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EFFECT OF COMPUTER ASSISTED INSTRUCTION ON STUDENTS' ACADEMIC ACHIEVEMENT AND INTEREST IN GEOGRAPHY IN SELECTED PUBLIC SECONDARY SCHOOLS IN ANAMBRA STATE

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ABSTRACT

The study was carried out to investigate the effect of computer assisted instruction on students' academic achievement and interest in geography in selected public secondary schools in Anambra State. Two research questions were raised for the study while two hypotheses were tested at 0.05 level of significance. Quasi experimental design was adopted for the study. The population of the study consisted of all the 8,656 Senior Secondary One (SS1) students in the 193 co-educational secondary schools in Anambra State. The sample for the study comprised 579 SSI students drawn from the population from three educational zones in Anambra State using simple random sampling technique. Two instruments used for data collection in this study were Geography Achievement Test (GAT) and Geography Interest Scale (GIS) constructed by the researcher. The instruments for data collection were validated by three experts. The reliability of the GAT (.76) and GIS (.82) was ascertained using Kuder Richardson reliability measure while GIS scale was established using Cronbach's alpha reliability coefficient. Data collected from the pretest and post test were analyzed using mean and standard deviation. In order to compare the performance (mean scores) of the experimental groups (those taught with CAI) and control groups (those taught with conventional method), analysis of covariance (ANCOVA) was used to test the significance of the differences at 0.05 alpha levels. Among other things, the findings of the study revealed that CAI improved students' geography achievement and interest more than the lecture method. Based on the findings of the study, it was recommended among other things that teachers who are experiencing abysmal failures of their students' performance in geography and other subjects should in collaboration of their management authorities experiment the effectiveness of CAI rather than sticking with the conventional methods.

Keywords: Effect, Computer Assisted Instruction, Students' Academic Achievement, Interest in Geography and Public Secondary Schools.

Introduction

Secondary education is the second level of education in Nigerian educational system. Secondary education in Nigeria aims to provide a well-rounded education that prepares students for further studies and/or fit in the world of works. The secondary school system in Nigeria is also designed to prepare students for both internal and external examination such as Senior Secondary Certificate Examination (SSCE), National (NECO), Joint Admission and Matriculation Board (JAMB) among others. All of these are compulsory examinations for further studies in the tertiary education level. Secondary schools in Nigeria are either public or private depending on the funding and management. It is public when it is funded and managed by the government in terms of provision of material and non-material resource. In this regard, the government procures essential school materials aside the erection of the structures, recruit the teachers, appoint the management personnel, and admit the students and so on. This is why the public school is often referred to as the government schools. Unlike its private school counterparts who are solely funded and managed by the private individuals, cooperate bodies and/or religious organisations.

Geography being one of the subjects offered in the secondary schools simply means the study of places and the relationships between people and their environments. It involves the description, distribution, and interaction of the diverse physical, biological, and cultural features of the Earth's surface. The term geography literally means earth's description or the science that deals with the distribution and arrangement of all elements of the earth's surface especially the earth's three aspects: the lithosphere, hydrosphere and atmosphere (Iwena in Shamle, Umar, Dakam and Tsebe, 2022). Geography could thus be said to be a social science discipline that fosters holistic knowledge about the world (Onuoha and Eze as cited in Ezeudu and Gbendu, 2020). Onuoha et. al. further revealed that the subject matter of geography focuses on the earth's surface and the processes or activities that shape it.

Geography seeks to explain the relationships between humans and the environment and promotes sustainable development through resource management and sustainability (Backman and Loof, 2015). For Kumar (2017), geography teaches one about their country with its natural advantages, resources, and beauty; its greatness and possibilities, and also its limitations, which enables one individually or as a nation to make better adjustments to their physical environment. The importance of studying geography cannot be over emphasised. According to Ng'eno (2015), it is important to study geography because it impacts the development of cultures and civilization and helps put current events in context. As such, not only does geography put current events in perspective, it helps one to understand history. According to Olusegun (2014), geography allows one to understand the place where one lives. Butt (2017) posited that people settle in specific places because of the landscape, and even, cities are almost always built on a river or other reliable water supply. The teaching of geography has been hampered by numerous challenges over the years. One of the foremost challenges is that of the teaching method (Nge'no, 2015). The peculiarity

surrounding geography is such that students have to be carried along in such a way that they fall in love not just with the subject but more importantly with the way it is being taught. The peculiarity of geography as a subject is such that it can be boring when its' numerous data, facts and figures are presented to the students in a traditional lecture set-up.

The researcher's observation as a geography teacher in Anambra State is that geography students often regard the subject as a subsidiary compared to other subjects like Mathematics, English, Physics, Chemistry and Biology. This creates a situation whereby geography lessons are never taken seriously by students who believe that the subject is not essential to the current job market. This is coming at a time when students' academic achievement in geography has not been satisfactory. It is disheartening that, Nigerian students performed poorly in geography concepts in Senior Secondary School Certificate Examinations (SSSCE) conducted by West African Examinations Council (WAEC) in recent years in various states of the federation, Anambra Inclusive (Ezeudu and Gbendu, 2020). Ezeudu and Gbendu (2020) attributed this failure trend to the dominant use of conventional teaching methods such as lecture method which possibly made the students irrespective of gender struggle with the retention of the contents they are exposed to in geography.

Quite understandably, there are certain topics in geography that seem abstract such as: the earth's spherical shape, latitude, and longitude, global land and water distribution, world continents, locations of places on the globe, rotation and revolution of the earth among others (Nge'no, 2015). To this end, the efficiency of teaching-learning process in geography is expected to have very close relationship with not just the students' learning style but most importantly, the teacher's teaching style (Suleman, Hussain, Ud-Din, and Iqbal (2017). This echoes the thoughts of Yahaya, Dutsinma, Suleiman and Ahmed (2021) who in their study revealed that one of the prominent issues in the teaching of geography is that geography teachers use any simple or suitable technique, ignoring students' need and requirement especially as it concerns the content of the lesson. Consequentially, many students are not carried along or are left behind resulting to students' poor performance in geography. It is in view of the above that the researcher deemed it necessary to search for an appropriate approach that is student-centred and that could enhance students' retention and achievement in geography. It is of interest to the researcher to see how the utilization of Computer Assisted Instruction (CAI) could help solve this lingering problem. One of the most important challenges in educational process is to make teaching learning process more interesting, exciting and beautiful and this seems to be possible with the help of advancements in educational technology such as the computers (Balasubramanian, 2017).

According to Bewley (2019), there are several types of computers used in education, including supercomputers, mainframe computers, minicomputers, and personal computers (PCs) or microcomputers. Personal computers (PCs) or microcomputers are the most commonly used type of computer in education and are

used for a variety of purposes, including word processing, internet research, multimedia presentations, and educational software (Bewley, 2019). PCs can be connected to a network, which allows students and teachers to share resources and communicate with each other. They are also useful for teachers who need to take their work home with them. Tablet computers on the other hand are similar to laptops, but they are smaller and more portable. They are often used in classrooms for interactive learning activities and educational games. On the other hand, smartphones are small, handheld devices that can be used for a variety of purposes, including internet research, communication, and educational apps. They are often used in education for health and fitness tracking, as well as for augmented reality and virtual reality applications.

Computer Managed Instruction according to Bhalla (2013), CMI is an instructional strategy whereby the computer is used to provide learning objectives, learning resources, record keeping, progress tracking, assessment of learner performance, prescribe and control individualized lessons. The student does not necessarily interact with the computer system. The learner may be in-line to take tests. In addition, the computer can diagnose the learning needs of students and prescribe optional sequences of instruction for them. According to Aribasala (2016), this mode of instruction employs use of computer in management of adjunct functions/instruction-related tasks such as material generation, lesson plan preparation, schedule preparation, attendance monitoring, student's performance assessment, individualized education plans preparation, student reinforcement, and communication.

In the light of this study, CAI refers to virtually any sort of computer application in instructional settings comprising of drill and practice, simulations, instructional exercises, supplementary exercises, instructional management, database development, programming, composing using word processors, and other different applications. According to Yildiz and Aktas (2015), CAI is an instruction al technique where computer technologies and self-learning principles are combined. This technique uses a blend of graphs, texts, sounds and videos for instruction al delivery.

To this end, it changes the role of the teacher from teaching capacity to that of a guide; captures students' enthusiasm towards learning, remove fright and embarrassment on students and bring about meaningful learning (Danjuma, 2015). According to Yildiz and Aktas (2015), CAI provides the learning environment where the level of the students' prior knowledge is known, real life events are discussed, students are both mentally and physically made ready and cognitive change is provided which provides opportunities to students to consolidate the recently-learned notions. According to Suleman, Hussain, Ud-Din, and Iqbal (2017), CAI provides flexibility to learners which are sometimes denied by the traditional process and method. CAI achieves this, by directing the learners' attention to different sections in a learning sequence without the direct assistance of the teacher. As such, it can encourage the advancement of students' decision-making and critical thinking aptitudes,

data processing skills and communication abilities. In the light of the foregoing, CAI could be of great assistance as it comprises of drill-and-practice, tutorial, or simulation activities.

Academic achievement of students has been of great concern to stakeholders in education system. In the light of this study, academic achievement is the educational objective attained by a student at the end of a learning process based on the assessment of the teacher through tests and examinations. According to Brown (2017) academic achievement is the extent to which a student teacher or institution has achieved their short or long term educational goals. Roberts (2017) sees academic achievement as that which is used to measure the performance of students in terms of ascertaining their level of expertise in what they have been taught. Students' academic achievement especially in geography could be gender biased.

Interest is an important variable in learning because when one becomes interested in an activity, one is more likely to be more deeply involved in the activity and thus achieve more (Okeke, 2018). Interest and achievement go hand in hand as factors that promote effective learning. Rowey (2019) posited that interest is subjective feeling of concentration and curiosity over something. Interest in this study portends eagerness to learn a set out task/activity for positive and near mastery of knowledge and skills related to the activity which was measured in this study using civic interest scale. It is very important for classroom teachers to adopt instructional techniques that could promote learner's interest and academic achievement in geography curriculum delivery. In the light of the foregoing, it is the interest of the researcher to ascertain the effect of Computer Assisted Instruction on students' academic achievement and interest in geography in selected public schools in Anambra state.

Statement of the Problem

Geography is about the study of earth and its allies thus seemingly abstract sequel to this students' exhibit poor interest and academic achievement. In ascertaining the reasons behind this scenario, fingers were pointed at the over- of the conventional lecture method and the difficult concepts that are obtainable in Geography. In Anambra State, the researcher further observed students' struggle with keeping themselves motivated especially when exposed to certain abstract concepts that are immanent in geography as a subject. Consequently, this study explored the efficacy of increasing students' academic achievement through computer assisted instruction approach. There are also existing gaps in the literature regarding differences in the effectiveness of the use of CAI for instructional delivery across various school subjects and genders. In a bid to fill these gaps, the researcher intends to ascertain the effect of computer assisted instruction on students' academic achievement and interest in geography in selected public schools in Anambra State.

Purpose of the Study

The purpose of this study was to determine the effect of computer assisted instruction on students' academic achievement and interest in geography in selected public secondary schools in Anambra State. Specifically, the study is to determine:

1. Pre-test and post-test mean achievement scores of students taught geography with Computer Assisted Instruction (CAI) and those taught with Lecture Method (LM) in selected public secondary schools in Anambra State.

2. Pre-test and post-test mean interest scores of students taught geography with Computer Assisted Instruction (CAI) and those taught with Lecture Method (LM) in selected public secondary schools in Anambra State.

Research Questions

The following research questions guided the study:

1. what is the pre-test and post-test mean achievement scores of students taught geography with Computer Assisted Instruction (CAI) and those taught with Lecture Method (LM)) in selected public secondary schools in Anambra State?

2. what is the pre-test and post-test mean interest scores of students taught geography with Computer Assisted Instruction (CAI) and those taught with Lecture Method (LM) in selected public secondary schools in Anambra State?

Research Method

Quasi experimental design was adopted for the study. The population of the study consisted of all the 8,656 Senior Secondary One (SS1) students in the 193 co-educational secondary schools in Anambra State. Using simple random sampling technique, 193 SS1 students from three selected education zones in Anambra State totally 579.Two instruments used for data collection in this study were Geography Achievement Test (GAT) and Geography Interest Scale (GIS) constructed by the researcher. The instruments for data collection were validated by three experts. The reliability of the GAT (.76) and GIS (.82) was ascertained using Kuder Richardson reliability measure while GIS scale was established using Cronbach's alpha reliability coefficient. Data collected from the pretest and post test were analyzed using mean and standard deviation. In order to compare the performance (mean scores) of the experimental groups (those taught with CAI) and control groups (those taught with conventional method), analysis of covariance (ANCOVA) was used to test the significance of the differences at 0.05 alpha levels. The researcher and the six research assistants administered the GAT to all the students in experimental group and those in the control group two days before the teaching commences in order to ascertain the homogeneity. The allocated time for the test was 120 minutes in the three periods per week (i.e. 40 minutes per period). The treatment stage involved exposing the experimental group to the treatment using the Computer Assisted Instruction (CAI) to learn the concepts chosen for the study. As already detailed in the lesson plan, the study was conducted in the school classroom during normal class learning duration. The students were divided into experimental group and control groups depending on the schools selected for each. The teacher brought in the CAI apparatus and used it for geography

instructional delivery. Thus, the normal Geography class-periods of instructions were used for the study. The lesson plans for the control and experimental groups (developed by the researcher) was used to teach both groups. The lesson plans are similar in terms of content coverage, behavioral objectives and evaluation questions though they differ in terms of classroom activities. The teachers and the students are computer literate so they easily handled and utilized the system without much difficulty (this was also a factor in the selection of the sampled schools). During the same period, the control group was taught the same concepts but through the conventional methods. This stage lasted for four weeks.

The post-treatment stage involved re-arranging and re-administering the GAT on the students after four weeks of treatment which is known as post-test. As such, the post test was used to evaluate the effect of the treatment on students' achievement in the course of study. After six weeks exercise (that is, 4 weeks of treatment and 2 weeks of procedural wait after such treatment), the post test was administered to the students in experimental and control groups in which the items were reshuffled to conclude the research. Three days revision was allowed to enable the students prepare for the test. After administration of the test, the scripts were collected, marked, scored, and collated for data analysis. All the necessary measures was taken to keep secret from the students that they are under experiment and the group to which they belong as well as no sharing of information occurred from one group to another. Geography Interest Scale (GIS) was also be administered to both groups, so as to elicit the students' interest at the end.

Presentation of Results

Research Question 1: What Is the Pre-Test And Post-Test Mean Achievement Scores of Students Taught Geography with Computer Assisted Instruction (CAI) and those Taught with Lecture Method (LM) in Selected Public Secondary Schools In Anambra State?

Table 1: Pre-Test And Post-Test Mean Achievement Scores of Students Taught Geography with Computer Assisted Instruction (CAI) and those taught with Lecture Method (LM)

Source of Variance	N	Pre-test Mean	SD	Post-test Mean	SD	Mean Difference	Remark
Experimental Group	92	48.76	9.44	60.43	9.69	11.67	Effective
Control Group	101	48.49	9.13	48.68	7.55	0.19	Not Effective

Data in Table 1 reveals that the pre-test mean achievement scores of students taught geography with CAI (experimental group) as 48.76 while pre-test mean achievement scores of those taught with Lecture Method (control group) was 48.49. At the end of the experiment, the post-test mean achievement scores of students taught geography with CAI (experimental group) increased to 60.43 whereas that of those taught with Lecture Method (LM)

was 48.68. This is indicative that the experimental group gained 11.67 post-test mean on achievement of geography whereas the control group gained only 0.19 post-test mean on achievement of geography. This shows that CAI which was used for the experimental group accounted for better achievement than the Lecture Method (LM) which was used in the control group. The CAI could therefore be said to be more effective than the LM in geography achievement of SS I students.

Research Question 2: What is the Pre-Test And Post-Test Mean Interest Scores of students taught Geography with Computer Assisted Instruction (CAI) and those taught With Lecture Method (LM) In Selected Public Secondary Schools In Anambra State?

Table 2: Pre-Test And Post-Test Mean Interest Scores of students taught Geography with Computer Assisted Instruction (CAI) and those taught With Lecture Method (LM)

Source of Variance	N	Pre-test Mean	SD	Post-test Mean	SD	Mean Difference	Remark
Experimental Group	92	56.88	11.0	68.40	9.85	11.52	Effective
Control Group	101	55.97	8.71	56.06	8.54	0.09	Not Effective

Data in Table 2 reveals that the pre-test mean interest scores of students taught geography with CAI (experimental group) as 56.88 while pre-test mean interest scores of those taught with Lecture Method (control group) was 55.97. At the end of the experiment, the post-test mean interest scores of students taught geography with CAI (experimental group) increased to 68.40 whereas that of those taught with Lecture Method (LM) was 56.06. This finding is indicative that the experimental group gained 11.52 post-test mean interest on geography whereas the control group gained only 0.09 post-test mean interest on geography. This shows that CAI which was used for the experimental group accounted for the difference in geography interest than the LM which was used in the control group.

Hypothesis 1: There is no Significant Difference between the Mean Achievement Scores of Students taught Geography with Computer Assisted Instruction (CAI) and those taught With Lecture Method (LM) in Selected Public Secondary Schools in Anambra State.

Table 3: ANCOVA on Mean Achievement Scores of Students taught Geography with Computer Assisted Instruction (CAI) and those taught With Lecture Method (LM).

Source	Type I Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	6154.251[a]	1	6154.251	79.434	.000
Intercept	573639.813	1	573639.813	7404.087	.000
Instruction Technique	6154.251	1	6154.251	79.434	.012
Error	14797.935	191	77.476		
Total	594592.000	193			
Corrected Total	20952.187	192			

a. R Squared = .494 (Adjusted R Squared = .490)

The ANCOVA analysis in Table 3 reveals that the mean achievement scores of students taught geography with CAI and those taught with LM were ascertained at F (1, 193) = 79.4, $p < .05$. The p-value ($p \leq .012$) is less than 0.05 and adjusted R^2 indicated that the observed difference contributed .490 (49%) understanding of the effects of instruction technique on geography achievement. As a consequence of this, the null hypothesis I was rejected. This implies that instruction technique affected students' achievement in geography since there is a significant difference between the mean achievement scores of students taught geography with CAI and those taught with LM.

Hypothesis 2: There is No Significant Difference between the Mean Interest Scores of Students taught Geography with Computer Assisted Instruction (CAI) and those taught with Lecture Method (LM) in Selected Public Secondary Schools in Anambra State.

Table 4: ANCOVA on Mean Interest Scores of Students taught Geography with CAI (CAI) and those taught with Lecture Method (LM).

Source	Type I Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	7322.847[a]	1	7322.847	86.633	.000
Intercept	740652.518	1	740652.518	8762.331	.000
Instruction Technique	7322.847	1	7322.847	86.633	.003
Error	16144.634	191	84.527		
Total	764120.000	193			
Corrected Total	23467.482	192			

a. R Squared = .412 (Adjusted R Squared = .408)

Data analysis in Table 4 reveals that the mean interest scores of students taught geography with CAI and those taught with Lecture method (LM) were ascertained at F(1, 193) = 86.6, $p < .05$. The p-value ($p \leq .003$) is less than 0.05 and adjusted R^2 indicated that the observed difference contributed .408 (40.8%) understanding of the effects of instruction technique on geography interest. Thus, null hypothesis II was rejected. This implies that instruction technique affected

students' interest in geography since there is a significant difference between the mean interest scores of students taught geography with CAI and those taught with LM.

Discussion of Findings

The result of research question one as presented in Table 1 showed that there is a mean difference on the achievement scores of students taught geography with CAI and those taught with Lecture Method (LM). From the result, the experimental group (CAI) had a mean gain of 11.67 while the control group had a mean gain of 0.19. This gives mean difference of 11.48 in favour of the experimental group which further indicates that greater effectiveness was achieved with CAI than the conventional lecture method. Comparing the result of research question one with hypothesis one, hypothesis one is rejected since the experimental group taught geography with CAI achieved better than the control group taught geography with LM as evidenced in the mean difference. This means that teaching geography with CAI is better than teaching it with Lecture Method. The finding of the study is supported by the findings of Suleman, Hussain, Ud-Din and Iqbal (2017) who revealed that Computer-Assisted Instruction (CAI) has a significant positive effect on students' academic achievement and retention in Physics as it was found more useful in different level of cognitive domain as the students of experimental group were found more interested, excited, satisfied and participated as compared to the students of control group who were found exhausted and bored.

The result of research question two as presented in Table 2 showed that there is a mean difference on the interest scores of students taught geography with CAI and those taught with Lecture Method (LM). From the result, the experimental group (CAI) had a mean gain of 11.52 while the control group had a mean gain of 0.09. This gives mean difference of 11.43 in favour of the experimental group which further indicates that greater effectiveness was achieved with CAI than the conventional method. Comparing the result of research question two with hypothesis two, hypothesis two is rejected since the experimental group taught geography with CAI had higher interest than the control group taught geography with LM as evidenced in the mean difference. This means that students' interest in geography is higher when taught with CAI than Lecture Method. This finding is supported by Suleman, Hussain, Ud-Din and Iqbal (2017) who revealed that Computer-Assisted Instruction (CAI) has a significant positive effect on students' retention in Physics. As such, CAI was found more useful in different level of cognitive domain as the students of experimental group were found more interested, excited, satisfied and participated as compared to the students of control group who were found exhausted and bored.

Conclusion

Instruction approach employed in instructional delivery has been adjudged as a critical component of curriculum delivery in education because it could affect both students' interest and academic achievement in a particular subject amidst other factors.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. CAI should be adopted in problematic subjects in secondary schools in Anambra State in order to improve students' interest and academic achievement in the subjects.
2. Teachers who are experiencing abysmal failures of their students' performance in certain subjects should in collaboration of their management authorities experiment the effectiveness of other instruction technique such as CAI rather than sticking with the conventional methods.

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