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# EFFECTS OF COMPUTER ASSISTED INSTRUCTION ON LEARNING OUTCOME IN SCIENCE SUBJECTS AMONG SECONDARY SCHOOL STUDENTS IN KOGI STATE, NIGERIA

**BY**

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**Abstract**

*This study investigated the effects of Computer Assisted Instruction (CAI) on learning outcome in science subjects (Chemistry & Physics) among secondary school students in Kogi state. Quasi-experimental, pre-test, posttest, non-randomized control group design was adopted for the study. One research question and corresponding hypothesis guided the study. The population of the study consists of 2,228 senior secondary two (SS2) students and an intact class size of 241 participants were purposively used for the study. Computer Assisted Instruction in both subjects Chemistry (CAIC) and Physics (CAIP) serves as the treatment while two research instruments Chemistry and Physics Achievement Test (CAT & PAT) were used to collect data for the study. The instruments were validated with a reliability index of 0.83 using the test-retest technique and Kuder-Rickardson formula 20(K-R20). The collected data was analyzed using mean and standard deviation for the research questions and T-test for the research hypotheses at 0.05 level of significance. The result shows significant difference in learning outcomes among the two subjects, with the greatest academic achievement score in physics and chemistry trail behind. It was recommended among others that Computer Assisted Instructions be embedded with Animation to take care of chemistry abstractive nature for a better result.*

*Keywords:* Computer-assisted Instruction, science subjects, learning outcome, animation

## Introduction

In a speedily dynamic and challenging world of today's Information and Communication Technology (ICT), it is imperative for the individuals to be equipped with the needed basic education to locate, access and utilize information where applicable. The world has turned global with ripple effect in all segment of our daily lives and with communication being an integral part of education, the education system is not left out of the net of ICT. Access to learning by all, creation of conducive learning environment, quality of knowledge delivery, expanded secondary and post-secondary education, reduction of expenditure on training among others were the improvement in the education sector that was as a result of ICT (Ogunleye, 2007). Mohammed and Yarinchi (2013) noted that ICT has taken a prominent collaborative position as a tool for various creativities in education. It is equally serving as a catalyst in modifying teaching and learning activities to the advantage of both teachers and learners in the learning environment. There is an urgent need for a paradigm shift from conventional teaching to a practical demonstration such that, when appropriate content matches appropriate strategies, students and teachers will benefit immensely (Alade, 2011).

ICT no doubt has find its space into the educational system of today, classrooms are currently being driven by the wave of ICT and the advent of computer-based learning has necessitated the shift from traditional methods to computerized methods of instruction Computers are today not only used as a means of analyzing data for schools but has been integrated as inescapable tool toward optimizing student's learning (Gambari, Shuaibu & Shittu, 2013). The Integration of ICT in the teaching and learning process has been adopted through the use of computers and other technological gadgets for curriculum content delivery and one of the most protuberant tools of ICT that has been adjourned widely to assist in the delivery of content and learning is the Computer Assisted Instruction. (Ayuba and Timayi, 2018). Observations have revealed that teachers are not mindful of the learning environment precisely the classroom interaction. They embark on teaching without taking into cognizance the strategy that is most appropriate at a particular point in time. Most teachers stick to the traditional chalk and talk method (conventional method of teaching) while few occasionally use the demonstration method. The teachers make themselves the all-in-all and carry out all the classroom activities by themselves only. This seems not to give room for students' contribution to classroom discussion, and makes students to conceal ideas to them. One of the most effective ways to make teaching and learning interesting and effective is taking advantage of instructional technologies, especially the computers (Tareef, 2014). With the use of computers in education, a lot of terms have come into and gone out of use in education. Yusuf (2005) also revealed that educational opportunities are being missed because most teachers do not know how to operate computer nor can

they teach students about the use of computers in the society. Some teachers still do not know how to use computers to promote educational efficiency. New demands for qualitative science teaching and learning have emerged because of the global knowledge exposition, popularity of science discipline and the development of educational technology. Observation of the typical Nigerian classroom situation reveals that teachers often disseminate knowledge and expect students to identify the facts of the knowledge presented. Not that alone, most teachers rely heavily on textbooks and most often, the information the teachers disseminate to students align with the view of the textbooks' writers.

Science is taught in all schools in Nigeria. Science is taught at Senior Secondary School (SSS) level as Biology, Chemistry and Physics. At this level, the teaching is not just concerned with knowledge of the subjects but more particularly with scientific method and the effect of the use of this method on individual student. Therefore, the teaching of sciences at SSS attempts to develop both manipulative and mental activities. The overall objective of science curriculum in SSS include application of students' scientific and technological knowledge and skills to meet social needs as well as take advantage of numerous career opportunities offered by science and technology. In view of this, it shows that there is a relevance of technology to science curriculum. Therefore, the use of ICT in science teaching and learning in classroom may be an expansion in the pedagogical resources available. CAI is simply the type of instruction aided by a computer-controlled display and a response entry device which uses a combination of text, graphics, sound and video to enhance the learning process through interaction, to achieve certain instructional goals and improve educational outcomes. Computer-Aided Instruction (CAI) is a diverse and rapidly expanding spectrum of computer technologies that assist the teaching and learning process. CAI is also known as computer-assisted instruction. Haruna and Toloruleke (2020) see CAI as a self-learning technique, practiced in an off-line or online utilizing the computer as a tool to facilitate and improve instruction. Sharma (2017) understands CAI as an interactive instructional technique whereby a computer is used to present the instructional material and monitor the learning that takes place. The main objective of programmed instruction is to provide individualized instruction for learners which serve as the brain behind the introduction of CAI to fulfill and take care of the special needs of the individual learner, for this objective to be achieved, there is a need for a device that is efficient, flexible, affordable and can store huge amounts of organized information which a computer stands tall in achieving. CAI covers the entire educational system by proving itself in useful tool in teaching various subjects which is in contrast with the teacher-centered method of teaching, where teachers are the key source of information and transmitters of knowledge while students are made to passive information. CAI methods of delivery are classified into drill and

practice, tutorials, simulation, problem solving approaches, educational games, discovery mode and dialogue level. Drill and practice is the commonest used CAI application due to its simplicity. It usually provides different set of questions in varied formats. At each stage, the computer asks questions and seeks responses objectively, using a very repetitive type of procedure (Eyo, 2018).

The potential benefits of Computer Assisted Instruction (CAI) cannot be underestimated in the contemporary world since there are established findings on the instructional value of computers, particularly in advanced countries (Gambari et al., 2013). The computer could be accessed individually or as a group unlike in a conventional classroom where students are lumped together irrespective of their individual differences and class size (Laleye, 2019). The program can adapt to the abilities and preference of the individual student and increase the amount of personalized instruction a student receives. Many students benefit from the immediate responsiveness of computer interactions and appreciate the self-paced and private learning environment. Moreover, computer-learning experiences often engage the interest of students, motivating them to learn and increasing independence and personal responsibility for education. Although it is difficult to assess the effectiveness of any educational system, numerous studies have reported that. CAI is successful in raising examination scores, improving student attitudes, and lowering the amount of time required to master certain material. While study varies greatly, there is substantial evidence that CAI can enhance learning at all educational levels especially in science subjects.

Science is typically taught in schools starting at an early age, and continues through higher education and beyond. Students learn about the fundamental principles of science and how to apply them through experiments, observations, and other hands-on activities. Science education is critical to developing the next generation of scientists, engineers, and innovators who will continue to advance our knowledge and improve the world around us. Science can be seen as the branch of study in which facts are observed, classified and quantitative laws are formulated (Alio, 2004). Science is also known as an organized body of knowledge that ensures the ability to acquire skills. It is a well-known fact today that science has become an integral part of man's life. Science and technology influence major aspects of life including feeding, clothing, shelter, healthcare as well as leisure. It has become such an indispensable tool that no nation wishing to progress in the socio-economic sphere will afford to relegate its learning in schools. The role of science in this modern era of technology is wide and profound. In line with this reasoning, Ogunleye and Fasakin (2011) and Oredein and Awodunni (2013) emphasized the importance of scientific knowledge in boosting national prestige, military might, international rating of a country, they added this cannot be achieved without

effective teaching and learning process. There are several branches or fields of science, each with its own set of topics, theories, and methodologies. Some of the major branches of science include: Physics: The study of matter and energy and their interactions. Physics covers a broad range of topics including mechanics, thermodynamics, electromagnetism, optics, and quantum mechanics. Chemistry: The study of the composition, properties, and behavior of matter. Chemistry covers topics such as atomic and molecular structure, chemical reactions, and the properties of different elements and compounds. Observation shows that science education is receiving an ever-increasing attention all over the world. The search for effectiveness in science teaching has been a focal point of educationally developed countries of the world. As a result of this, science teachers and educational agencies have been concerned with finding the best ways of encouraging the secondary school students to be more interested, motivated and excel in the discipline. Today, the emphasis of the Nigerian government is on the production of scientists that would advance the technological need of the country and this is reiterated by the Federal Government of Nigeria in its National Policy on Education (NPE) (2014).

Chemistry and Physics are the core science subjects in the 6-3-3-4 educational system as recommended in the NPE (2014). They are prerequisite subjects for most science-oriented courses in tertiary institutions. Both Chemistry and Physics have contributed immensely to improving the quality of life in the area of health, teaching, and agriculture among others. Learning outcomes refer to the specific knowledge, skills, and competencies that students are expected to acquire or demonstrate after completing a particular educational program or course. Learning outcomes can be expressed as statements that describe what students should know, be able to do, or understand after engaging in a learning experience. They help to provide a clear understanding of what students should achieve and guide the development of curricula, instructional activities, assessments, and evaluation. Learning outcomes are important in education as they provide a framework for designing and evaluating educational programs, and they help students and instructors to focus their efforts towards achieving specific goals.

**Statement of the Problem**

The call for the usage of ICT in the education sector has gained prominence over the years as ICT is seen to have affected every aspect of individual life turning the world to a global village. The traditional method of teaching science subjects has been widely criticized by several researchers over the years because of its inadequacies of tackling some learners' challenges that inhibits teaching and learning process. In proffering solution to this, CAI was advocated to complement or substitute the traditional method of teaching. Ekundayo (2022) & Haruna and

Tolorunleke (2020) reported that computer assisted instruction have a significant impact over the traditional method of teaching chemistry but there seems none or barely few literatures to the best of the researcher's knowledge that has compared the effects of (CAI) between the two subjects (Chemistry and Physics). It is on these premises; this study compared the effects of CAI on the learning outcomes of secondary school students in both Chemistry and Physics subject to ascertain the level of suitability of CAI on these subjects.

**Objective of the Study**

The main objective of this study is to investigate effects of CAI on secondary schools' students' learning outcome in both Chemistry and Physics subjects. Specifically, this study

1. Investigated if there is significant difference in the mean achievement scores of students taught with Computer Assisted in Chemistry and those taught using Computer Assisted in Physics

**Research Question**

1. What is the difference in the mean achievement scores of students taught Chemistry using CAIC and those taught Physics using CAIP?

**Hypothesis**

$HO_1$: There is no significant difference on effect of CAI on students' learning outcome in both Chemistry and Physics subjects.

**Literature Review**

Ekundayo (2022), investigated the effects of CAI on secondary school students' performance in chemistry. A sample of 240 second year senior secondary school students (SSS II) from three secondary schools, in Ondo State, Nigeria was used. The students' pre-test and post test scores were subjected to analysis of covariance (ANCOVA). The findings of the study showed that the performance of students exposed to CAI either individually or cooperatively were better than that of their counterparts who were exposed to the conventional classroom instruction. Samaila et al., (2016) conducted research on the development of computer aided instruction for effective teaching for use of electrical and electronic devices at the Nigeria Certificate in Education (NCE) technical level in north eastern Nigeria. CAI was tested by using it to teach an experimental group (S1), while control group (S2) was taught using the lecture method. The results of the study revealed that there was variation between the mean scores of students taught about the use of electrical and electronic devices using CAI and students taught using the lecture method. The CAI was found to be effective in teaching use of electrical and electronic devices. In a related development, Laleye (2019) used a quasi-experimental pre-test- posttest design to find out the efficacy of a computer assisted instructional package (CAIP) on students' performance in basic science in Ondo State, Nigeria. Two secondary schools were purposively selected and assigned to experimental groups 1 and 2 in

equal numbers. Students in experimental group 1 were exposed to CAIP individually and experimental group II in cooperative groups. An equivalent school was selected as the control. The results of the analysis revealed that students taught with the developed package performed significantly better than their counterparts taught with the conventional method of instruction.

Eyo (2018) conducted a study that investigated the effects of a computer assisted multimedia instructional (CAMI) package on secondary school students 'achievement in biology in two educational zones of Niger State, Nigeria. The sample comprised of 364 students (206 boys and 158 girls) selected from six senior secondary schools in two educational zones. The samples were divided into an experimental group and a control group. The experimental group was taught using a CAMI package while the control group was taught using lecture method. The findings of the study showed that students in the experimental group achieved significantly better than their counterpart in the control group. Busari, Ernest and Ugwuanyi (2016) carried out research on the effect of CAI on senior secondary students' achievement in chemical reaction and equilibrium in Egbeda local government area of Oyo State, Nigeria. The instrument used in the study was the chemical reaction and equilibrium achievement test (CREAT).The students' scores from CREAT were collected and analyzed using mean and standard deviation to answer the research questions. The results showed a significant difference between the mean achievement of students taught chemical reaction and equilibrium using CAI and those taught using a conventional teaching strategy. Thus, the students taught using CAI performed better than their counterparts. Samuel and Okonkwo (2020) also found out that low academic self-concept in Chemistry is overcome when many difficult concepts are made clearer through appropriate teaching techniques such as CAI. More so, abstract concepts which pose difficulties are easily understood when given e-visual explanations.

**Methodology**

The pretest-posttest nonequivalence and non-randomized quasi-experimental research design was adopted for this study to avoid the disruption of school activities. This enabled the researcher to use intact classes of a total (291) SS2 students from each of the selected schools as the research participants without disrupting the normal academic settings of those schools.. The reason for SS2 students was because they have been exposed to the traditional method of teaching sciences at SS1 class, thus, making it interesting to investigate the adaptability and significance level of the students learning with computer as a tool. The population of the study comprised of the entire 28,387 senior secondary schools' students in Kogi state. Out of which, the sample size of 291 Chemistry students were purposively selected from the government owned senior secondary schools within

the study area. Multistage sampling technique was used to select 2 senior secondary schools that are co-educational with same level of ICT facilities, the two schools selected were randomly assigned into experimental group 1 and experimental group 2 respectively. The experimental group I were taught chemistry using (CAIC) while the experimental group II were taught Physics using (CAIP), both teaching lasted for period of six weeks. An instrument was used to collect the relevant data for this study which was tagged 'Chemistry Achievement Test (CAT)'. The CAT was a 40-item, four optioned multiple choice questions drawn from the topics taught during the treatment. Respondents were asked to choose the most appropriate option for the item. The test instrument consists of 40 multiple choice objective items with five options (A–E) adopted from past examinations of West African Examination Council (WAEC, May/June) and National Examination Council (NECO, June/July) for Chemistry and Physics. Pretest was administered to both groups before the treatment and posttest after the treatment. The research material used for this study was the Computer-Assisted Instruction software which was developed by the researcher with the aid of program developer. The software is titled 'Computer Assisted Instruction in Chemistry and Computer Assisted Instruction in Physics respectively. The software was developed by adapting the Rapid Application Development (RAD) model of James Martins approach of 1980. This software is an interactive and user friendly programme and is composed of CAI tutorials which are presented in one or more windows. The CAIC and CAIP (software) were installed in the computer laboratory of the experimental schools for the students. To test for the hypotheses, the data were analyzed using a two-way Analysis of Variance (ANOVA) using Statistical Package for Social Sciences (SPSS) version 20 at 0.05 alpha level.

**Results**

**Research Question: what is the difference in the mean achievement scores of students taught Chemistry using CAIC and those taught Physics using CAIP?**

**Table 1**

*Adjusted Academic Achievement Mean scores of Experimental group 1 and Experimental group 2.*

| Group | N | Mean | SD | Df | Average Mean |
|---|---|---|---|---|---|
| Experimental 1 | | 28.43 | 6.14 | | |
| | | | | | 26.29 |
| | | | | 4.27 | |
| Experimental 2 | | 24.16 | 3.30 | | |

Table 1 shows that adjusted mean scores of CAIP and CAIC at posttest are 28.43 and 24.16 respectively Table 1 shows also that the standard deviation for CAIP and CAIC are 6.14 and 3.30 respectively and that the difference in the mean is 4.27. It can therefore be inferred that there is a difference in the adjusted mean scores of CAIC and CAIP group with CAIP performing better than the CAIC at posttest. The standard deviation values shows that the deviation from the theme an which are 6.14 and 3.30 are a bit larger showing that the score is heterogeneous

**Hypothesis**

**$HO_1$: There is no significant difference on the effect of CAI on students' learning outcome in both Chemistry and Physics subjects**

**Table 2**

*Result of ANCOVA analysis testing the null hypothesis*

| Source | sum of square | Df | Mean Square | Cal-F | Crit-F | LS | Prob | Decision |
|---|---|---|---|---|---|---|---|---|
| Corrected model | 1012.358 | 2 | 506.179 | | | | | |
| Intercept | 1588.575 | 1 | 1588.575 | | | | | |
| Covariate | 554.198 | 1 | 554.198 | | | | | |
| Methods | 327.771 | 1 | 327.771 | 15.60 | 3.84 | 0.05 | .000 | Reject |
| Error | 3760.235 | 179 | 221.107 | | | | | |
| Total | 104204 | 182 | | | | | | |
| Corrected Total | 4772.593 | 181 | | | | | | |

*. The mean difference is significant at the 0.05 level.

Table 5 shows that F-computed 15.60 is greater than F-critical 3.84, and the level of significance 0.05 is greater than the probability value of 0.00. This result rejects the null hypothesis that There is no significant difference in the mean achievement score of student taught Chemistry using CAIC and those taught Physics using CAIP respectively Students taught using CAIP performed better than those taught using CAIC.

**Discussion**

The results in table 1 and 2 indicated that students taught Physics using CAIP achieved significantly better than their counterpart taught Chemistry using CAIC. This could be as a result of the highly abstractive nature of Chemistry that requires

supplement or deeper explanation whereas physics is chiefly a calculation subjects allowing for more students' participation in the learning processes which enhanced their achievement in the subject. This finding is in line with the findings of Yusuf, (2005) who discovered that CAI enhance students' achievement irrespective of gender. The result of this study is in a sharp contrast with the findings of Samuel & Okonkwo (2020) whose study reveals that students benefited equally when taught Physics and Chemistry usin CAI.

## Conclusion

The findings of this study revealed that students achieved significantly higher when taught Physics with CAIP while students taught Chemistry using CAIC trailed behind, Hence, it was concluded that CAI works suitably with teaching and learning of Physics than Chemistry. Based on the findings of this study, it could be concluded that CAI is good in the teaching and learning of science subjects. In addition, the use of Computer-Assisted Instruction in teaching both Physics and Chemistry enhances better achievement of both male and female students in Chemistry and physics as such, gender friendly.

## Recommendations

This following recommends were made based on the findings of the study:

1. Teachers should key into the use of CAI with animation to simplify the ambiguity in sciences especially Chemistry subjects
2. Chemistry and Physics teachers should endeavor to use CAI packages despite numerous challenges when teaching/practical demonstration of the subjects to enhance effective learning.
3. Government should organize workshops for science subject teachers especially Chemistry and Physics teachers at the senior secondary school on the effective utilization of CAI
4. There should be provision of laptops to the science teachers and student to arouse their interest in the integration of ICT
5. The curriculum planners should review the curriculum to accommodate the use of computer assisted instruction

## References

Alade, I.A. (2011) Trends and issues on curriculum review in Nigeria and the need for paradigm shift in educational practice, *Journal of Emerging Trends in Educational Research and Policy Studies*, vol. 2, pp. 325-333. Retrieved fromhttp://jeteraps.scholarlinkresearch.com/articles/eduucational.pdf

Alio, B. C. (2004). *The effect of Polya's problem solving techniques on secondary school students' achievement in Mathematics*. ABACUS Publishers.

Ayuba, I. &Timayi, J.M. (2018). Impact of computer-based instruction on students' performance and retention in algebraic word problems, Kaduna State, Nigeria. *ABACUS (Mathematics Science Series)* vol. 45, no. 1, pp. 7-13.

Busari, O. O., Ernest, S. B., & Ugwuanyi, D. N. (2016). Effects of computer-assisted instruction on senior secondary school students' achievement in chemical reactions and equilibrium in Egbeda Local Government Area of Oyo State. *International Journal of Secondary Education*, 4(4), 39-43.

Ekundayo, S. K., (2022). Effects of computer assisted instruction on students' academic achievement in chemistry among and boys and girls in public secondary schools in Ondo state, Nigeria. *British Journal of education vol.* 10 2. Pp 31-41

Eyo, U.E., (2018). Effects of computer assisted multimedia instruction on senior secondary school students' achievement in biology in two educational zones of Niger State, Nigeria, West Africa. *IOSR Journal of Research & Method in Education (IOSR-JRME)*. vol. 8, no. 2, pp. 53-59.

Federal Republic of Nigeria (2014). National policy on education, NERDC press

Gambari, A.I., Shuaibu, A., & Shittu, A.T. (2013). Students' Perception towards the use of computer-assisted instruction on learning mathematics in Minna, Niger State, Nigeria: *International Journal of Behavioral Sciences.* vol. 4, no. 1, pp.14-21.Retrieved from https://staff.futminna.edu.ng/EDT/content/journal/PF0890/60.pdf

Haruna, M. M. &Tolorunleke, E. A., (2020). Effect of Computer assisted instruction (CAI) on senior secondary school students' achievement and retention in chemistry in Bwari area council, FCT Abuja. Journal of educational media and technology, vol. 26, 2:2020

Laleye, A.M. (2019) Effects of a Computer-Programmed Instructional Strategy on Basic Science Students' Learning Outcome in Two Instructional Settings in Ondo State, Nigeria; *International Journal of Scientific Research and Management (IJSRM)*.07(02).PP.869-876.Retrieved 24/8/19 fromhttps://pdfs.semanticscholar.org/034c/c43ed667a4defd13de9d9436fca9b6054fc9.pdf

Mohammed, K. &Yarinchi, B.M. (2013) Information communication technology (ICT) and media education: In historical perspective; *European Scientific Journal*. vol. 9, no. 20, pp.16-23. Retrieved from https://www.eujournal.org/index.php/esj/article/view/1572

Ogunleye, B. O. (2007). Teachers' perceived barriers to successful implementation of ICT in the teaching and learning of science subjects in Nigerian Secondary Schools. *Nigerian Journal of Computer Literacy. 200-215,* 8:1

Ogunleye, B. O. & Fasakin, A. O. (2011). Everyday phenomenon in Physics education: Impact on male and female students' achievement, attitude and practical skills in urban and semi-urban setting in Nigeria. *Pakistan Journal of Social Science*; 8(6): 316-324.

Oredein, A. O. & Awodunmi, A. O. (2013). Impact of teacher's motivational indices on science students' academic performance in Nigerian senior secondary schools. *International Education Students*, 6(2): 31-43.

Samaila, Y., Makinde, A.A. &Zambwa, J. *(2016)* Development of a computer-aided instruction for effective teaching of electrical and electronic devices at Nigeria certificate in education technical level in north eastern Nigeria. *International Journal of Vocational and Technical Education Research* vol. 2, no. 1, pp.45-57. Retrieved from http://www.eajournals.org/wpcontent/uploads/Nigeria.pdf.

Samuel, N. N. C., & Okonkwo, O. I. (2020). Effects of computer assisted instruction on senior secondary school students' academic self-concept in Chemistry. *Journal of International Academic Research for Multi-disciplinary*, 8(7), 13-20.

Sharma, R. (2017) Computer assisted learning – A study; International *Journal of Advanced Research in Education & Technology*. vol. 4, no. 2, pp.102-105.Retrieved from http://ijaret.com/wp-content/themes/felicity/issues/vol4issue2/rishu.pdf

Tareef, A. B. (2014). The effects of computer-assisted learning on the achievement and problem-solving skills of the educational statistics students. *European Science Journal*; 10(28): 271279.

Yusuf, M. O. (2005). Information and communication technology: Analyzing the Nigerian national policy for information technology. *International Education Journal*; 6(3): 316-321.