Comparative Effectiveness of Computer Assisted Instruction (CAI) with Traditional Instruction at the Teacher Training Level

Dr. Sushma Tyagi

Abstract

The paper aims to evaluate effectiveness of Computer Assisted Instruction (CAI) for teacher trainees in comparison with traditional method of instruction. Experimental study was conducted at Sonepat. CAI programme based on interactive tutorial mode of presentation was developed and used for study. Study was conducted using Two Groups, Randomized Matched Subjects, Post-test-only Design. Two matched groups were formed on the basis of teacher trainee's intelligence level, each group comprised of 20 subjects and randomly assigned as experimental and control group. Experimental group received CAI whereas control group received traditional instructions for the same topic 'Intrinsic program learning'. After completion of Instruction an achievement test was administered to both the groups. Then the Null hypothesis was tested using t–test, which revealed the significant difference in effectiveness of CAI and traditional teaching. The study revealed the greater effectiveness of CAI over traditional method.

Introduction

Aim of researches and innovations carried out by human is to preserve, transmit and add to the existing knowledge. In the past, the means of achieving this aim were the teachers, books and some audio-visual aids i.e. the traditional education system. Though traditional mode of instruction have served the learner population since very long, but have its own limitations like teacher dominated class room environment, excess class strength, poor performance of learners, and inability of catering needs of individual differences and mass education. Learners can achieve better if they learn at their own continence, which is the important feature of CAI. Keeping this in mind it was decided to carry out the present study.

Computer Assisted Instruction can also be used as self instructional device with the principal of automization. CAI is nothing but learning with the help of computers. It can be used to impart formal and non-formal education at all levels and also in all areas. CAI is based on the principal of programmed instruction. CAI facilitates the learner by providing:

- Individualized Instruction
- Effective Interaction with the learner
- Immediate feedback

Computer Aided Instruction (CAI) proved to be more productive when it is well planned and considered as an integrated part of instruction (Ponraj, P. and Sivakumar, R. 2010). A well planned

instructional design helps in integrating computers into instructional process. One such model developed by Morrison, Ross and Kemp (2007) is a nine step process, includes

1. Identify instructional problems, and specify goals for designing an instructional program.
2. Examine learner characteristics that should receive attention during planning.
3. Identify subject content and analyze task.
4. State the instructional objectives for the learner.
5. Sequence the content within each instructional unit for logical learning.
6. Design instructional strategies so that each learner can master the objectives.
7. Plan the instructional message and delivery.
8. Develop evaluation instruments to assess objectives.
9. Select resources to support instruction and learning activities.

Following these nine steps a CAI program was developed and used as instruction material for the experimental group. Important features of CAI program developed for present study are-

- Program was developed on topic 'Intrinsic programmed learning'.
- Macromedia flash software was used for developing the program.
- Designing of program was based on instructional module developed by Morrison, Ross and Kemp (2007)
- Psychological principles of learning were kept in mind while developing CAI program.
- Program operates in a user friendly environment, works simply on mouse click method.
- Instructions were given to teacher trainees about use of CAI program for learning.

Objectives

Objectives of the study were-

1) To develop a CAI program for the topic- 'Intrinsic programmed learning'.
2) To study the effectiveness of traditional instructions in terms of mean achievement score obtained by the subjects.
3) To study the effectiveness of CAI in terms of mean achievement score obtained by the subjects.
4) To study the comparative effectiveness of CAI and traditional instruction.

Hypothesis

There is no significant difference in the effectiveness of traditional instructions and CAI at teacher training level.

The Sample

The study subjects (teacher trainees) were selected from four teacher training colleges of Sonepat district of Haryana state. Purposive sampling was used for the present study. The sample of the study comprises of 40 teacher trainees. Two matched groups were formed on the basis of teacher trainee's intelligence level (using G. C.Ahuja Group test of Intelligence). Each group comprised of 20 subjects and randomly assigned as experimental and control group. The groups were formed after controlling the intervening variables i.e I.Q., and Medium of instruction.

Variables of the Study-

Independent Variables: Modes of teaching instruction i.e.

1.Computer Assisted Instruction
2.Traditional Instruction

Dependent Variable: Achievement scores of teacher trainees obtained through two different modes of instruction

Tools Used

The tools used in this study were: -

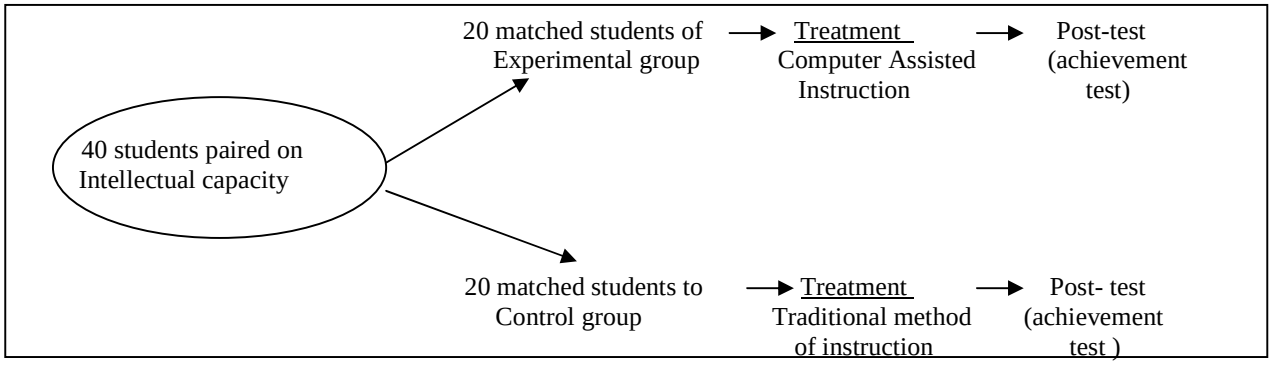
1. A CAI program on 'Intrinsic programmed learning'. (Develpoed by investigator)
2. G.C. Ahuja Group Test of Intelligence (GGTI) by Dr. G.C. Ahuja
3. Achievement test. (Develpoed by investigator)

Statistical Techniques

Statistical Techniques used in the study were- Mean, S.D., t-test and Graphical presentations.

Conceptual framework of the study

The study aimed to evaluate effectiveness of Computer Assisted Instruction (CAI) for teacher trainees in comparison with traditional method of instruction. The first phase of this study was the development of program for computer assisted instruction and in the second phase an experiment was conducted to determine the comparative effectiveness of CAI.



Conceptual framework of the study

Analysis of Post Test Performance

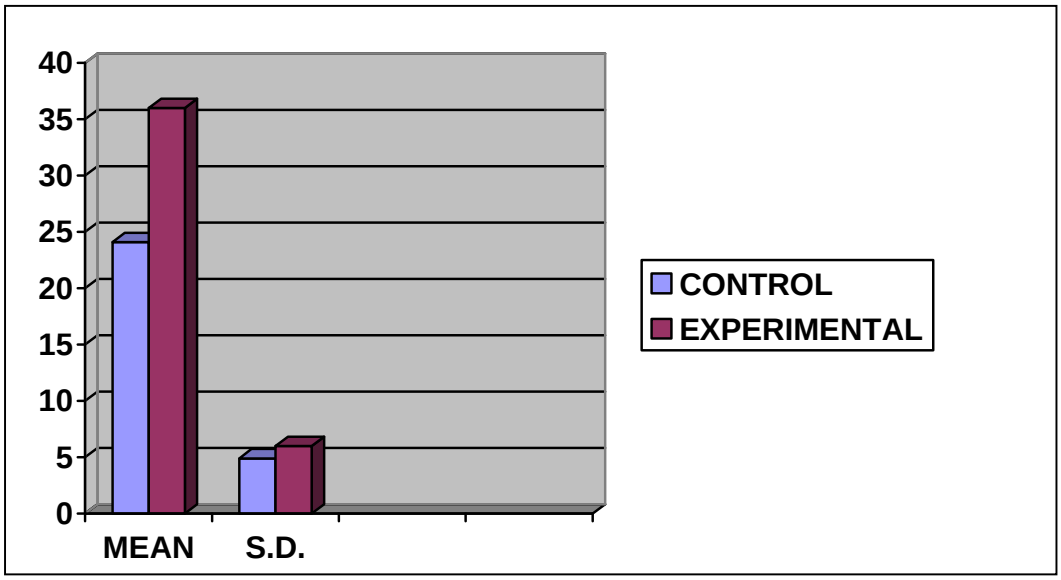
Achievement scores were obtained by conducting a achievement test after providing CAI to experimental group and traditional instruction to the control group. The following table and graph furnishes the data of the post test (achievement test) performance of control and experimental groups, it also furnishes the significance of difference between the achievement scores of subjects in two groups.

Table- Analysis of achievement scores of the Control and Experimental group

Group	N	Mean Achievement Score	S.D	t-test	Level of Significance
CONTROL	20	24.1	4.90	8.2231	Significant at 0.05 level.
EXPERIMENTAL	20	36	6		

The mean achievement score of control group is 24.1 whereas that of experimental group is 36.The calculated t-value 8.22 is much greater than the critical value 2.42 at 0.05 level of significance. This implies that the difference in the achievement of the control group and experimental groups is significant.

Figure: Difference between Mean and Standard Deviation of Control and Experimental group



Thus the null hypothesis namely, 'There is no significant difference in the effectiveness of traditional instructions and CAI at teacher training level' is rejected. Further, the mean achievement score of experimental group is 36, which is significantly higher than the mean achievement score of control group i.e. 240.1. It may therefore be concluded that CAI helps in enhancing the achievement of students in comparison to the conventional teaching. The finding of the study is supported by researches conducted by Wang S., Sleeman P.J., 1993; Owens E. & Waxman H., 1994; Prabhakar, S. 1995; Reddy and Ramar (1995) attempted to study the effectiveness of multimedia modular approach as against traditional method in teaching mathematics to low achievers and found that the multimedia modular approach did help the poor achievers in doing better in mathematics.; Harrington D., 1999; Balasubramanian, N. and Meera, S. 2002; Sharma, A. and Sansanwal, D.N. 2002 conducted a similar study & found that Multimedia treatment had significant effect on achievement in science; Vasanthi, A. and Hema, S. 2003; Carter M.B., 2004; Joy, B.H.H. and Shaiju, S.L. 2004; Maniar, A. and Bhatt, D. (2007) conducted a study on "Designing Educational CD-ROM for Higher Education Students" and found That educational CD-ROM on topic "Graphic Aids" was effective in terms of gain in knowledge; Carmelita Y. Ragasa ,2008; Uplane, Megha M., Sonawane,Sanjeev A. and Padmini, M.S. (2011) found that the developed software package helped the students in performing & retaining the 'Physics content' better; Gupta, R. & Tyagi, S. 2011 found that CAI enhanced the achievement and retention of experimental group students of class XII in learning Genetics.

Conclusions

Conclusions drawn from the study-

- Subjects show higher achievement when taught through CAI.
- Subjects who are undergoing a CAI were found to enjoy it. Novelty of learning through CAI kept the learners self-motivated.
- The CAI keeps the learner active throughout the learning process.
- Teacher trainees benefited from the individualization, self-pacing and interactive nature of the CAI program.
- Provision of feedback during instructional process has a better impact on student learning.
- Computer assisted instruction is a interesting, useful and powerful mode of instruction.

Precisely, Computer Assisted Instruction provides greater opportunities for the learner to learn by serving individual differences. CAI proved to be better than the traditional method of learning among teacher trainees in the present study. It brings an enhancement in achievement and provides new multisensory learning experiences. Further, CAI can also be used as means of drill and practice, as virtual lab to carryout diverse types of experiments during learning and have much scope as learning service in distance education.

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