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EFFECT OF COMPUTER ASSISTED INSTRUCTIONAL TECHNIQUE ON SECONDARY SCHOOL STUDENTS' INTEREST AND ACADEMIC ACHIEVEMENT IN COMPUTER STUDIES IN ANAMBRA STATE

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ABSTRACT

The study investigated the effect of computer assisted instructional technique on secondary school students' interest and academic achievement in Computer Studies in Anambra State. Two research questions guided the study and two null hypotheses were tested at 0.05 level of significance. Quasi-experimental pre-test, post-test non-randomised control group research design was adopted for the study. The population of this study comprised all 1,812 SS1 computer studies students made up of 807 males and 1,005 females in 2021/2022 academic session in 62 public secondary schools in Awka education zone of Anambra State. The sample for the study comprised 93 SS 1 computer studies students made of 32 males and 61 females drawn using multistage sampling procedure. Two sets of instrument titled Computer Studies Achievement Test (CSAT) and Computer Studies Interest Scale (CSIS) were used for data collection. The instrument was subjected to face validation by three experts, two in the Department of Science Education, and an expert in Measurement and Evaluation in the Department of Educational Foundations, all in the Faculty of Education, Nnamdi Azikiwe University. The content validation was established using the table of specifications. The reliability of CSAT was determined using Kuder-Richardson formular 20 (k-R20) which yielded 0.76 and the reliability of CSIS was determined using Cronbach alpha which yielded 0.79. Mean and standard deviation were used to answer the research questions and Analysis of Covariance (ANCOVA) to test the hypotheses. The findings of the study revealed among others that students taught computer studies using computer assisted instructional technique had higher achievement score than those taught using lecturer method. It was also found that students taught computer studies using computer assisted instructional technique had higher interest score than those taught using lecturer method. Further result showed that there is no significant difference between the mean achievement scores of students taught Computer Studies using computer assisted instructional technique and that of those taught using lecture method in Anambra State. Based on the findings, it was recommended among others that teachers should use computer-assisted instructional technique in teaching Computer Studies to improve the academic achievement and interest of students.

Keywords: Computer, Assisted Instructional, Technique, Students, Interest, Academic Achievement, Computer Studies

Introduction

Education is an instrument for equipping individuals with skills and knowledge to become useful members of the society. It enables individuals to think and behave in a way which contributes to the development of the society. Ughamadu, Anagor and Chike (2021) noted that education plays indispensable roles for scientific and technological advancement of any nation by equipping students with requisite knowledge, essential skills and desirable behaviour which help become self-reliant and also contribute to the growth of the society. The education system can contribute to technological advancement of a nation through computer studies.

Computer studies is a subject taught at secondary school level. It is act of studying of operating and application of computers to process and disseminate information. Nwafor, Okpala and Oka (2019) defined computer studies as the study of computer science, meaning of computer and algorithmic processes, including the principles, hardware and software designs, applications and the impact on society. It is technological-based subject that provides opportunity for students to acquire knowledge and skills to operate computer. Similar to this, Ezeanyika and Okigbo (2021) referred to computer studies as a subject at the senior secondary school level of education targeted at equipping the students with the skills of efficient computer operation. Adigun, Onihunwa, Irunokhai, Sada and Adesina (2015) defined computer studies as the study of the theory, design, use and analysis of computer devices. Operationally, computer studies is a subject that is concerned with learning of principles, rudiments and usage of computer hardware and software for executing tasks.

Computer studies is taught at senior secondary school level to enables students acquire skills of designing and applying computer software and hardware in their daily activities. Edeh, Akindutire, Ugboaja, Ohwo, Umoke and Osijirin (2021) noted that computer science as a course is being taught as Computer studies or Information Technology at the secondary school level in Nigeria. Continuing, Edeh, et al asserted that computer science curriculum is often designed to equip learners with the skills and tools they need, to analyze, design and implement computer hardware and software and to adapt to digital era or knowledge-based society. Computer studies provides opportunity for students to acquire skills and knowledge to keep abreast with rapidly technological changes across the globe. Adigun et al (2015) noted that knowing the computer itself, its operation, what it can do, how it can do it and why it's doing it are the basis of computer studies curriculum in secondary school. Most senior secondary school teachers still implement computer studies curriculum using lecture method. To buttress this, Egbutu and Okeke (2021) noted the common means of instruction in secondary schools is lecture method.

The lecture method is a teacher-centred instructional approach which is characterized by chalkboard, textbook and notebook in teaching the students. Ojonugwa, Igbo, Apeh and Ndukwu (2020) defined the lecture method as the chalk-talk instructional strategy that places the students at the passive corner of the class and the teacher as the principal actor. In lecture teaching approach, the teachers present the

lesson with little or no explanation, while the learners simply listen and copy notes. Idika (2021) posited that the lecture method fail to promote students' reasoning and critical thinking capability, the learners spend additional time on writing notes and practically, looking at the board or just listening to the teacher. The lecture method is appropriate in covering large content areas and high number of students but may not adequately meet the diverse needs of learners. One of innovative instructional approach that may meet the learning needs of students is computer-assisted technique.

Computer assisted instructional technique is the use of moving images to teach the students. According to Bello, Kamar, Yushau and Abubakar (2022), computer assisted instructional technique is the use of pictures, videos and animations or even combining text with pictures and videos to explain some concepts or phenomena during the lesson. Computer assisted is the use of slides in presenting lesson to the students. The slides in computer assisted package are accompanied by audio that enable the teachers to easily explain any content of lesson that is difficult to convey. Opesemowo and Omideyi (2023) defined computer assisted instructional technique as an teaching aided package prepared by a computer-controlled machine and a response entry device that uses an amalgamation of text, graphics, sound, and video to boost educational outcomes by enhancing the learning process through interaction. In the context of this study, computer assisted instructional technique is the programming and designing of instructional content to appear as moving images and presented in a projector for explanation and illustration of a concept in the classroom.

Computer assisted instruction is used to present contents in text, images and slides to enable students to learn at their own pace in the classroom. Computer assisted instruction can be utilized in teaching students through computer-based software such as MicroSoft PowerPoint. Emiri (2020) noted that computer assisted instruction involved the use of several telecommunication gadgets such as laptops, projectors, projector slides and PowerPoint presentation in the teaching and learning process. The contents of Senior Secondary School Computer Studies curriculum to be used in the study will be transformed into CAI software composed of digital tutorials, images, text, and videos. The CID (software) will be installed in the available computers of the experimental schools for the students to be exposed to treatment, while those in control groups are left to the teaching method. Computer assisted integration during instructional delivery could stimulate students' active participation in teaching and learning process which is likely to improve their academic achievement.

Academic achievement is the examination outcome of students exposed to instruction in the classroom. According to Ikwuka and Adigwe (2021), academic achievement is a product of education or learning which is commonly measured by examination or continuous assessment. It is the students' results which are assessed by their scores in tests and examination. According to Enoch and Asogwa (2021), academic achievement refers to the overall accomplishment of students which is evident

in their scores in standardized examinations. The academic achievement is considered as key criterion to determine the knowledge and skills acquired by students exposed to learning experience in the school. In the context of this study, academic achievement is learning outcome which is measured by the grades or scores obtained by students in examination. There appears to be continuous poor academic achievement of students in computer studies in secondary schools in Anambra State in particular and Nigeria at large. This ugly situation was buttressed by Edeh, Akindutire, Ugboaja, Ohwo, Umoke and Osijirin (2021) who reported that there has been persistent decline in the academic achievement of students in computer studies at the senior secondary school level in Nigeria. The WAEC results analysis obtained from Anambra State Ministry of Education (2020) indicated that the number of candidates that sat for WAEC examinations in Computer Studies in Anambra State public secondary schools for the year 2017, 2018 and 2019 were 16,123, 19,124 and 21,543 and the number of candidates that obtained credit and above were 8,192, 9,019 and 11, 276 which represented 50.8%, 47.2% and 52.3% of the population that sat for the examinations. The 49.2%, 52.8% and 47.7% of candidate who failed to pass computer studies in 2017, 2018 and 2019 respectively usually brings about sadness and frustration to the individuals concerned and their parents as well as other members of the family. Similar to this, Ezeanyika and Okigbo (2021) observed that despite the relevance of computer studies in development of the nation, society and individuals, analysis of school performance in computer studies examination results show that students have not improved in their achievement and skills in computer studies as contained in reports on students' achievement in computer studies by the WAEC Chief Examiner in year, 2020. In the same vein, Nwafor, Okpala and Oka (2019) noted that the required standard expected of the students in computer studies examinations, and their performance assessment in examination which was reviewed by the Chief Examiner indicated that majority of the students/candidates had shown little or no understanding of the contents of the syllabus as evident in their responses which include inability to explain/define terms or acronyms, basic programming and use of keywords in defining terms, misinterpretation of computer file, inability to differentiate between data and information among others. One of the ways to minimize poor academic achievement of students in the computer studies is through stimulating their interest during teaching of the study.

Interest is the act of paying attention to something to discover more about it. Chikendu, Ejesi and Abumchukwu (2021) defined interest as the ability of an individual to show positive attitude towards an object, situation or value. Interest makes learners to actively participate in teaching and learning process in the classroom. According to Nwosu and Ndanwu (2020), interest is arousal as a result of the effort to satisfy a felt need. It is a predisposition towards classroom activity. Interest is eagerness to learn and acquire more knowledge of phenomena. Modupe (2021) defined interest as a persisting tendency to pay attention and enjoy some activities. In

the context of the study, interest is the curiosity that enables students to actively partake in the instructional process in classroom.

Change and innovation in education system has made it imperative to seek new ways to improve the teaching of computer studies in the classroom. This is a widespread of integration of information technology in the education system. In the same vein, Usman and Jilang (2018) noted that the development of computer technologies has totally changed the methods of teaching and learning. They added that in this present era, computer assisted instruction technique which is the most advanced and sophisticated form of programmed instructions, was introduced in the education systems to bring about tremendous changes in the teaching and learning process. The addition of Robotics in the curriculum and use of ICT in all subjects in this modern age has made the integration of computer assisted instruction teaching computer studies to probably stimulate the interest and improve the academic achievement of students. This prompted the investigation into the effect of computer assisted instructional technique on students' interest and academic achievement in computer studies in public secondary schools in Anambra State.

Statement of the Problem

Effective teaching of Computer Studies is crucial in Nigeria that is rapidly undergoing social change and technological advancement. The average trends of students' academic achievement in computer studies between 2017 and 2020 seem to undermine Nigeria's quest for scientific development and technological advancement. The average academic achievement of students in Computer studies which tend to be source of worry to students, parents, educational stakeholders and the researcher could be attributed to the teachers' teaching methods.

The teachers who are the repertoire of knowledge appear to still use lecture method in teaching computer studies which have abstract concepts and phenomenon. The lecture method makes students passive listener and fail to address their learning needs probably due to the fact that some students prefer to learn by hearing, while some learn by watching images or videos of concepts taught. Consequently, some students lose interest in learning Computer studies, believing that it is too boring, abstract and too difficult to comprehend. Many researchers have attempted to respond to the problem by conducting studies on the effect of computer assisted instructional technique in teaching different subjects in varying geographical location. Thus, the problem of the study is to determine the effect of computer assisted instructional technique on secondary school students' interest and academic achievement in Computer Studies in Anambra State.

Research Questions

The following research questions guided the study:

1. What are the mean achievement scores of students taught Computer Studies using computer assisted instructional technique and that of those taught using lecture method in Anambra State?
2. What are the mean interest scores of students taught Computer Studies using

computer assisted instructional technique and that of those taught using lecture method in Anambra State?

Research Hypotheses

The following research hypotheses were tested at 0.05 level of significance.

1. There is no significant difference between the mean achievement scores of students taught Computer Studies using computer assisted instructional technique and that of those taught using lecture method in Anambra State.
2. There is no significant difference between the mean interest scores of students taught Computer Studies using computer assisted instructional technique and that of those taught using lecture method in Anambra State.

Research Method

The design of the study was a quasi-experimental design. Specifically, it used pre-test and post-test non-equivalent control group design. Non-equivalent control group design was used because the students were not sampled. The two groups of students were pretested. This research design was considered suitable because participants were not randomly assigned to groups rather treatment condition was randomly assigned to two intact groups which were already organized.

The study was carried out in Awka Education Zone, Anambra State.

The population of the study consisted of 1,812 SS1 computer studies students made up of 807 males and 1,005 females in 2021/2022 academic session in 62 public secondary schools in Awka education zone of Anambra State. The sample for the study comprised 93 SS 1 computer studies students made of 32 males and 61 females from Awka education zone using multistage sampling procedure. Firstly, the purposive sampling technique was used to select two schools from the Awka educational zone. The criteria used for the selection of the two schools were that the students must be offering computer studies, the schools must have computer laboratory and qualified computer studies teachers. Secondly, simple random sampling was used to assign one intact class to experimental groups and the other intact class to control groups. The groups for the study were coded group A and group B comprising one experimental class and one control class respectively. Experimental class (Group A) consists of 49 students (17 males and 32 females) and control class (Group B) consists of 44 students (15 males and 29 females). The two intact classes were taught separately.

Two sets of instrument titled Computer Studies Achievement Test (CSAT) and Computer Studies Interest Scale (CSIS) were used for data collection. CSAT is made of two sections namely A and B. Section A of CSAT is designed to generate information about the students' bio data. The Section B of CSAT consist of forty multiple choice questions with four options A-D obtained from WASSCE past questions. The items were drawn using tables of specification to ensure that enough sample questions were drawn from each of the contents to be taught which includes 12 questions on overview of the computer system, 8 questions on input devices, 5 questions on output devices and 15 questions on computer software.

CSIS was divided into two sections namely; A and B. Section A covered students' demographic variable such as gender. Section B of CSIS was generated by the researcher from literature and consists of 20 items designed to measure the level to which students are interested in Computer Studies. CSIS has 13 positive items and 7 negative items. The scaling is done on a four-point rating scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The instrument was subjected to face and content validation by three experts, two in the Department of Science Education, and an expert in Measurement and Evaluation in the Department of Educational Foundations, all in the Faculty of Education, Nnamdi Azikiwe University. The content validation was established using the table of specifications. To ascertain the face validation, the researcher presented the title, purpose of the study, research questions and hypotheses with a copy of the table of specification (Test-blue print). The suggestions of the experts were applied in producing the final instrument used for the study. The reliability of the instruments were established using Kudder-Richardson formular 20 for CSAT which yielded 0.76 and Cronbach alpha method for CSIS which yielded 0.79.

The research assistants who are the computer studies teachers from the sampled schools teaching in SS one were briefed for two weeks regarding the teaching methods By the end of the briefing, the researcher organized a micro-teaching session for the participating research assistants to ensure that they have mastered the instructional technique expected of them. The experimental aspect of the study was conducted in three stages. The first stage was pre-test and familiarization when both (Experimental and control groups) were given pretest before the commencement of the experiment. The second stage involved teaching activities which lasted for five weeks and the final stage was post-testing.

The initial differences of subjects in the intact classes were controlled using Analysis of Covariance (ANCOVA). The experimental bias was avoided by using regular Computer Studies teachers in the two schools under the study were briefed as research assistants and used. Pre-test sensitization was controlled in this study through a longer time interval of five weeks between the pre-test and post-test. These tests demand much more than recall information in that it emphasizes comprehension and application. The study was limited for the period of five weeks to minimize maturation effect. The items in the instrument was renumbered and reshuffled to minimize the ability of the students to realize that they were being re-tested.The researcher collected data for the study using two research assistants who are computer studies secondary school teachers in Anambra State. Mean and standard deviation were used to answer the research questions and Analysis of covariance (ANCOVA) was used to test the null hypotheses at 0.05 level of significance. The decision rule for the hypotheses is that whenever the probability value (p-value) is less than or equal to the significant value of 0.05, the null hypothesis was rejected, otherwise the null hypothesis was not rejected.

Presentation of Results

Research Question 1: What are the mean achievement scores of students taught Computer Studies using computer assisted instructional technique and that of those taught using lecture method in Anambra State?

Table 1: Mean Pre-test and Posttest Achievement Scores of Students taught Computer Studies using Computer Assisted Instructional Technique and those taught using Lecture Method

Method	N	Pretest Mean	Posttest Mean	Pretest SD	Posttest SD	Mean Gain
CIA	49	14.02	31.08	3.23	3.66	17.06
LM	44	12.77	17.32	3.00	4.01	4.55

Table 1 shows that students taught Computer Studies using computer assisted instructional technique had pre-test achievement mean score of 14.02 with standard deviation of 3.23, while their posttest mean achievement score was 31.08 with 3.66 value of standard deviation and mean gain of 17.06. Those students that were taught computer studies with lecture method had pre-test achievement mean score of 12.77 with standard deviation of 3.00, while their posttest mean achievement score was 17.32 with 4.01 value of standard deviation and 4.55 mean gain.

The mean achievement gain difference between students taught computer studies using computer assisted instructional technique and those taught using the lecture method was 12.51 in favour of the experimental group. The spread of score in the posttest is more homogenous among students taught using computer assisted instructional technique because the SD scores is smaller (3.66) compared to the SD score (4.01) of those taught using lecture method. The result indicated that students taught computer studies using computer assisted instructional technique had higher achievement score than those taught using lecture method.

Hypothesis 1: There is no significant difference between the mean achievement scores of students taught Computer Studies using computer assisted instructional technique and that of those taught using lecture method in Anambra State.

Table 2: Summary of ANCOVA on Difference between the Mean Achievement Scores of Students taught Computer Studies using Computer Assisted Instructional Technique and those taught using Lecture Method

Source of variation	SS	Df	MS	F	P-value	Decision
Corrected Model	4651.508	2	2325.754	195.025	.000	
Intercept	1646.782	1	1646.782	138.090	.000	
Pretest	259.931	1	259.931	21.796	.000	
Method	3864.879	1	3864.879	324.087	.000	S
Error	1073.288	90	11.925			
Total	61867.000	93				
Corrected Total	5724.796	92				

a. R Square = .813 (Adjusted R Square = .808)

Table 2 shows that at 0.05 level of significance, 1df numerator and 92 df denominator, the calculated F is 324.087 with P-value of .000 which is less than 0.05. Thus, the null hypothesis was rejected. Therefore, there is significant difference between the mean achievement scores of students taught Computer Studies using computer assisted instructional technique and that of those taught using lecture method in Anambra State.

Research Question 2: What are the mean interest scores of students taught Computer Studies using computer assisted instructional technique and that of those taught using lecture method in Anambra State?

Table 3: Mean Pre-test and Posttest Interest Scores of Students taught Computer Studies using Computer Assisted Instructional Technique and those taught using Lecture Method

Method	N	Pretest Mean	Posttest Mean	Pretest SD	Posttest SD	Mean Gain
CIA	49	12.49	28.10	2.50	5.30	15.61
LM	44	12.31	17.61	2.68	3.07	5.30

As shown in table 3, the pretest mean interest score of students taught Computer Studies using computer assisted instructional technique was 12.49 with standard deviation of 2.50, while their posttest mean interest score was 28.10 with 5.30 value of standard deviation and mean gain of 15.61. Those students that were taught computer studies with lecture method had pre-test interest mean score of 12.31 with standard deviation of 2.68, while their posttest mean interest score was 17.61 with 3.07 value of standard deviation and 5.30 mean gain.

The mean interest gain difference between students taught computer studies using computer assisted instructional technique and those taught using the lecture method was 10.31 in favour of the experimental group. The spread of score in the posttest is more homogenous among students taught using lecture method because the SD scores is smaller (3.07) compared to the SD score (5.30) of those taught using computer assisted instructional technique. The result indicated that students taught computer studies using computer assisted instructional technique had higher interest score than those taught using lecture method.

Hypothesis 2: There is no significant difference between the mean interest scores of students taught Computer Studies using computer assisted instructional technique and that of those taught using lecture method in Anambra State.

Table 4: Summary of ANCOVA on Difference between the Mean Interest Scores of Students taught Computer Studies using Computer Assisted Instructional Technique and those taught using Lecture Method

Source of variation	SS	Df	MS	F	P-value	Decision
Corrected Model	2733.159	2	1366.580	78.438	.000	
Intercept	980.896	1	980.896	56.301	.000	
Pretest	182.898	1	182.989	10.498	.000	
Method	2501.959	1	2501.959	143.605	.000	S
Error	1568.024	90	17.422			
Total	54098.000	93				
Corrected Total	4301.183	92				

b. R Square = .635 (Adjusted R Square = .627)

Table 4 shows that at 0.05 level of significance, 1df numerator and 92 df denominator, the calculated F is 143.605 with P-value of .000 which is less than 0.05. Thus, the null hypothesis was rejected. Therefore, there is significant difference between the mean interest scores of students taught Computer Studies using computer assisted instructional technique and that of those taught using lecture method in Anambra State.

Discussion of the Findings

The finding of the study revealed that students taught computer studies using computer assisted instructional technique had higher achievement score than those taught using lecturer method. This agreed with the finding of Ukaigwe and Goi-tanen (2022) which revealed that students taught with computer-assisted instructional strategy recorded higher mean achievement scores than those taught using lecture instructional method. This also supported the finding of Agwagah, Arua and Abugu (2019) which indicated that the mean achievement of students exposed to computer assisted instructional approach is higher than those exposed to lecture method in secondary schools. The agreement in findings could be attributed to the fact that the studies were conducted in the same level of education using students with similar maturity level. This finding could be explained by the fact that computer-assisted instruction technique combined texts, graphs and images which make learning process more interactive and engaging that learning process lecture method which makes lesson to be boring and student to be passive listeners. The teachers' use of CAI technique in teaching Computer Studies stir up the enthusiasm needed by students to engage in teaching activities and understand lesson taught and thereby improve their academic achievement than the lecture method of technique.

It was also found that there is significant difference between the mean achievement scores of students taught Computer Studies using computer assisted instructional technique and that of those taught using lecture method in Anambra State. This affirmed the finding of Ukaigwe and Goi-tanen (2022) which indicated that the achievement score of students taught with computer-assisted instructional strategy significantly differed from that of those taught with traditional instructional strategy. This is in line with the finding of Gongden, Yame and Gongden (2020) which indicated

that a significant difference exist between the mean interest scores of students taught using computer-assisted instructional technique and those taught using lecture method in favour of the experiment group. The same level of education in which the studies were conducted could account for the agreement in the findings. The reason for is significant difference between the mean achievement scores of students taught Computer Studies using computer assisted instructional technique and that of those taught using lecture method could be the interactive learning environment created by CIA technique to improve the understanding and retention of lessons presented to students.

The result of the study revealed that students taught computer studies using computer assisted instructional technique had higher interest score than those taught using lecturer method. This agreed with the finding of Nnorom and Emeka-Ifeanyi (2021) which revealed that students taught biology using computer assisted instructional technique yielded greater interest score than those taught using lecturer method. The agreement in the findings could be explained by similarity in geographical location of the studies. The possible explaination for this finding is that computer assisted instructional technique involve the combination of text, sound and videos to help meet the learning styles of students which arouse their interest in computer studies. The lecture method which limits the participation of students in learning process might make them struggle to assimilate the learning concepts and thereby lead to disinterest of the learner during lesson presentation.

Further result indicated that there is significant difference between the mean interest scores of students taught Computer Studies using computer assisted instructional technique and that of those taught using lecture method in Anambra State. This agreed with the finding of Chikendu, Ejesi and Abumchukwu (2021) which revealed that that there was significant difference between the mean interest scores of students taught chemistry using computer assisted instructional technique and that of those taught using lecture method in Anambra State. This also affirmed the finding of Egbutu and Okoli (2021) which revealed that difference between the mean interest scores of students taught chemistry using computer assisted instructional technique and that of those taught using lecture method was statistically significant. Computer assisted instructional technique offer opportunity to students to see what they are about to learn which might be connected with the significant difference in the mean interest scores of those taught with lecture method.

Conclusion

Based on the findings, it is concluded that computer-assisted instructional technique is an effective technique of teaching Computer Studies in secondary schools in Anambra State. The teachers' use of computer-assisted instructional technique in Computer Students at secondary school level has significant effects on the interest and achievement of male and female students. Computer-assisted instructional technique is more effective than and superior to lecture

method of teaching Computer Studies in secondary schools.

Recommendations

Based on the findings of the Study, the following recommendations were made:

1. Teachers should use computer-assisted instructional technique in teaching Computer Studies to improve the academic achievement and interest of male and female students.
2. Post Primary Schools Service Commission should expose teachers to annual training programme on use of computer-assisted instructional technique to enable them upgrade their skills in using the technique in presenting lessons to bring about improvement on academic achievement and interest of students.
3. State Ministry of Education should develop standardized software on computer-assisted instructional technique and make them available for teachers to boost their morale in using it to improve students' academic achievement and interest in Computer Studies.

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