International Journal of Advance Research and Innovation
Vol. 8(4), Oct-Dec 2020, pp. 7-10
Doi: 10.51976/ijari.842002

Article Info

Received: 29 Jul 2020 | Revised Submission: 20 Oct 2020 | Accepted: 28 Oct 2020 | Available Online: 15 Dec 2020

Use of Computer-aided Instruction for Effective Teaching and Learning of Physics in Secondary Schools in Makurdi Local Government Area of Benue State

B. A. Atsuwe and E. O. Azande***

ABSTRACT

Computers today are widely used to do many computations in a fraction of time; it would take most humans to do. The study is therefore set-up to find out if the use of computer-aided instruction would improve students' performance in computer science in secondary schools. A quasi-experiment was carried out on forty (40) students from two (2) selected secondary schools in Makurdi Local Government Area of Benue State as sample. A pre-test-post-test method of data collection was adopted. Descriptive statistics was used. The pearson product moment correlation coefficient of internal consistency for conventional teacher oriented method and the computer aided instruction was 0.6231 which is an indication that difference exist between the two groups also from the test analysis and comparison, t¬-critical (t-crit) was greater than t-calculated (t-cal) i.e t-crit 1.73 > t-cal 0.18. Two hypothesis were tested at P<0.05 level of significance using t-test analysis. The result of the findings showed that, students who learnt via computer-aided instruction performed better than those who learnt via the conventional teacher oriented instructions or the chalk board method. Also, male students performed better than the female students using computer-aided instruction. It is recommended that, computer-aided instruction should be used in schools to teach various concepts in computer science.

Keywords: *Computer-aided instruction; Conventional; Performance.*

1.0 Introduction

Computer has become or involved in our day-to-day life activities. It is also been tremendously useful in many aspects of human endeavours such as the business organizations, security firms and most especially in the educational arena. Olusi, (2008) opined that, there exist a significant difference in the means of computer-aided instruction and the teacher oriented instruction. This implies that students learn better and even faster using computer-aided instruction as compared to the teacher oriented instruction and the significant difference could be associated with the enthusiasm or interest developed by the students with the use of computer technology in performing a given task. Again he stated out that, there exist a significant difference in the mean achievement of male and female students using C.A.I and the teacher oriented method in learning mathematics.

Hansen and Schwartz (2001) in their study which took a critical look at the analysis on other research work carried out within a decade and they revealed that, males and females have different classroom experiences because they approach learning differently and because teachers also tend to treat them differently. Datal, Haworth, Davis, Fowler and Randolph (1992). They confirmed that students using the CAI software became involved in the mechanics of learning how to use the software and as a result were distracted from the actual task at hand they suggested that, software supported learning experience over a short time frame will not be effective or yield a good result.

Computer-aided instruction is the use of an instructional material presented by the computer. The use of computers to presents drills, practice exercises and tutorial sequences to the student in a dialogue about the substance of the instruction. (McGraw-Hills dictionary of scientific and technical terms). Molenda cited in Ughamadu (1998) that there are

**Corresponding author; Department of science Education, Federal University of Agriculture, Makurdi, Benue State, Nigeria (E-mail: ella4mneuter@yahoo.com)*
***Department of science Education, Federal University of Agriculture, Makurdi, Benue State, Nigeri*

three (3) levels of computer aided instructions which includes; tutoring, practice and dialogue.

a. Tutoring level which is a strategy of a teaching program, it is that part of it which decides on what to do next.
b. Practice level which assumes that a concept, rule or procedure has previously been taught to the learner. The learner is led through a series of examples so as to increase dexterity and fluency in using computer skills.

Dialogue levels which is the highest level which involves sophisticated interaction and the computer. Conventional teacher oriented instruction is otherwise known as the chalk board method of teaching. The teacher conveys the message or information through a chalk board after he must have explained vividly the subject matter while the students listen attentively and hence copy what is written on the chalk board. (Stanley 1992).

2.0 Statement of the Problem

It is clearly observed that computer science as a subject does not reflect in any of the senior secondary school examination syllabus in the country (Nigeria), this challenge may be as a result of teachers low literacy level in computer science to impact knowledge to students and as well prepare them for examination level.

2.1 Purpose of study

The study is design to give answers to the following objectives.

1. To investigate the extent to which the use of CAI affect the performance of students in computer science in senior secondary schools.
2. To compare the academic achievement levels of male and female students using CAI.

3.0 Hypothesis and Methodology

There exist a significant difference in computer science achievement levels of students receiving CAI and those receiving conventional learning method. (Alternative hypothesis, HA). There exist a significant difference between the mean achievement of the male and female students using CAI and the chalkboard method. (Alternative hypothesis, HA)

The research design adopted for this study was pre-test-post-test. Experimental and control design.The population of the study here comprised of two selected secondary schools in Makurdi LGA. Eighty five (85) senior secondary one (ss1) students from two (2) of the selected schools and these schools were the Benue State University Technical college and Aveco model school.

3.1 Sample and sampling technique

Twenty (20) students were randomly selected from the forty three (43) in the electrical shop of part one ss1 at the B.S.U technical college and were used as the experimental group and were taught using C.A.I.

Similarly, twenty (20) students were also randomly selected from the forty two (42) senior secondary one (SSIA) class of the Aveco model School and were used as the control group which were taught using the chalkboard approach. A simple random sampling techniques was used in each case above to arrive at a total at forty (40) senior secondary one students used for the study.

The criteria used for selection includes;

1. schools that teach Physics up to senior secondary
2. Schools that use CAI in teaching her students
3. Schools that use the chalk board method in teaching her students.

Nine schools met the criteria for the chalk board method of teaching at senior secondary school level and only one turn up to use the C. A. I method of teaching her students at the senior secondary school level.

3.2 Instrumentation and validation

The instrument for the study were pre-test and post-test, lesson notes were used for the control group and CAI package was used for the experimental group. The pre-test and post test were given before and after the instructions or lessons respectively and the scores for each test was extracted for the hypothesis testing.The scores for the pre-test were tested using pearson product moment correlation coefficient (PPMCC) and the correlation coefficient is 0.6231 and a second confirmatory test was used to confirm the outcome of the result which was the t-test and hence t-crit (1.65) > t-cal (0.13) which goes in line with the implication of the correlation coefficient (0.645) there by accepting the hypothesis HA.

3.3 Research procedure

The computer-aided instruction students were given a pre-test and the scores were used for correlation and then instructions were given to them via a C.A.I package then a post-test was issued to them, both the post-test and the pre-test were of the same content. Like wise the chalk board learning students were also given a pre-test before instruction and a post-test after the instructions. And the content of both instructions was introduction to word processing using micro soft word and this was carried out within six weeks duration of time.

4.0 Data Analysis and Results

The analysis was carried out using T-test. The two hypothesis were formulated at $p<0.05$ alpha levels.

4.1 Hypothesis 1

There exist a significant difference in Physics achievement level of students receiving CAI and those receiving conventional teacher oriented instruction. The result is presented in Table1

Table 1: Analysis of Significant Difference between CAI Students and the Chalkboard Method

Learning method	N	D.F	t-cal	t-crit	Decision at P<0.05
CAI	20	38	0.13	1.65	*
Conventional	20				

*= significant at $p<0.05$ alpha level.

The result of the analysis in Table 1 showed that, the calculated t-value of 0.13 is less than the critical t-value of 1.65, the alternative hypothesis which stated that, there exist a significant difference in the Physics achievement level at students receiving CAI and those receiving the conventional chalk board method was accepted.

This implies that there is significant difference between the academic achievements of students taught with C.A.I and those taught with the conventional method.

4.2 Hypothesis II

There exists a significant difference between the mean achievements of male and female students using C.A.I.

Table 2: Analysis of Male and Female Students' Achievement Conventional Method

Learning method	N	D.F	t-cal	t-crit	Decision at P>0.05
CAI	10	18	0.18	1.75	*
Conventional	10				

* = significant at $p<0.05$ alpha level.

The result of the analysis in table 2 showed that the calculated t-value of 0.18 was less than the critical t-value of 1.73. Therefore, the alternative hypothesis which stated that, there exists a significant difference between the mean achievements of male and females students using C.A.I was retained.

This showed that, there is a significant difference between the mean achievement levels of male and female students using C.A.I.

4.3 Discussions

The analysis in Table 1 showed that the students taught with computer-aided instruction performed better than those taught with conventional method. The result was in line with Olusi, (2008), Hansan and Schwartz, (2001), Hativa, (1989), Mcleod, (1988). They found out that, students who learnt or who are exposed to C.A.I learning strategy performed significantly better than those exposed to the conventional method. This feat is been promoted by empowering the learner and making him more self-reliance and significantly elevates the self-confidence of the learner which can not be obtainable by using the conventional method.

From the analysis on Table 2 that there was a significant difference in the academic achievement of male and female students using C.A.I and it also find support from other research work carried out by Olusi, (2008), Hansen and Schartz (2001), they concluded that, male students benefited more or achieve better than their female counterpart been taught with the computer-aided instruction (C.A.I).

5.0 Conclusions

In view of the findings of this research, the following conclusions were made; Computer-aided instruction (CAI) generally has significant influence on students achievement in Physics at the senior

secondary school level. Computer aided instruction (CAI) significantly influence students understanding of Physics at the senior secondary school level. Male students seemed to have benefited more than the female students with the use of CAI in the teaching and learning of Physics.

Government should make available computers to her secondary schools so as to master-mind this feat or extricate this inadequate availability of computers in her secondary schools. Schools that can not afford the desired computers in equal ratio to her students should at least embark on projected instructional method of teaching and learning. A national curriculum with a fully integrated information technology components should be established by the government. This should include, information and communication technology (I.C.T), multimedia computer facilities and integrated learning system.

References

[1] E Amanze. Welcome to computer Science and Basic Programming Language, Enugu: Acena Publishers, 1991, 9-13

[2] NP Dala, PT Henry, WJ Fowler. Educational software journal of Education Technology system, 20, 1972, 169-178

[3] SO Emaikwu. Fundamentals of Educational Research methods and Statistics. (Revised Edition). Kaduna: Deray prints Ltd, 2008.

[4] GB Gary. Computer literacy (Awareness, Applications and Programming), California: Andisen-Wesley Publishing company, 1986..

[5] TE Hall, JY Arne, OS Larson. Education and Treatment of Children. New York: Harper and Row Publishers, 2000.

[6] http://en.m.wikipedia.org/wiki/educational-software.

[7] http:// teachnet. Edb:utexas.edu-lynda-abbett/Research methods. html.

[8] M Marois. Man and computer. New York: Oxford American Publishing Company, 1974.

[9] FI Olusi. Using computers to solve mathematics by Junior Secondary schools Students. Alabama: Project Innovation Publishers, 2008.