Impact of Computer Assisted Instruction (Cai) On the Biology Performance of College Level Students

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ABSTRACT

This study looked into how biology performance in college levels was affected by computer-assisted instruction (CAI). Examined was the impact of gender on the academic performance of students exposed to computer-assisted instruction (CAI) in either individualized or cooperative learning environments. It was a quasi-experimental study. Using a factorial design of three by two. 190 first-year B.Ed college students from two private colleges in Jaipur, Rajasthan, made upthe study's sample. Analysis of Covariance was performed on the students' pre- and post-test results (ANOVA). The study's conclusions demonstrated that students who were exposed toCAI, either individually or collaboratively, performed better than their peers who received traditional classroom teaching. But there was no discernible difference.

INTRODUCTION

Biology has a special place in the curriculum of educational institutions. Many science courses, including those in biochemistry, medicine, pharmacy, agriculture, nursing, and other fields, center on biology. It is clear that biology is a must for all students planning to study these subjects. These and other elements have brought attention to scholars' and curriculum developers'attitudes regarding biology as a subject taught in colleges (*Kareem,* 2003). Despite biology's significance and appeal to Jaipur pupils, their performance in college level has been subpar (*Ahmed,* 2008). Researchers have been concentrating on the question of why biology students perform poorly for a while now. It has been noted that subpar scientific achievement is a result ofthe poor.

In the modern environment, the potential advantages of computer-assisted instruction (CAI) cannot be understated. Numerous studies have been conducted on the educational benefits of computers, especially in developed nations. Currently, there are numerous CAI packages covering various topics. It is evident that using computer resources and facilities to improve students' learning is currently a popular study topic worldwide. This could be the reason why, despite the fact that teachers do not use these resources, *Handelsman, Ebert-May, Beichner, Bruns, Chang, et al.* (2004) stated that "many exercises that depart from traditional method are now readily accessible on the web" (*p.* 521). They also demonstrated how much learning is improved by interactive lecture methods.

Cotton (1997) reviewed empirical studies on CAI and came to several conclusions, including the following: research on the relative efficacy of conventional instruction and CAI alone is inconclusive; computer-based education results in higher achievement than conventional instruction alone; and the use of CAI as a supplement to conventional instruction produces higher achievement than the use of conventional instruction alone. Additionally, students learn curriculum materials more quickly through CAI than through conventional instruction alone, retain it better through CAI than through conventional instruction alone, and CAI activities seem to be at least as cost-effective as—if not more so—than tutoring and teacher-directed instruction.Additionally, it has been discovered that computer-assisted education.

Spence (2004) discovered that, when college students were exposed to mathematics courseware in both traditional and online learning environments, gender had no discernible impact on their proficiency in the subject. However, compared to their traditional female counterparts, female online learners had a much lower chance of finishing the course.

PURPOSE OF THE STUDY

The study looked into how biology students in colleges performed when they received computer-assisted instruction. The study specifically looked at:

1. Any differences in biology performance between college students who received individualized computer assisted instruction, cooperative computer assisted instruction, and traditional.
2. How pupils' gender affects their biology performance in terms of whether they receive cooperative or customized computer-assisted instruction.

RESEARCH HYPOTHESES

The study tested the following research hypotheses.

1. Ho: When biology students get (i) customized computer assisted instruction, (ii) cooperative computer assisted instruction, or (iii) conventional training, there is no discernible difference in their performance.
2. Ho: When students receive tailored computer-assisted training in biology, there is no discernible difference in their performance between genders.
   In biology, there is no discernible variation in the academic achievement of male and female students when they receive cooperative computer-assisted instruction.

RESEARCH METHODOLOGY

Design of Research

Pre-test, post-test, non-equivalents, non-randomized, control group design was used in this quasi- experimental study. A 3x2 factorial design is used in the design. Three treatment levels are represented by this paradigm: two gender levels (male and female), customized computer assisted instruction (experimental group 1), cooperative computer assisted instruction (experimental group 2), and conventional instruction (control group).

Sampling

The first-year B.Ed biology students in Muhana and Sanganer City, Jaipur, were the research's target demographic. However, due to the nature of the study, a purposeful selection of the research sample was necessary. This is due to the fact that studies on CAI must inevitably be carried out in classrooms with student access to computers and a high level of computer literacy. For this reason, the study specifically selected a sample from sadguru College in Muhana. These two educational institutions were chosen to serve as the test groups. D.C.S. College in Sanganer, a third institution, was also included in the control group sample since it is thought to have standards that are roughly comparable to those of the colleges utilized for students.

Instruments for Research

The "Computer Assisted Instructional Package (CAIP)" treatment tool and the "Biology Performance Test (BIOPET)" test tool served as the research equipment. The therapeutic tool, a computer. The Biology Assisted Instructional Package (CAIP) was an interactive, self- instructional package that took an average student two and a half hours to complete. It included five lessons divided into sections. These are all from the ecological section of the B.Ed biology curriculum in Jaipur. It was created by the researchers using Dream Weaver and Flash, with the help of a qualified programmer. The text is written in Hypertext Markup Language (HTML), andthe graphics are transformed to Graphic Interchange Format (GIF). The sequence of intrinsic programming.

Collect Data

Students in the control group learned the same material as the experimental groups, but using the traditional teaching approach. They received their education in a traditional classroom setting. The overhead projector, charts, and chalkboard were all used in the classroom to deliver lessons. Every group received treatment for a total of five weeks.

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Following the therapy, the three groups underwent a rearranged post-test BIOPET exposure.

RESULTS

ANOVA was used to analyze the student scores in each of the three groups. The two research hypotheses that were specified for the study were used in the analysis.

The following is a summary of the analysis and discussion outcomes:-

1. First hypothesis: Students' performance in biology does not significantly differ depending on whether they get individualized computer assisted instruction, cooperative computer assisted instruction or conventional.

The results of an ANOVA analysis of the student scores to ascertain the relative efficacy of the two instructional treatments (CCAI, and CCI) are displayed in Table 1.

Table 1: Pre-test Analysis of the Mean Score of Students Applied to CCAI and CCI.
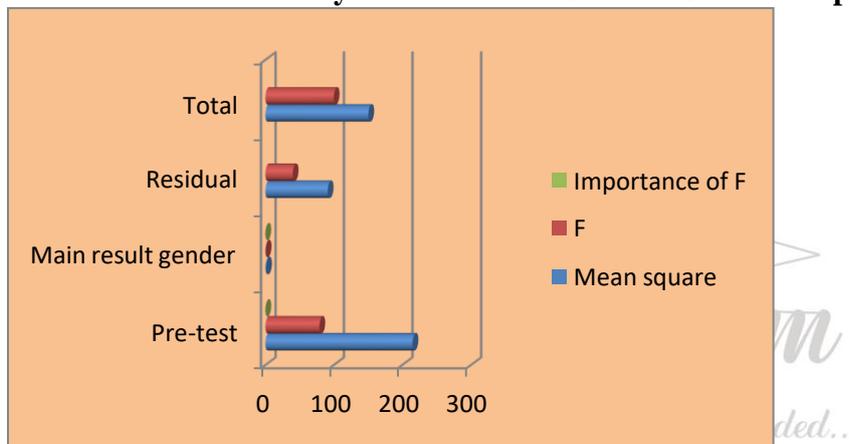
Denoted F is significant at 0.05 alpha levels

A review of Table 1 indicates that the main effect (treatment) had a significant $F_{(3,110)} = 32.790$, $\alpha = 0.000$. This is as a result of F = 0.000's significance being less than the 0.05 alpha level. This finding indicates that, when the pre-test was statistically controlled, the various CAI modes (CCAI) as well as the traditional way of instruction (CCI) created a
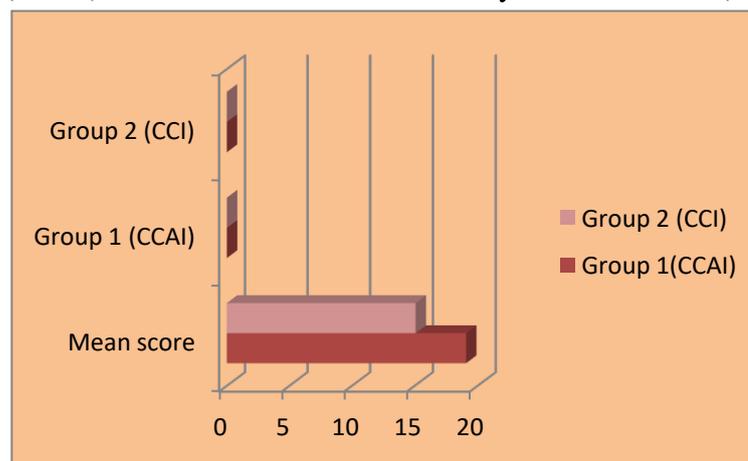
significant difference on the post-test performance of students. Thus, the first hypothesis was disproved.

As shown in **Table 2,** a follow-up Scheffe test was carried out to determine the location of the significant difference between the mean scores of the three treatment groups for each therapy.

The mean difference is significant at the 0.05 level.

According to **Table 2** findings, the data suggests a noteworthy distinction in the post-test results between students exposed to CCAI (X = 19.0876) and those subjected to CCI (X =

15.0700), with the CCAI-exposed students exhibiting a greater advantage. The post-test results of students exposed to CCI (X=15.0700) showed a significant difference, favoring the ICAI group.

Second hypothesis: When given individualized computer assisted instruction (ICAI), male and female biology students perform similarly in terms of academic achievement.

To determine the impact of the primary treatment (ICAI) on the academic performance of the male and female students, analysis of covariance (ANOVA) was employed.

Investigation of Covariance of Mean Scores of Male and Female Students Exposed to
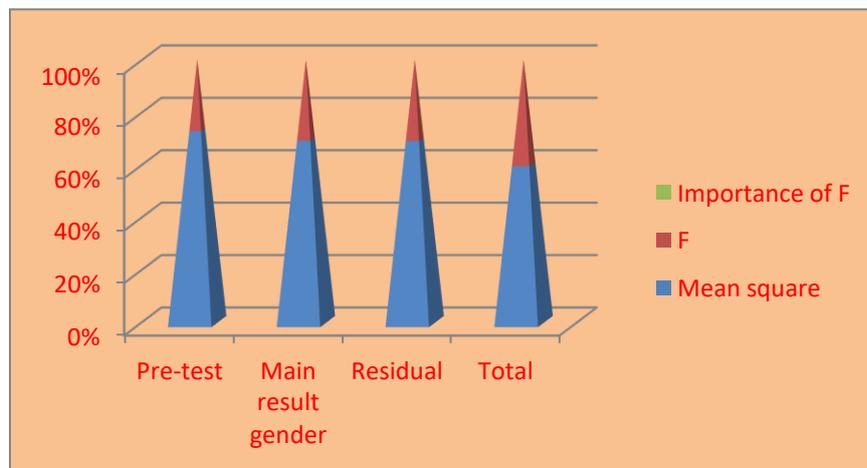
CAI

Denotes F is not significant at 0.05 alpha levels.

Table 3 analysis reveals that the main effect (treatment) had a F (1, 40) = 0.561, α = 0.515 that was not significant at the 0.05 alpha level. This finding demonstrates that when the covariate (pre-test) was statistically controlled, the performance of the male students did not differ substantially from that of their female counterparts when both were taught utilizing Individualized Computer Assisted Instruction (ICAI).

EXAMINATION OF THE RESULTS

A significant difference was found between the performance of students taught biology using computer-assisted instructional packages in cooperative and individualized learning settings and those taught biology using traditional classroom instruction. This difference was attributed to the analysis.

There was a significant difference between the performances of students exposed to CCAI (the two experimental groups), according to the Scheffe test, which was used as a post hoc analysis to locate the observed significant difference. It should be highlighted that, as evidenced by the higher group mean, students exposed to CCAI performed better than those exposed to CCA. Additionally, notable disparities were seen favoring the two experimental groups as compared to the control group (conventional group).

Hypotheses two and three were used to investigate the impact of gender on biology students' academic performance when taught using the CAI package in individualized or cooperative learning contexts. The analysis of covariance (ANOVA) result for students exposed to the CAI package in the two contexts revealed no discernible gender difference. These results demonstrated that, regardless of whether students received individualized or cooperative biology instruction using CAI, gender had no bearing on their academic achievement.

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