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A STUDY OF ATTAINMENT OF ENVIRONMENTAL SCIENCE
CONCEPTS BY ENGLISH AND HINDI MEDIUM PRIMARY
LEVEL SCHOOL LEARNERS THROUGH COMPUTER ASSISTED
INSTRUCTION (CAI) PROGRAM.



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ABSTRACT:

The natural world is complex and human activity can have unexpected consequences that are hard to reverse. The study of how physical and biological processes maintain life, and how humans affect nature, requires a broad interdisciplinary perspective. Environmental problems and their associated solutions typically involve social, political and economic aspects which the scientist must be aware of. This is why the dedicated study of environmental science is so important. It is only by understanding how the world works that a person can begin to tackle some of his pressing problems. Computer is bringing some exciting innovations to Education. The most exciting innovation is the Computer Assisted Instruction (CAI) which is becoming increasingly popular. Computer assisted Instruction (CAI) is a supplementary instructional strategy in effective teaching. The teacher of today realizes the need for presenting different learning experiences to suit individual differences among

pupils and attempts to use the modern and latest media and methods like CAI. In this paper, researcher elaborates use, utility and importance of CAI in teaching of Environmental Science.

KEY WORDS: Environmental Science, human activity, biological processes, Computer Assisted Instruction

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 is 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.

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.

The key to science education in primary schools is motivation - for staff and students. An exciting class will inspire both students and teachers to learn and to immerse themselves in the topic and this is best achieved through the provision of outstanding teacher resources and a faculty that is committed to making science exciting in the classroom environment. Programs such as Primary Connections have been fantastic in achieving this. Engaging kids with science is easy - teachers just need to remember to always relate science ideas back to their everyday lives. A poor experience in primary science will undoubtedly deter further science studies. It is the responsibility of primary educators to pave the way for scientists of the future. The reverse is also true - an inspiring, quality science education at primary level will give a student the tools and desire to continue their science

journey.

Literature Review:

The effectiveness of CAI has been defined differently by different investigators. To some, effectiveness means the amount of learning that takes place initially. To others it means the degree of retention of learning, or at the very least, whether or not an individual stays in or drops out of a learning experience. Still others are concerned with the learner's change in attitude towards the computer as an instructional medium or simply as a helpful tool in teaching-learning process. Finally, owing to the fact that CAI is in its infancy, some are simply concerned with the transportability of material and/or acceptance of the material for use by others.

The results of the studies reviewed reveal that CAI has been found to be effective in individualized tutorial form and also as supplement to the conventional teaching. Research takes advantage of the knowledge which has accumulated in the past as a result of constant human endeavor. The review of the earlier research findings provide an empirical framework to carry out further researches. Thus, the survey of related literature is a crucial aspect in the planning of any research. Each study rests on earlier ones and provides a basis for future ones. Though the investigator aimed at a comprehensive and thorough survey of related literature, related directly or indirectly with the theme of this work, yet, it is quite possible that some studies may have escaped one's attention.

Studies done by researchers like Solomen (2003), Agarwal, Rashmi (2000), Alessi, Stephen M; Trollip, Stanley R. (1991), Vardhini. V.P. (1983), Dalton and Hannafin (1986), Lore and Chamberlain (1988), Price (1989), Christmann, et al. (1997), Patel, J.A. (2009), Vandana (2007), Jyothi, K.B.S. (2007), Pareek, R. (2005) revealed the effectiveness of CAI. As evidence, these researches helped to know that how can learning be enhanced through Computer Assisted Instructions. However, there are much more aspects of using CAI in education on which researches could be done.

Studies done by researchers GopalaKrishnan, Sindhi, N.O. (1996), Phoolwala, R.N. (1997), Bayraktar (2000), Chang (2002), Hounshell & Hill (1989), Morse (1991), Cepni, Tas & Kose (2006), Coye & Ferguson & Chapmen (1993), Lee (2001), Rowe & Gregor, (1999), Brophy (1999), Tsai & Chou (2002), Ramjus (1990), Singh, B. (2005), Ponraj, P. and SivaKumar, R. (2010), Mercedes (1991), Rivet, J.R. (2001) revealed that CAI increased not only students' performance but also there was an increase in their attitude towards Science. These researches include only one aspect of effectiveness but there could be wider aspects for the same.

Researchers like Kulik and Bangert-Drowns (1985), Ryan (1991), Snowman (1995), Christmann et al. (1997), Badgett (2000), Chang (2000), Brophy (1999), Stern and Repa (2000), Dunn (2002), Khirwadker, A. (1998), Meera, S. (2000), Matejczyk (1996), Tseng (1999), Joshi, Anuradha and Mahapatra, B.C. (1997), Das, A. (1998), Patel, R. (2001), Dange, J.K. and Wahb, S.A. (2006), Sarupria, S. (2005), Insun Hwang (1993), Watson, D., Blackeley, B. and Abbott, C. (1998) had done studies on usage of CAI at different levels of students and found significant results regarding it. There were so many studies done at Secondary, Senior Secondary and College level but very few studies were done at primary level. Therefore, there could be wider aspect for usage of CAI at primary level.

Review of the studies done in India and abroad reveals that many studies have been done on women and minority groups in environmental management, effect of green class model on environmental knowledge, school curriculum and environmental education, school teachers attitude towards environment and environmental problems, investigation of undergraduate students environmental attitude, environmental knowledge, environmental attitude and perception among pre-service and in-service secondary school teachers, etc. There are no studies done in India and

abroad to understand the level of environmental awareness and environmental ethics at primary level through computer assisted instruction program. Since students are the enlightened group of energetic youngsters, who can play a major role in bringing about awareness in society, the researcher has emphasized on environmental ethics, which is an integral part of human ethics. Therefore the present study is different in terms of technique, methodology and other components.

Statement of the Problem:-

Envisaging the importance of modern instructional strategies i.e. CAI in Environmental Science, the investigator has designed the present study to find out the awareness and achievement of primary level learners with respect to the use of modern instructional strategies. The study is entitled-

"A STUDY OF ATTAINMENT OF ENVIRONMENTAL SCIENCE CONCEPTS BY ENGLISH AND HINDI MEDIUM PRIMARY LEVEL SCHOOL LEARNERS THROUGH COMPUTER ASSISTED INSTRUCTION (CAI)."

Rationale of the Study:-

Science and Technology are intimately related to each other. Science is concerned with the knowledge and understanding of the universe, world and its environment while technology deals with the application of scientific concepts to change the world to suit us better. These changes may relate to survival needs such as food, shelter and defense or they may relate to human aspirations such as knowledge or art. In view of this, it has been pleaded that science and technology should be integrated as one subject of study at school level. Technology has always had a place in the science curriculum in the yesteryears but until now it has been used in science curriculum for motivational value only. But we should understand that scientific work is mainly,

recognized in the society through its technological byproducts. Even the children are always interested in exploring, inventing and making artifacts at age when they enter the school. Therefore is the content of technology should find its place in science at equal level. Needless to say, some organizations have worked in this direction. The publication of science for all Americans (American association for the advancement of science) provides a significant boost to technology as an integral part of science. After finding place in science curriculum, next question comes how both the domains can be taught together. One way is: We can discuss the concepts of science and then take up the computer based artifacts, which are based on those science concepts for learning. In second approach we discuss the artifacts in class and its process for making and using (which are mainly scientific in nature) are explained. Computer assisted instruction effects on students such as academic achievement, attitude towards course. Students attitudes are one of the key factors in learning science, learning process is important in improving of positive attitude. The development of positive attitude towards Science can motivate student interest in Science subject. Some study showed that CAI was more effective than other methods in increasing student's interest in science lessons and using teaching process computer assisted application aid to make teaching learning process more effective and the reconstruction of knowledge by students themselves.

Computer programs are more interactive and can illustrate a concept through attractive animation, sound and pictures. They allow students to progress at their own pace and work individually or problem solve in a group. A computer provides immediate feedback; let students know whether their answer is correct. If answer is not correct, the program shows students how to correctly answer the question, computer offer a different type of activity and a change of pace from teacher led or group instruction. Today Microsoft power Point become easy to use and easy in availability and teachers can easily modify and even produce their own CAI material based on the needs of their own classes. 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.

Objective of the study:- The main objective of this study is–

- To assess difference between Experimental and Control group in attainment of Environmental Science concepts through CAI program.

Hypothesis of the study:- On the basis of objective given above, the following hypothesis of the study has been formulated -

- There is a significant difference between Experimental and Control group in attainment of Environmental Science concepts through CAI program.

Delimitations of the study:- Certain delimitations need to be imposed for conducting the study by keeping in view the constraints.

1. This study is applied on students of Sri Ganganagar district of Rajasthan state.
2. As researcher has used only fifth grade students as sample for the study therefore the present study has been limited to students of fifth standard only.
3. This study has been done for Environmental Science subject, therefore, it is delimited to this subject only.
4. This study focuses only on the National Curriculum Framework, 2005 developed by the national body, National Council of Educational Research and Training (NCERT) and their textbooks. In this study, CAI program (In English and Hindi language) has been applied on selected unit of course content in Environmental Science subject for class V therefore this study has been limited to these concepts of Environmental Science for class V students of both English and Hindi medium.
5. Comparison between Experimental and Control group has been done on the basis of techniques like Mean, Standard Deviation and ANCOVA.

Method of study:- In this study the investigator uses Experimental Study method.

Population:- The population of the study has been considered as all students of class V studying in English and Hindi medium schools of Sri Ganganagar District of Rajasthan state.

Sample:- The researcher chooses two English and two Hindi medium schools (one for control and one for experimental group in each category) of Sri Ganganagar District of Rajasthan state. Both English and Hindi medium schools have been selected randomly and all students (boys and girls) studying in class V of selected schools are taken as a cluster.

TABLE 1: Distribution of Samples

Group/Medium	Experimental Group	Control Group	Total
English Medium	Blooming Dales International School(32)	Saraswati Public Girls Sr. Sec. School.(30)	62
Hindi Medium	Gupta Bal Bharti School(33)	Vishwas Vidya Mandir(30)	63
Total	65	60	125

Tools Used:-

The following tools are used for the study-

1. Computer assisted instruction program (CAI) based on Environmental Science Concepts for grade 5 developed in both English and Hindi language.
2. Construction of Attainment Tests for Environmental Science Concepts (Self developed).

Statistical techniques:-

To fulfill the above objective, the main statistical technique ANCOVA is used.

Administration of CAI Program:-

Researcher divides four selected schools in two groups for her research work i.e. Experimental and Control Group. Blooming Dales International school (English medium) and Gupta Bal Bharti (Hindi medium) are counted as Experimental group and Saraswati Public Girls Senior Secondary School (English Medium) and Vishwas Vidya Mandir (Hindi Medium) are considered as Control Group by the researcher as per the availability of computer labs and level of students studying there. Both English and Hindi medium schools have been selected randomly and all students (boys and girls) studying in class V of selected schools are taken as a cluster. Self made pre tests based on selected concepts of environmental science subject have been administered on all selected groups to check the pre acquired knowledge of students regarding the same topics. Then teaching of selected chapters has been done in both groups by conventional method in control groups and through CAI in experimental groups of both English and Hindi medium schools. Post tests have been administrated in both categories control as well as experimental to check how much, students have got after such teachings (CAI as well as through traditional).

Analysis of Attainment of Environmental Science concepts through CAI program :-

This analysis has been done on data collected from pre and post tests of both Experimental and Control groups. In each group, data collected from both mediums has been taken together and this data (collected from pre and post tests) has been used for analysis. This analysis has been done by using one-way ANCOVA for 2 independent samples.

To test research hypothesis "There is a significant difference between Experimental and Control group in attainment of Environmental Science concepts through CAI program" formulation of null hypothesis "There is no significant difference between Experimental and Control group in attainment of Environmental Science concepts through CAI program" has been done. Result Analysis of data collected is given below.

Table 2: ANCOVA SUMMARY

Adjusted Mean Table		
Experimental group	Control Group	Total
65	60	125
Observed Means		
168.8154	146.6	158.152
Adjusted Means		
169.5408	145.8141	158.152

Summary Table for the Analysis of Covariance

Source	SS	Df	MS	F	P
Between	16453.03	1	16453.03	12.74	0.000513
Within	157539.03	122	1291.3		
Total	173992.06	123			

*Significant at .0.01

Analysis and Interpretation:-

The objective of this analysis is to compare adjusted mean scores of achievement tests of Experimental group and Control group by considering pretests as covariate. The data has been analyzed with the help of One Way ANCOVA by considering pre test as covariate. Here the adjusted mean and the homogeneity of regression assumption have been tested. Results obtained are given in table 2. The table for ANCOVA SUMMARY has shown significant result at 0.01.

The calculated value of F through ANCOVA has been found to be 12.74 which is greater than the table value i.e. 6.635 at 0.01 level of significance and 3.8415 at 0.05 level of significance on degree of freedom 1 and 122. Therefore the null hypothesis-1 "There is a significant difference between Experimental and Control group in attainment of Environmental Science concepts through CAI program" has been rejected and Research hypothesis-1 "There is no significant difference between Experimental and Control group in attainment of Environmental Science concepts through CAI program" has not been rejected. As per data collected, it has been observed that Mean scores of Post tests of Control group are 160.15 and 145.33 whereas for Experimental group are 162.34 and 147.33. There is difference between Mean scores of post tests of Control and Experimental group. Mean scores of Experimental groups are higher than Control groups. This shows that Performance of students after going through concepts through CAI is slightly improved. CAI has better impact on student's performance. Therefore it is generalized that there is a significant difference between Experimental and Control group in attainment of Environmental Science concepts through CAI program. This implies that there is significant impact of CAI program on attainment of Environmental Science concepts.

CONCLUSION:-

Thus from the above table, it can be concluded that Computer Assisted Instruction is highly effective and individualized instruction which is very helpful for teachers as well as students. CAI system

encourages self paced- learning rather than merely transferring information. Thus, the Educational objectives can be achieved in a more effective and elegant fashion. Teaching through CAI is effective and impressive than traditional or contemporary teaching.

Discussion of the Result:-

As per above interpretation, we find that mean scores of post tests of Experimental group is higher than the Control group. There is very slight difference between mean scores of post tests of both groups. We can see that there is small difference between mean scores of pre tests of both groups and very slight difference between mean scores of pre tests of English medium Experimental and control group and Hindi medium Experimental and Control group. During conduction of these classes, Researcher observed that few of concepts were not cleared to students in previous classes. They were having a lot of doubts in their mind. While teaching these concepts, students were getting problem in attainment of few concepts of Environmental Science in English and Hindi medium like From tasting to digesting, Experiment with water, Seeds and Seeds and A treat for mosquito and ch[ht] p[kus ls ipus rd ikuh ds iz;ksx lquhrk varfj{k esa They scored less marks in these concepts rather than others. Few of these concepts got cleared through CAI and performance of students was slightly improved in these concepts. That might be the reason for high mean scores in Experimental group than Control group. Researcher finds that In EVS few concepts can't be explained through conventional teaching to students to that extent. CAI helps teacher to explain these concepts thoroughly. Therefore, CAI proves to be a helping tool for teacher which helps in teaching learning process.

Educational Implications:-

The above conclusions highlight the need for a holistic perspective on Educational Development:

- Present study shows that Computer Assisted Instruction is highly effective and individualized instruction which is very helpful for teachers as well as students. CAI system encourages self-paced-learning rather than merely transferring information. Thus, the Educational objectives can be achieved in a more effective and elegant fashion. Teaching through CAI is effective and impressive than traditional or contemporary teaching. There is a need to develop a Computer Assisted Learning Program i.e. CAI in Environmental science in schools for primary level learners by all educational institutions. It develops interest among students and makes teaching interesting.
- Computer Assisted Instruction programs need to assist science teachers in three least addressed challenges viz. locating the appropriate CAI program for learners, channelizing individual interpretations by the learners and addressing that CAI program among learners. Some already studied/developed Computer Assisted Learning programs can be used for the above purpose.
- CAI program needs to be more interactive and give learner space to get feedback, reflect and rethink. Science teachers might need initial assistance in developing competence for self sufficiency in using Computer Assisted Instructional material on their own. For developing a Computer Assisted Instruction program among learners in science, the identified characteristics of desirable computer-assisted learning program (as per the perceptions of science teachers) can be used.
- There is a need to provide facilities for the proper use of laboratories including computer software and web based technology should be enhanced and updated in each school.
- There is a need to provide financial support for equipping and updating the primary teacher training institutes with facilities and resources to be provided.
- Some Effective steps should be taken for enriching the trained teacher certificate course with proper emphasis on modern instructional strategies like co-operative learning, computer assisted

instructions, E-learning and web-based technology.

- Innovative instructional strategies should be included as an integral component of the theory and practical aspects of the curriculum.
- Accessibility to information and communication technology should be made available in each school.
- There is a need to spread proper awareness on the significance and use of modern instructional strategies to be cultivated among primary level students and teachers. Agencies like NCERT, SCERT, CIET (Central institute of educational technology) should organize awareness program, training sessions and in service courses in this regard.
- There is a need to provide proper practice and support to students in adopting group learning strategies like brainstorming, panel discussions, projects, seminar, demonstration etc.

Suggestions for Further Studies:-

Research in any branch of human knowledge is never a closed chapter. There is always a need of finding solution to new problems and testing to reality of the solution to the older problems. In the light of the results subsequent conclusion and experience gained in the course of this study, following suggestions may be made for further research in this area.

- There is a very obvious suggestion that naturally emerges out of this work is that Researcher need to compile already developed computer assisted programs from different parts of the world and test their adequacy in addressing those CAI programs among learners in science.
- Researcher also proposes to develop Computer Assisted Instruction material on specific areas/topics amongst learners in science. Then test the efficiency of these programs in science classrooms, in natural school settings, on individual learners.
- It is a need to understand the economic viability of the application of Computer Assisted Learning for being used in these specific contexts.
- How to involve parents in the process of science learning, how community participation is ensured, and its resources used etc are the issues that need to be understood.
- A long standing issue of paying individual attention to the science learners can be slightly addressed in this way, but only to the extent that it is related to CAI program. Larger issue remains about how we engage every learner in science learning practices.
- Further research can also be taken up to address the issue of large classrooms. How to strengthen the role of teacher and empower them is also need a deeper understanding and may be undertaken
- A comparative study may be conducted with reference to the effectiveness of CAI and Co-operative learning in different subjects.
- 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.
- The present study opens up many avenues for more similar studies on a wider sample on all available modern instructional strategies for valid generalizations
- Self learning packages required for different instructional strategies may be prepared and subjected to assessment.

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