.

Vesper Marianne (1 992). Comparing paper-based and electronic outlining as a study strategy for mainstreamed students with learning disabilities (Doctoral Dissertation, 1 992). Dissertation Abstracts International, 53 (31, 699-A).

- Aliweh, Ahmed Mahmond (1989). The short-and long-term effect of communication strategy instruction on the speaking proficiency of Egyptian coliege students (Doctoral Dissertation, Aliweh, Ahmed Mahmond, 1989).Dissertation Abstracts International, 50 {9}, 2762-A.
- Ahmed , E . S . (2004). Emerging e-learning in developing countries: Challenges and opportunities. Cairo: Centre for Spatial Database Management and Solutions.
- Anderson, Jeffery W. (2004). A study of pre-service teacher exposure to technology in the college classroom and field experience (Doctoral Dissertation, The University of Alabama at Birmingham, 2004). Dissertation Abstracts International, 65 (12), 4530-A.
- Arenz, Bernard William (1991). Relationship of computer-assisted cooperate learning to the acquisition of mathematical problem-solving skills (Doctoral Dissertation, The University of Wisconsin-Madison, 1991). Dissertation Abstracts International, 53 (3), 699-A.
- Baker, Therese L. (1994). Doing social research. New York: McGraw-Hill, Inc. Balasubramaniam, N ., and Rangaraj, K.R. (2002). Development . validation of syllabus oriented computer-based instructional package in teaching Physics. Edutracks, 3, 12.
- Albrechtsen, K., Kariger, H. & Parker, C. (2001). Distance education and the impact of technology in Europe and Japan. Educational Technology Research and Development, 49 (3), 107-1 16.
- Bandura, A., & Walters, R. (1963). Social learning and personality development. New York: Holt, Rinehart and Winston.
- Alessi, Stephen M.; Trollip, Stanley R. (1991). Computer-based instruction: methods and development (2nd ed.). Engteewood Cliffs, NJ: Prentice Hall.
- Anand, G.P., & Ross, R.M. (1 987). Using computer-assisted instruction to personalise arithmetic materials for elementary school children. Journal of Educational Psychology, 79 (1), 72-78.
- Ardil, C. (2003). Creating an interactive and collaborative e-learningenvironment in educational process. Turkish Online Journal of Distance Education, 4 (3), [http: 1/ tojde.anadolu.edu.tr](http://tojde.anadolu.edu.tr).
- Blancy. Nancy T. (1977). Independent in the classroom: A field survey. Journal of Educational Psychology, 67 (Z), 12 1-1 27.
- Chou, S.W. (2005). Designing good institutional contexts for innovation in a technology-mediated learning environment. Journal of Computer Assisted Learning, 2 1 (4).
- Dash, N.K. (2005). Learning gain from face-to-face workshop over selfinstructional material: A study. Indian Journal of Open Learning, 14 (I), 147-57.
- DeVrises, D.L., & Slavin, R.1. (1978). Review of ten classroom experiments. Journal of Research Development on Education, 2 (1 2), 28-38.