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THE ROLE OF COMPUTER-ASSISTED INSTRUCTION IN ENHANCING COMPUTER LITERACY AMONG JUNIOR SECONDARY SCHOOL STUDENTS IN ENUGU STATE

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Abstract
Computer technologies and their related resources are increasingly adopted in the educational ecosystem in Nigeria. The trend demands that every student possess essential computer knowledge to be aligned with modern-day teaching and learning. CAI has been widely used in teaching in Nigeria, but it is still unclear if the adoption of CAI can as well enhance computer literacy. The present study examined the role of CAI strategy in improving the computer literacy of junior secondary school students. A total of one hundred and eighty-seven secondary school students were drawn from eight public secondary schools in Enugu state as the study's participants. The study adopted a quasi-experimental pre-test and post-test study design. The result revealed a significant difference in student's computer literacy between the students taught with the CAI method and those taught with the conventional way at MD = 5.08, t (185) = 7.328, p = .000. Thus, the study concludes that a computer-assisted instructional method is an indispensable tool that could influence students' computer literacy, especially among secondary school students. The practical implications and recommendations are discussed.

Keywords: *computer literacy, CAI, students, junior secondary school*

INTRODUCTION

Information and Communication Technologies (ICT) have significantly impacted many sectors in today's knowledge economy (Lim et al., 2020). The educational ecosystem, especially in developing nations, is currently witnessing an increasing adoption of computer technologies. Teaching innovations in Nigeria's education system are popularized in information communication technology. Indeed, many scholars have underscored the essentialness of ICT in the education development of Nigeria (Adedokun-Shittu & Shittu, 2015; Bukar et al., 2016; Ejiroghene, 2021; Elugbadebo & Johnson, 2020; Ibara, 2008; Matthew et al., 2015; Shittu et al., 2012; Tunmibi et al., 2015; Udochukwu et al., 2019; Yusuf et al., 2013).

Computer technologies play a significant role in all aspects of living in every society and have become an essential tool in all human endeavors, including education and personal life. In particular, modern-day schooling is increasingly dependent on computer infrastructures. Thus, knowledge related to computer use is becoming a prerequisite for educational development in recent times. Computer literacy generally describes the ability and capacity to utilize the computer system and its related components efficiently. The term is conceptualized as being knowledgeable about computer hardware and software and the capabilities to understand how computer resources can be used. It is the basic understanding of operating computers and similar technology, such as the internet, tablets, and smartphones.

Previous research described computer literacy as the ability of an individual to interact with a computer (Poynton, 2005). This assertion underscores computer literacy as essential knowledge for every individual, particularly students. Hence, being computer literate allows a learner to cope with the rapidly changing environment in technology. Most students, especially the young learners who are not exposed to technology, are likely to have trouble understanding the process necessary for computer literacy. Indeed, computer usage requires a set of cognitive skills that develop over time. Exposing students to computer-related learning is critical for developing computer literacy in schools.

Several disparate studies have applauded the adoption of computer-assisted instructional methods in the classroom to enhance students' participation, interest, and achievement (Abdullahi et al., 2018; Joel & Ephraim, 2019; Nkechi & Chibuzo, 2019; Nwosu & Ndanwu, 2020). The computer-assisted instruction (CAI) trend entails adopting a computer-aided learning instruction approach in the classroom. The computer has many purposes in school. Thus, it can improve student capability and enhance school teaching and learning (Doko & Robert, 2015). A computer-assisted instructional method is an innovative instructional approach that prompts purposeful interaction between a learner and the computer device with relevant learning materials in the form of software designed to help learners acquire the anticipated learning objective at their capabilities and command. The system is an interactive instructional procedure incoperating a computer system in presenting instructional material and monitor the learning that takes place. The system is an interaction between learners, a computer-controlled display and a response entry device for the purpose of achieving educational outcomes.

Innovation entails making changes to something established by introducing something new. It applies to radical or incremental product changes, processes, or services. Modern-day education is developing under exponential growth in the adoption and utilization of information and communication technologies and the escalation of innovation (Ogurtsova et al., 2019). Over the years, there have been several variations in the educational landscape worldwide. Indeed, the sector has witnessed an increasing level of innovations recently. Educational innovations denote the procedure or method of scholarly activity that differs significantly from conventional practice and is used to improve competence in the academic environment (Mykhailyshyn et al., 2019). This entails the willingness and flexibility in the adjustment of educational activities.

CAI in teaching and learning entails engaging learners in an exciting learning environment. The innovations create a conducive setting for teachers and learners to improve learning efficiency. The CAI encompasses learning models, including tutorials, exercises, simulations, and games that make the learning process varied and attractive to students (Nainggolan, 2021). Research has demonstrated that computer-assisted instruction can positively impact literacy skills (Toonder & Sawyer, 2021). For example, Rogowsky et al. (2018) examined the effects of computer-assisted instruction, framed as playful activity and presented via e-tablet–on preschoolers' literacy and numeracy skills and found that educational software may enhance literacy and numeracy skills. Shamir et al. (2019) reported a substantial, long-term, meaningful improvement in early literacy due to CAI software. Notably, several scholars in Nigeria have studied CAI programs in various domains, including achievement, motivation, teaching, and learning (Adigun, 2020; Hussaini et al., 2017; Lawal & Abdullahi, 2019; Olakanmi et al., 2016; Usman & Madudili, 2020). However, the role of the CAI model in computer literacy, especially at the junior secondary school level, has not received much research attention. Thus, the justification for the present study. The junior secondary level marks the early stage of the post-primary school journey and represents an important stage of cognitive development. Students at this phase are likely between the ages of 10 and 13 in most cases. They begin their education journey by being immersed in a diverse knowledge-based curriculum; thus, computer knowledge becomes an essential component. The present study examined CAI as a technological pathway to developing computer literacy.

Hypothesis: There would be a difference in computer literacy between students taught with CAI and those acquainted with the conventional method

Method

The present study employed a quasi-experimental design with pre-test and post-tests and two groups (experimental and control conditions). Secondary school students in Enugu State made up the population of the study. One hundred and eighty-seven (n = 187) students enrolled in the science classes comprising males and females between the ages of 10 and 15 years with a mean age of (M=9.14) and (SD= 1.24) were randomly selected from eight public secondary schools in Enugu metropolis as the study participants. They were assigned two conditions, with group A as the experimental condition. On the other hand, group B represents the control condition.

Procedure

Authorization was duly obtained from the school authorities. Thus, a reliable corporation was established between the researcher and the school personnel. However, teachers were trained as research assistants. The training of the research assistants lasted for eight days; thus, each day was used to prepare the teachers in each of the eight selected schools. The training informed the teachers of the study's purpose and guidelines. The study lasted four weeks, with one lesson period each week. However, the regular school periods were utilized. The usual teachers taught the classes while the researcher provided the rules, instructions, lesson plan, and the CAI program materials. The researcher also visited regularly to ensure strict compliance with the lesson plan.

Before the commencement of the experiment, a questionnaire was administered to the students as a pre-test study. The pre-test was used to determine the student's overall knowledge of the computer system. On concluding the pre-test, the research assistants collected the questionnaires and recorded the scores before handing them over to the researcher for further analysis. The primary study resumed with the experimental conditions being taught basic subjects, including English language, mathematics, and social studies, with the computer system. In contrast, the control conditions were taught the same lesson using the conventional method. Finally, the post-test study was conducted similarly to the pre-test, except that the questions were reshuffled. The data from the pre-test and post-test were subjected to data analysis.

Result

Table 1: shows mean and standard deviation scores for the group (A/B).

		Pre-test		Post test		
Group	N	Mean	Standard Deviation	Mean	Standard Deviation	Mean Gain
Experimental	98	43.17	10.54	50.19	13.68	7.02
Control	89	42.29	11.29	44.39	13.38	2.01
MD		0.88		5.08		

Table 1 shows that the mean in the pre-test study for experimental conditions is 43.17 while the mean in the pre-test for control conditions is 42.29 giving the pre-test mean difference of 0.88. The finding indicates no significant difference in the participants' mean scores on their level of computer literacy. On the other hand, the post-test study reveals a mean of 50.19 for the experimental conditions and 44.39 for the control condition, with a mean difference of 5.08. The gain score for the two conditions was 7.02 and 2.01, respectively. Thus, the result shows that the experimental conditions improved computer literacy due to their exposure to the computer-assisted instructional method.

To test the research hypothesis, which stated that there would be a significant difference between the student's taught with CAI and those acquainted with the conventional approach. The data was computed with t-test statistics and analyzed in the table below.

Table 2: shows a t-test comparison of the differences in computer literacy.

Source of variation	N	Mean	SD	df	t	Sig
Experimental	98	50.19	13.68			
Control	89	44.39	13.38	185	7.328	000

The t-test analysis performed on the data established a significant difference between the experimental and control conditions on computer literacy MD = 5.08, t (185) = 7.328, p = .000, as shown in Table 2 below. Thus, the result supports the study hypothesis and offers evidence that the CAI strategy efficiently enhances computer literacy in junior secondary schools.

Discussion

This study was conducted to determine whether there would be a significant difference between the students taught with the computer-assisted instructional method and those prepared with conventional methods in computer literacy. For the pre-test and the post-test study conducted, the mean and standard deviation scores showed that the CAI method significantly influenced the experimental group's computer literacy in the post-test study (M = 50.19, SD = 13.68) compared to the control group (M = 44.39, SD = 13.38). An independent t-test was performed to test the study's hypothesis that there would be a significant difference between students taught with the CAI method and those taught with the conventional way on computer literacy in junior secondary schools. The result established a significant difference between the experimental conditions and the control conditions on computer literacy. Thus, the development confirmed the hypothesis, thus, signifying that the computer-assisted instructional method is an indispensable technological tool that

could increase secondary school students' computer literacy. The likely reason for this development could be attributed to the increasing exposure of school children to computer technologies. Thus, children show interest in computer-related devices in contemporary society. Indeed, their interest in computer devices could attract students' attention and engage them more in computer-related educational resources than conventional classroom teaching methods. Bostan and Antohe (2010) noted that computer-assisted instruction stimulates visual and hearing capacities, readjusts them in the middle of the phenomena, and completes their knowledge. Therefore, the CAI method presents a pathway to positively engaging the youngsters in computer use for effective teaching and learning in Nigeria's secondary education landscape.

The implication of the study

The research findings have some implications for the teachers, students, school authorities, and curriculum planners. Indeed, the finding implicates the CAI method as an effective strategy to enhance students' computer literacy. Also, this has implications for all the stakeholders in education with inclusive students. More so, it implies that the teachers' continuous use of the conventional discussion method will not significantly improve students' computer literacy. It equally means that if school authorities and curriculum planners do not make an effort to enforce the use of CAI by the curriculum implementers (teachers), the students may not improve their computer knowledge as expected.

Conclusion

The present research investigated whether computer-assisted instructional methods enhance students' computer literacy in secondary school. The research established a positive difference between the two conditions on computer literacy in the post-test study. Thus, the study concludes that the computer-assisted instructional method is an essential technological tool that could improve secondary school students' computer knowledge and usage. Therefore, the study contributes to the literature by supporting previous research that promotes the integration of computer-assisted instructional methods in the classroom in Nigeria. Nevertheless, the sample size used in the study may pose a significant challenge for generalizing this result. Future researchers should include more representative samples and explore other moderating variables that could broaden our understanding of this outcome. However, the study recommends fully integrating computer resources in the classroom and consistently training instructors in this direction.

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