

EFFECTS OF COMPUTER BASE INSTRUCTION ON SS 11 GEOGRAPHY STUDENT ACHIEVEMENT IN BORNO AND YOBE STATE

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Abstract

Innovation has led to the use of computers to aid human efforts today where an intense campaign for the introduction of Information Communication Technology (ICT) is spreading around the globe. It ensures transactional instructional communication where the teacher manages the human materials, time and space to make sure that instructional conditions help in drawing student's attention to Computer usage has always influenced educational practices because of technological innovations. The objective of this study is to determine the Effectiveness of Computer Based Instruction on Academic Performance of SS II Geography Students, Quasi-experimental design was used and intact classes were also selected in this study. One Computer treatment (base instruction techniques) was used to teach the experimental group while lecture method (control) was used to teach the control group. The study revealed that, the students taught with Computer Based Teaching Strategy performed significantly better than those taught using the lecture method only. The study recommends that, the school managements should embark on the training of teachers on computer management skills and ICT compliance to carry out effective computer instruction. Government should also make computer base instructional material available such as slide projector, overhead projector, laptops, to aid the teaching and learning process.

Keywords: Academic, Computer, Effect, Instruction and Performance

Introduction

In recent times, there have been intense global campaigns for the introduction of Information and Communication Technology (ICT). It was on the basis of this that Abdulla Al-Hawaj & Twizell, (2008) observed that the use of ICT in the teaching and learning of most school subjects is critical to make learners learn better and teachers to teach well. It ensures transactional instructional communication where the teacher manages the human materials, time and space to make sure that instructional conditions help in drawing student's attention to Computer usage has always influenced educational practices because of technological innovations. Most important jobs in a modern economy today are technologically based. Jonathan, A., Godwin, A. & Justine, A. (2017).

According to new world Encyclopedia (2011), Computer based instruction (CBI) refers to an educational system of instruction performed almost entirely by computer. It involves an

instructional process where computers serve as key components of the educational environment. Computer based teaching strategy is a method that uses computers in a learning media and strengthens student's motivation and educational processes (Muchiri, J.M. 2018). The process allows students to use computer programs to learn at their own pace. Computer based instruction is also known as

Computer Based learning (CBL) or Computer-Based Training (CBT). Similarly, Farooq (1997) asserted that CBI is a device which provides students with interactive involvement with instructional materials. Students are availed some levels of control over what they learn and instruction is directed towards the needs of individual student. However, it is good to be pointed out that teachers as well as student-teachers need to be vast in the application of computer. Computer assisted instruction (CBI) uses a combination of text, graphics, sound and video in the learning process (Bliss et al, 2017). Its application is more in distance learning situation, and the internet has made most modern teachers and learners to develop much interest on it

However, some teachers today use computer to assist them in their academic work to facilitate teaching and learning, especially courses like geography that are deeply rooted in graphs and diagram Yet, there is a wide gap between what is required of the teachers' experience during teaching exercise and their application of computer knowledge to carry-out teaching exercise. Meanwhile, modern teaching devises to assist in teaching today require very much of computer skills.

Godwin (2017) studied the effects of computer assisted instruction on students' achievement in core mathematics the result of analysis indicates that CAI is effective for students in the development mathematical concepts adequately with limited teacher guidance. Similarly, Diane & Brian (2019) in an article, "Effects of Computer- Assisted Instruction on the Mathematics Performance of Students with Learning Disabilities: A Synthesis of Research". Its overall results indicate that well designed CAI with effective instructional variables should be considered as a promising intervention to support mathematics instruction for students with LD. In another related study, Suleman (2017) investigated "Effects of Computer-Assisted Instruction on Students' Academic Achievement in Physics at Secondary Level". The results indicated that computer assisted instruction has a significant positive effect on students' academic achievement and retention in physics.

Different methods have been used in the teaching of Geography. Good teaching is a result of the different methods that enable students to learn and at the same time there no single best method of teaching. Such a position supports the idea that if students are to learn effectively, they have to be exposed to different methods of teaching and learning. What is of key importance is that the different methods that students are exposed to have to take cognizance of the students' learning styles. The learning styles of the students to a large extent determine the methods to be used when teaching. As such teaching methods are equally important as they are a scientific way of presenting subject matter which takes into consideration the psychological and physical requirements of the student. The methods to be adopted in the teaching of Geography depend on a number of factors. These include observation method, field work, excursion method, laboratory method, demonstration method, lecture method, project method, descriptive method,

and comparative method (Basha, 2004). The advent of modern technology in education has brought in new methods of teaching. These are learning through technology, computer assisted instruction and E-learning.

One of the commonly used methods in teaching is the lecture method. The lecture method is characterised by the use of an organized verbal presentation of the subject matter which is at times augmented by visual aids and is also characterized by the active participation of the teacher in delivering information. It has been observed that the method is commonly used in colleges and other institutions of higher learning. Basha (2004) notes that the lecture method is characterized by a number of weaknesses which include the following: negligible participation of students; ignores the need to develop students' faculties; it fails to cater for individual needs and differences; fails to promote the participatory approach to learning; does not develop any scientific skills in students; and tends to be authoritarian.

Discussion is another method used across disciplines. It goes beyond the stage of giving information as propagated by the lecture method, as it helps students to process information. One major advantage of the discussion method is that it can be used to complement other teaching and learning methods. Discussion sessions differ from lectures in that students are more active than in the lecture method as they are directly involved and that the discussion method promotes personal contact

The advent of new technology in education has put a teacher in the 21st Century in a complex position as he/she is at the crossroads with the past, present and future. On a similar note, Becker H.J (2000) asserts that the computer may be used by teachers for consequential activities such as worksheets and homework, assignments, quizzes and tests. These activities are assigned so that students can practice and demonstrate skills mastered. Becker (2000) further asserts that classroom teaching is sometimes viewed as an activity in which resources for serving individual clients are brought to bear against a population of individual clients to be saved. As noted by Rallis (2000) the computer has been used to replace the chalkboard as what the teacher or student notes down can be projected on the screen. Such notes are then shared by the whole class and can be saved for future use. When using computer, power point can be used in place of slides and uploaded to course web page. Power point can be used by both the teacher and student to give presentations in class and also present assignments. Gibson, Cartledge and Keyes. (2011) conducted a comparative study on the teaching of reading through the computer and traditional method and concluded that computer assisted instruction had advantages over the traditional method of teaching English. The use of computer assisted instruction is also supported by Rani (2007) who investigated the effects of computer assisted instruction on language achievement of children with learning disability. Rani (2007) concluded that computer assisted instruction method was much more superior to the traditional methods.

Statement of the Problem

Modernization has led to the use of computers to aid human efforts today. The use of technological gadgets or devices to either support or supplant human efforts is on alarming rate. Therefore, the application of technology in the classroom to aid the delivery of lessons is often seen as the best method to harness fast learning and retention, hence high achievement among students is enormous. This is why, complain from the general public shows that failure of students in Geography could be attributed to lack of instructional materials to aid the teaching and learning of these social science subjects.

Objectives of the Study

The aim of this research is to determine the effects of computer based instruction on Geography students' academic performance. The specific objectives are to determine:

- I. The attitude of students towards Geography when taught using computer based Strategy;
- II. The effectiveness of computer base Strategy on students' academic achievement in Geography; and
- III. The gender difference on students' attitude towards Geography when taught using Computer base Strategy.

Research Design

The design for this study is quasi-experimental. For this design, there must be two groups (experimental and control), both were tested before and after treatment (Computer Based Instruction). Quasi-experimental design is a situation as 'compromise designs' a suitable description when applied to much educational research where the random selection or random assignment of schools and classrooms is quite impracticable.

The population of the study comprises all the 86 Senior Secondary Schools in Borno and 69 in Yobe States, making 155 Senior Secondary Schools in both States. While the sample of the study of 379 students were categorized into twelve (12) intact classes that is four intact classes from boys' schools, four intact classes from girls' schools and four intact classes from mixed schools. Two research instruments were used in this study. A researcher design Geography Achievement Test (GAT) and a self-developed questionnaire on attitude of students toward Geography. The Geography Achievement Test was used to assess students' academic achievement in Geography while the questionnaire was also used to get information on the attitude of students toward Geography when exposed to Computer Based Instruction. The Geography achievement test was validated by a Geography teacher who has at least twenty years of working experience in senior secondary schools teaching Geography. The instrument was pilot tested to determine the reliability index using Cronbach's Alpha. The item difficulty was also tested for the Geography Achievement Test questions for the purpose of standardization of the instrument.

The researcher with the help of thirty-six (36) research assistants (three from each school) with minimum qualification of NCE in Geography or a Bachelor Degree holder who has undergone Post Graduate Diploma in Education carried out the exercise together. The research assistants were given special training in order to keep to the professional ethics of teaching and also on the specified teaching method each of them used in their respective classes.

The data generated from this study were coded and analyzed. The demographic characteristics of the respondents were presented using charts, frequency counts and simple percentages. Research questions were answered using frequency counts and simple percentages while hypotheses were tested using Independent Sample T-Test, Paired Sample T-Test and One Way Analysis of Variance.

Results And Discussion

Research Question One: Is there mean difference in attitude of students taught Geography using Computer Based Teaching Strategy and those taught using traditional lecture method?

Table 1: Mean difference in attitude of students taught Geography using Computer Based Teaching Strategy and those taught using traditional lecture method

Study Group	N	PRE-TEST		POST-TEST			
		Mean	SD	Mean Diff.	Mean	SD	Mean diff.
Experimental	188	46.05	14.55	3.80	71.48	12.01	23.11
Control	191	42.25	15.56		48.37	17.35	

Table 1 outlines the mean difference in the attitudes of students taught Geography using ComputerBased Teaching Strategy and those instructed through the traditional lecture method. In the Experimental group, the pre-test mean attitude score was 46.05, increasing significantly to 71.48 in the post-test. Conversely, the Control group exhibited a pre-test mean attitude score of 42.25, slightly rising to 48.37 in the post-test. The mean difference of 3.80 in the pre-test suggest that, students’ attitude before the treatment is being applied were almost similar. The mean difference in the post test was 23.11 in the favour of the experimental group. This results suggest that, Computer-Based Teaching showed potentially more substantial positive impact on students' attitudes toward Geography compared to the traditional lecture method.

Research Question Two: Is there mean difference in academic performance of students taught Geography using Computer Based Teaching Strategy and those taught using traditional lecture method?

Table 2: Mean difference in students’ academic performance between those taught Geography using Computer Based Teaching Strategy and those taught using traditional lecture method

Study Group	N	PRE-TEST		POST-TEST			
		Mean	SD	Mean Diff.	Mean	SD	Mean diff.

Experimental	188	48.43	12.89	1.98	71.59	11.67	22.29
Control	191	50.41	11.94		49.30	13.94	

Table 2 presents the mean difference in students' academic performance between those taught Geography using Computer-Based Teaching Strategy and those taught using the traditional lecture method in both pre-test and post-test. For the Experimental group, the pre-test mean academic performance score is 48.43, with a standard deviation (SD) of 12.89. Following the intervention, the post-test mean increases to 71.59 while the control group had a mean performance of 50.41 in the pre-test and 49.30 in the post test. The mean difference of 1.98 in the pre-test shows that, there the difference is insignificant while the mean difference in the post test was 22.29 which indicated that, Geography using Computer-Based Teaching Strategy had positive impact on students' academic performance.

Research Question Three: Is there mean difference in academic performance of students taught Geography using Computer Based Teaching Strategy by gender?

Table 3: Gender difference in students' academic performance between when taught Geography using Computer Based Teaching Strategy

Study Group	N	PRE-TEST			POST-TEST		
		Mean	SD	Mean Diff.	Mean	SD	Mean diff.
Male	103	49.21	12.66	0.39	61.96	15.75	3.07
Female	85	49.63	12.27		58.89	18.02	

Table 3 presents an analysis of gender differences in students' academic performance in Geography when taught using the Computer-Based Teaching Strategy. In the pre-test phase, both male and female students displayed similar mean scores, with males at 49.21 and females at 49.63. In the posttest phase, male students' mean score was 61.96 while female students' mean score was 58.89. The mean difference in the pre-test and the post-test are 0.39 and 3.07 respectively which shows that, male and female students had similar means in both pre-test and the post-test when taught Geography using Computer-Based Teaching Strategy.

Hypothesis One: There is no significant difference in students' attitude toward Geography when taught using Computer Based Teaching Strategy and those taught using lecture method.

Table 4: Independent sample t-test of the pre-test and post-test of students’ attitude between those taught Geography using Computer Based Teaching Strategy and those taught using lecture method only

Pre-Test						
Study Group	N	Mean	SD	T	Df	p-value
Control	191	42.25	15.56	-2.456	377	0.150
Experimental	188	46.05	14.55			
Post Test						
Control	191	48.37	17.35	-15.054	377	0.000
Experimental	188	71.48	12.01			

Table 4 presents the results of an independent sample t-test conducted to compare the pre-test and post-test academic performance of students taught Geography using Computer Based Teaching Strategy and those taught using the lecture method only. In the pre-test phase, the control group (N=191) had a mean score of 42.25 with a standard deviation (SD) of 15.56, while the experimental group (N=188) had a mean score of 46.05 with an SD of 14.55. The t-test yielded a non-significant result ($t = -2.456$, $df = 377$, $p - \text{value} = 0.150$), indicating no significant difference in the pre-test scores between the two groups. However, in the post-test phase, the control group (N=191) had a mean score of 48.37 with a SD of 17.35, while the experimental group (N=188) had a considerably higher mean score of 71.48 with an SD of 12.01. The t-test for the post-test scores revealed a highly significant difference ($t = -15.054$, $df = 377$, $p - \text{value} = 0.000$), suggesting that students taught with Computer Based Teaching Strategy performed significantly better than those taught using the lecture method

Hypothesis Two: There is no significant difference in ‘students’ academic performance’ between those taught Geography using Computer Based Teaching Strategy and those taught using lecture method only.

Table 5: Independent sample t-test of the pre-test and post-test of students’ academic performance between those taught Geography using Computer Based Teaching Strategy and those taught using lecture method only

Pre-Test						
Study Group	N	Mean	SD	T	Df	p-value
Control	191	50.41	11.94	1.55	377	0.121

Experimental	188	48.43	12.89			
Post-Test						
Control	191	49.30	13.94			
				-16.87	377	0.000
Experimental	188	71.59	11.67			

Table 5 displays the outcomes of an independent sample t-test comparing the pre-test and post-test academic performance of students instructed in Geography using Computer Based Teaching Strategy versus the lecture method. In the pre-test phase, the control group (N=191) had a mean score of 50.41 with a standard deviation (SD) of 11.94, while the experimental group (N=188) had a mean score of 48.43 with an SD of 12.89. The t-test indicated a non-significant difference ($t = 1.55$, $df = 377$, $p - value = 0.121$) between the pre-test scores of the two groups. However, in the post-test phase, the control group (N=191) had a mean score of 49.30 with an SD of 13.94, and the experimental group (N=188) revealed a significantly higher mean score of 71.59 with an SD of 11.67. The t-test for posttest scores revealed a highly significant difference ($t = -16.87$, $df = 377$, $p - value = 0.000$), indicating that students taught with Computer Based Teaching Strategy achieved significantly better outcomes compared to those taught using the traditional lecture method only.

Hypothesis Three: There is no significant gender difference in ‘students’ academic performance’ between those taught Geography using Computer Based Teaching Strategy and those taught using lecture method only.

Table 6: Independent sample t-test on gender difference of the pre-test and post-test of students’ academic performance of students taught Geography using Computer Based Teaching Strategy

Study Group	N	Mean	SD	T	Df	p-value
Male	103	49.21	12.66			
				-0.329	186	0.742
Female	85	49.63	12.68			
Male	103	61.96	15.75			
				1.760	186	0.079
Female	85	58.89	18.12			

Table 6 displays the outcomes of analysis of independent sample t-test examining gender differences in the pre-test and post-test academic performance of students taught Geography using the Computer Based Teaching Strategy. In the pre-test phase, male students had a mean score of 49.21 (SD=12.66), and female students had a mean score of 49.63 (SD=12.68). The t-test revealed a non-significant difference ($t = -0.329$, $df = 186$, $p - value = 0.742$) between male and female students in their pre-test scores. In the post-test phase, male students achieved a mean score of 61.96 (SD=15.75), while female students had a mean score of 58.89 (SD=18.12).

The t-test for post-test scores showed no significant difference ($t = 1.760$, $df = 186$, $p - \text{value} = 0.079$) between male and female students.

Conclusion

The importance of computer base instruction in our education system is enormous because it not only aid teaching and learning process, but it also serves as the modern and effective method of teaching. This study sought to determine the effects of computer base instruction in secondary school in geography students. Quasi-experimental design was used and intact classes were also selected in this study. One treatment (Computer base instruction techniques) was used to teach the experimental group while lecture method (control) was used to teach the control group. The study found among others that, the students taught with Computer Based Teaching Strategy performed significantly better than those taught using the lecture method only.

Recommendations

- The school managements should embark on the training of teachers on computer management skills and ICT compliance to carry out effective computer instruction.
- Government should make computer base instructional material available such as slide projector, overhead projector and laptops, to aid the teaching and learning process.
- Government should also construct a provision where the computers base instructional material will be effectively used, such as network connection of computer cables and projectors throughout the classes and halls.
- Computers should be made available and accessible for the students for them to explore.

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