Original Article

Predictive Effect of Programmed Learning Strategy and Students' Computer Literacy on Senior Secondary School Students' Achievement in Computer Studies

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Abstract

The study established, how PLS affects students' learning Computer Studies success and Computer Literacy level. The study looked at whether student computer literacy could predict how well they would do in computer studies. With a population of 4832 SS II pupils, with 236 SS II students making up the sample.this study's design was a quasi-experimental one. Because the Department of Mathematics and Computer Education, ESUT specialists had verified the Student Computer Literacy Scale (SCLS) and Computer Studies Achievement Test (CAT), they were used to gather data. In a trial run, 45 students from Army Day Secondary School in Gariki received each instrument. The institution was chosen since it was beyond the focus of the investigation. Cronbach Alpha and Kuder-Richardson (KR-20) coefficients, which were used to analyze the data, produced coefficients of 0.79 and 0.86, respectively. These findings demonstrated the instruments' dependability. For research topics and testing hypotheses, data was examined using mean and standard deviation, Pearson Product Moment Correlation Coefficient, and multiple regression. According to the study, students' computer literacy was a significant predictor of their ability in computer studies, and programmed learning strategies improved both the students' performance and their computer literacy. As a result, the study advised that the Federal/State Ministries of Education create computer science curricula that include programmed learning methodologies and must create measures to ensure that students taking computer science are computer literate.

Keywords: Predictive effect, programmed learning strategy, computer literacy, students' achievement, computer studies

Introduction

The study of Science, Technology, and Computer Studies in school is the key to any nation's technological advancement. Computers are today's driving force in research and technology. Oda

(2020) revealed that the world is driven by computer and any nation that did not align with ICT is a backward nation, and for any nation to be ICT complainant, the nation must educate her citizenry the rudimentary knowledge of Computer. Information and communication technology (ICT) is essentially all about computers (James, 2019). ICT would not exist without computers (Oda, 2020). A computer is an electronic device that receives, processes, and outputs data (James, 2019). Computer is the fastest devices that can aid any form of educational, scientific, financial and economical transactions (Anderson, 2017). In fact, Anderson (2017) remarked that remarkable progress of development of Computers has not been only causing great changes in every aspect of society but also bringing crucial changes in education. Obiakor (2019) asserts that the usage of computers in education is expanding since using the internet to look for employment necessitates computer literacy.

At the secondary stages of school, students can use computer applications to explore and produce learning. The daily/weekly observations of tertiary science experiments can be stored on computers. Computers are required in secondary schools in Nigeria due to the potential for computer-based learning as well as its practical value (Obiakor, 2019). It can learn in a multitude of ways, such as through touch, sight, and sound. Students' performance can be evaluated by computers, which can also direct them to the proper learning tasks. The computer can show diagnostic tests, provide branching programs tailored to each student's needs, and offer prescriptive activities that may point students in the direction , a meeting with the instructor, a lab experiment, or a book. According to Baugher (2013), a computer can provide words that need to be spelled, sounds that need to be created, directions that need to be followed, and visuals and symbols that need to be interacted with via touching. Its qualities outperform those of a typical teacher due to its patience, recall, and limitless ability for details. According to Fajola (2012), the computer operates diligently and consistently since it does not experience fatigue or lack of concentration like humans do.

Utilizing computers in the classroom and learning at all levels to carry out a wide range of multipurpose tasks, Students at the secondary level of education can use computers to research and create their own learning applications (Oda, 2020) In order to use computers in the classroom, you must also be computer literate. In order to use computers in the classroom, you must also be computer literate. It is essential to give Nigerian citizens computer literacy so they can keep up with the current trends in computer usage in our educational system. Even though the National Policy of Education of 1988 initially specified the study of computer science, this was carried out by the Federal Government of Nigeria in 1987 (Okeke, 2017). However, it wasn't put into practice until 2006.

In 1987, the Federal Government of Nigeria incorporated computer studies into the National Policy with the intention of preparing people or pupils for the twenty-first century.

1. To transform the educational system a result of the expanding convergence of computer technology and communication.
2. To give people or students a thorough understanding of computers.

According to the Federal Ministry of Education (2014), the goal and objectives of adding computer science into the curriculum are for pupils to have the necessary to be employed, a person must have a certain degree of literacy, numeracy, communication, manipulation, and problem-solving advantageous to themselves as well as to society at large. The 2020 West African Examination Council (WAEC) syllabus aims to evaluate candidates' understanding, knowledge, and acquisition of the following topics: fundamental computer concepts and how they operate; manipulative, computational, and problem-solving skills; software applications; computer-related simple device operation; online skills and their applications; safe attitudes and best practices for safe computer use; and the potential for further study in computer-related fields.

According to the West African Examination Council (WAEC, 2020), the main subject areas covered by the entire computer studies curriculum are: Computer basics, computer evolution, computer hardware, computer software, basic computer operations, computer applications, file

management, problem-solving techniques, information and communication technologies, as well as computer ethics and related social issues. The ability of computers to support education is what drives the need for computer studies in secondary schools (Okafor, 2018). It was believed that computer studies was a brand-new educational system developed to assist socioeconomic and technological growth as well as to improve teaching and learning. The purpose of computer studies is to inform the public about computers. Computer literacy, according to Aribo (2016), is the ability to interact with a computer and understand what it can do. Knowing how to read, write, and speak computer language is necessary to be computer literate. Computer studies may also be described as the information and abilities a person has acquired to use a computer system to carry out a specific task (Okafor, 2018).

Due to its critical role in the advancement of the country, the Nigerian government sought to incorporate computer science at all levels of education, from primary schools to universities. Students' computer knowledge and skills may be very high, high, low, or very poor depending on how frequently they have used computers (Okafor, 2018).). In line with Nwankwo and Obiakor's (2020) report, which found that students' performance in computer science was subpar in both national and state examinations, Onoye, Oguejiofor, and Ezenwagu (2021) reported that students' successful completion of the West African Senior Secondary School Certificate Examination result in Computer Studies was very low. Numerous researchers, including Ahiakwo (2013), Nwagbo (2015), Olarewaju (2016), and Fajonyomi (2017), have explained why students perform poorly in computer science courses by pointing to computer science curricula, teacher methods, parents, the government, a lack of computer science facilities, and other factors. Ogbazi (2017) cited a lack of adequately skilled human resources as the root problem. According to Nkwodimah (2013), it is the instructor's caliber.

From all these causes enumerated by scholars, one notable cause that stands out is the methodology of teaching Computer Studies as revealed by Onoye, Oguejiofor and Ezenwagu (2021) and Okafor (2018). According to Oda (2020), if all the factors that are causing students' poor achievement are

made right and the Computer Studies teacher uses a wrong methodology to administer the Computer Studies, the whole aim is defeated. Methodology is the key at which the aims of Computer Studies are achieved (Okafor, 2018). The facilitators who should impart to the pupils the computer science concepts that are required to be learned are the computer science teachers. According to Olarewaju (2016) and Nwagbo (2015), the method used by them to impact the concepts in Computer Studies matters a lot. In their respective research, Olarewaju (2016) and Nwagbo (2015) found that students' poor ability in computer studies was significantly impacted by teachers' disregard for the activity-oriented strategy. This is because the method used by them makes the Computer Studies teachers to be repertoire of all knowledge in Computer Studies. Oda (2020) revealed that the Computer Studies teachers preferred using conventional method because most secondary schools lack adequate number of Computer sets that are effective and efficient while the schools that have adequate number of Computer sets lack the electric supply to power those Computer sets. This prompted researchers to embark on researches to determine the strategy that can boost students' achievement and still accommodate the lack of Computer sets in schools. Researchers recommended the strategies to be guided discovery, mastery learning strategy, simulation strategy, gaming strategy, problem solving strategy, project-based strategy, problem based learning strategy, which they felt could be more effective in teaching and learning of Computer Studies compared to the conventional method of teaching (Alio, Anibueze and Ayogu, 2017; Obodo & Onoh 2017; Nneji & Ezemaenyi, 2014). Although each of these teaching techniques has been demonstrated to be helpful for teaching computer science, Alio, Anibueze, and Ayogu (2017) found that none of them is completely effective for increasing students' achievement, interest, and retention in computer science at the senior secondary school level.

However, these strategies can help the Computer Studies teachers to promote students' autonomy, competence and relatedness in Computer Studies (Alio, Anibueze and Ayogu, 2017). One strategy that Pigcon (2014) has found that's 95% effective in students' achievement, although in Biology is Programmed Learning Strategy. Another researcher that has researched Programmed Learning Strategy is Onuchie (2019), although the work was done in Computer Studies. The scholar found

that the rate at which students' achievement improved was 90% which was still in line with Pigcon's finding. This is because Programmed Learning Strategy is a behaviorist learning theory which relates Computer Studies to manage human learning under controlled conditions such as sequentially and individualized learning (Pritchard, 2019).

A student-centered learning technique known as the "programmed learning strategy" involves giving learners a variety of brief learning frames or bits of information in a logical order that offers quick knowledge and feedback following a comprehension exam. According to Boden (2020), the act of breaking down the content to be acquired into a series of sequential steps is known as a programmed learning strategy. Typically, this strategy transitions students from a background of familiar knowledge into a complex and novel collection of concepts, principles, and understandings. The programmed learning strategy facilitates individualized learning, gives learners with quick feedback, both positive and negative, and breaks up material into manageable chunks that they may process on their own time (Ravenscroft & Andrew, 2011). Programming for computer studies, branched programming, and linear programming are all examples of programmed learning strategies. A programmed learning method known as linear programming breaks down computer science into a series of little steps or frames that build logically on one another, with each step covering a very small portion of the idea or skill being taught.

Due to the employment of improvised printed self-instruction in the Linear Programmed Learning Strategy system's teaching and learning processes, a learner is expected to respond to the items offered to him or her in a logical order. With the inclusion of "remedial frames" and "remedial solutions," this programmed learning makes use of a variety of potential routes through the sequence of frames in order to address misconceptions that were found in students' responses to particular steps, which did not necessarily need to be minor. One of the more well-known student-centered learning techniques is linear programming, which entails self-administering and self-paced learning and involves giving the learner knowledge in manageable chunks known as "frames" (Pritchard, 2019). Each frame includes a brief section of the material to be learnt along

with a question that the student must respond to. After every frame, the learner discovers extra knowledge or is pointed in the direction of it based on a wrong response or receives praise for a right response. With linear programming, the lessons begin with the student's prior knowledge and work their way up to the ultimate learning objective.

In Linear Programmed Learning strategy lesson, students work at their own speed independently and assess their own comprehension after each step through exercises, questions or filling in a frame (Pritchard, 2019). Thus, it helps learners to overcome difficulties encountered during teaching and learning process and enhances effective learning. According to Ausbel, Novak, and Henesiana in Nneji (2012), it is the process of preserving the availability of a copy of the newly learned methods or the repeat performance by a learner using newly acquired knowledge. In addition to being utilized for self-instruction, programmed learning also serves as a mechanism. Additionally, the linear programmed learning strategy regulates how each learner differs and assigns equal weight to the learning environment, desirable behavior, and material mastery. Then, linear program learning enhances student engagement, modest steps, prompt feedback, reinforcement, and uniformity of instruction (Anderson & Fretting, 2014). Considering that few secondary schools in Nigeria have an adequate number of computer sets that can be used to teach students computer science, and those that do may not have a reliable source of electricity to power those computer sets, Onuchie (2019) claims that this approach is effective in teaching computer science in Nigeria. This makes it challenging for computer science teachers to effectively use computer science in the classroom. According to Onuchie (2019), with Linear Programming Learning Strategy, the entire procedure is demonstrated to the students with all the steps, up to the mastery of Computer Studies and with prompted exercises, the students are meant to master the concept of Computer Studies which will then make the students to have better achievements in Computer Studies. This is because Linear Programming Learning Strategy is the methodical use of reinforcement theory in the design and study of complex behavior to mastery in Computer Studies through demonstration, prompted and released approach (Pritchard, 2019).

However, according to experts like Ahmed (2020), there were no appreciable differences between the computer science students and their Expository approach counterparts. The Linear Programmed Instructional resources are a good alternative for average and below average students who don't respond well to the traditional method of instruction, according to Carbo and David (2015). In their individual research, Kurima (2014) and Chaudhary (2015) discovered that the use of PLM—programmed learning materials—worked better than traditional teaching methods. Therefore, it is necessary to determine its efficiency in Computer Studies in the Enugu Education Zone as there are disagreements over its impact on students' achievement in this subject. This study is necessary as a result of the effect of the Enugu State Government's closure of schools from March 27, 2020 to November 11, 2020, which prevented computer science teachers from covering their curriculum due to the Covid-19 outbreak in Nigeria in 2020 (The Cable New, March 15, 2020). The study also found a link between students' computer literacy and their success in computer studies as well as the efficiency of programmed learning strategies on students' computer literacy. This is due to Oda's (2020) finding that there was no correlation between computer literacy among pupils and computer science achievement in Nigeria. Ekeme (2019) found that there are topics in computer studies that do not necessarily require one to be computer literate to succeed in them, in contrast to Delsika, Ati-Sukmawati and Iskandar (2018), Oyelabi (2017), Bellman, Esogbue and Ichiro (2014) who found a link between students' academic success in computer science education and their computer literacy skills. Oyelabi (2017) continued by stating that students' poor computer studies performance was a result of their inadequate computer literacy skills.

Digital literacy is distinct from computer literacy. Concepts that can be distinguished. A person's level of computer knowledge can be ascertained using tests that show a person's achievement in computers, while a person's proficiency with computers is often evaluated by questionnaires, which test a person's capacity to create and alter text, resolve small computer-operational problems, and arrange and computerized information analysis (Kegel, 2019; Tobin, 2013).

Computer literacy, according to Kegel (2019), is the capacity to effectively use computers and related technologies, with skill levels ranging from basic computer usage to complex issue resolution. Understanding how computers operate and function is another essential aspect of computer literacy. How well a person uses computers and other pertinent technologies to complete a task is a good indicator of their level of computer literacy (Kegel, 2019). Users who want to become more computer literate should choose the computer abilities they want to master and take the time to learn how to utilize them more deliberately and precisely. For senior secondary school, the study looked into the relationship between student computer literacy and programmed learning technique success in computer studies by students.

Purpose of the Study

The purpose of the study was to ascertain the relationship between student computer literacy and their level of computer study competency in senior secondary school. Specifically, the study determined:

1. The difference between pupils who received computer science instruction using a programmed learning strategy and those who received it using a traditional manner in senior high schools;
2. The mean computer literacy test scores of senior high school pupils who took computer science courses using the programmed learning strategy compared to those who took the traditional approach;
3. The relationship between pupils' proficiency in computer studies and their performance in senior secondary school.
4. How Students in senior secondary schools participate in computer studies relation to their level of computer literacy

Research Questions

The study was guided by the following research questions:

1. How do the average performance ratings of senior high school students studying computer science using a programmed learning technique compare to those studying the subject using a traditional approach?
2. What are the average computer literacy skills of senior secondary school pupils who are studying computer science using the programmed learning strategy compared to those who are receiving instruction utilizing the conventional method?
3. What connection exists between the pupils' proficiency with computers and their performance in computer science in senior secondary school?
4. How does computer literacy affect students' ability in computer studies, and relative to other factors?

Research Hypotheses

The following hypotheses tested at 0.05 significance level guided the study:

$H0_1$: There was no appreciable difference in the mean achievement scores of senior secondary school students who learned computer science using the Programmed Learning Strategy and those who received traditional instruction.

$H0_2$: In terms of their mean scores for computer literacy levels, Students who learned computer science utilizing the Programmed Learning Strategy did not differ significantly from those who learned it the traditional way.

$H0_3$: There is no connection between pupils' computer literacy levels and their performance in computer studies in senior secondary school.

$H0_4$: Computer literacy level has no appreciable relative impact on student performance in senior secondary school computer science.

Method

The research design used in this study was a non-equivalent quasi-experimental one. The 4832 SS II students who participated in the study came from the 31 secondary schools in the Enugu Education Zone. The study used 236 SS II students from the three coeducational secondary schools

in the Enugu Education zone as its sample. As a result, the researchers chose 117 students at random from the control group and 119 from the experimental group. As opposed to this, the test items in section B of the SCLS were broken down into four (4) response groups: Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). The respondent's personal information was in part A; these categories were given a 4, 3, and 2 point scale, respectively. Depending on which box the student checked, the 15 correct answers in SCLS scored 4 or 3 points. If the student chose the right response, they would receive the full 90 points, but the 15 incorrect answers would only receive 2 or 1 points, depending on what they chose. Section B of the CAT had 40 multiple-choice questions with a maximum score of 100 points, each worth 2.5 points. The researchers provided training to each and every teacher of computer studies who took part in the study. Computer Studies classes were taught by their respective lecturers. The test lasted for six (6) weeks.

The Statistical Package for Social Science (SPSS) was used to examine the data from the pre-, post-, CAT, pre-, and post-SCLS surveys. Research questions 1 and 2 were answered using means (x) and standard deviations (s), whereas research questions 3 and 4 were resolved using the Pearson Product Moment Correlation Coefficient (r) and standardized and unstandardized regression coefficients, respectively. Research hypothesis 1 and 2 were evaluated using ANCOVA, whereas research hypothesis 3 was analyzed using multiple regression ANOVA at significance levels of 0.05. The null hypothesis (H0) was rejected if the value of F (the significance level of the test statistics) was less than 0.05. In that case, do not reject at 0.05.

Results

Question 1: How do students in senior secondary schools who are taught computer science using the Programmed Learning Strategy compare to those who are taught using the traditional approach in terms of mean achievement scores?

Table 1

The Students' Mean achievement Scores and Standard Deviations in Computer Studies

Groups	Number	Students' Achievement					
		Pretest			Posttest		
		Mean ($\bar{x}$)	Standard (s)	Dev.	Mean ($\bar{x}$)	Standard (s)	Dev.	GAINED MEAN
Experimental	119	36.94	12.18		52.71	12.21		15.77
Control	117	35.81	11.97		38.91	12.51		3.10
Total	**236**							

Table 1 revealed that the mean achievement score of students in the experimental group increased from 36.94 to 52.71 and a gained mean of 15.77 which is 42.69% increase while the mean achievement score of students in the Control group increased from 35.81 at the pretest level with the standard deviation of 11.97 to 38.91 at the posttest level with the standard deviation of 12.51 and a gained mean of 3.10 which is 8.66% increase.

$H0_1$: There is no significant difference between the mean achievement scores of senior secondary school students taught Computer Studies using Programmed Learning Strategy and those taught using the conventional method.

Table 2

Analysis of Covariance (ANCOVA) of the Students' Mean achievement Scores in Computer Studies

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Decision
Corrected Model	45338.286[a]	2	22669.143	3217.979	.000	
Intercept	3616.110	1	3616.110	513.322	.000	
GROUP	9451.192	1	9451.192	1341.636	.000	S
Pre_CAT	34103.297	1	34103.297	4841.105	.000	

Error	1641.375	233	7.045
Total	350536.000	236	
Corrected Total	46979.661	235	

WHERE S = Significant at P < .05; a. R Squared = .965 (Adjusted R Squared = .965)

According to the ANCOVA results in Table 2, GROUP had a significant F-value of 0.000 and an F-value of 1341.636. As indicated, the null hypothesis 1 was rejected because 0.000 was less than 0.05. The study came to the conclusion that there was a substantial difference in the mean achievement scores between senior secondary school students who were taught computer science using the Programmed Learning Strategy and those who were taught using the traditional way.

Question 2: What are the average computer literacy skills of senior secondary school pupils who are studying computer science using the programmed learning strategy compared to those who are being taught using the traditional approach?

Table

Mean Scores and Standard Deviations of the Students in Computer Studies

Groups	**Number**	**Students' Computer Literacy Level**						
		Pretest			**Posttest**			
		Mean ($\bar{x}$)	**Standard (s)**	**Dev.**	**Mean ($\bar{x}$)**	**Standard (s)**	**Dev.**	**GAINED MEAN**
Experimental	119	15.08	8.75		24.50	8.79		9.42
Control	117	14.53	8.64		18.08	8.71		3.55
Total	**236**							

Table 3 revealed that the mean achievement score of students in the Experimental group increased from 15.08 at the pretest level with the standard deviation of 8.75 to 24.50 at the posttest level with the standard deviation of 8.79 and a gained mean of 9.42 which is 62.47% increase while the mean achievement score of students in the Control group increased from 14.53 to 18.08 at the posttest level with the standard deviation of 8.71 and a gained mean of 3.55 which is 24.43% increase.

$H0_2$: There is no significant difference between the mean scores of the students' Computer literacy levels of senior secondary school students taught Computer Studies using Programmed Learning Strategy and those taught using the conventional method.

Table 4

Analysis of Covariance (ANCOVA) of the Students' Mean Computer Literacy Skill Scores in Computer Studies

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Decision
Corrected Model	19915.855[a]	2	9957.928	5118.343	.000	
Intercept	2599.940	1	2599.940	1336.361	.000	
GROUP	2035.285	1	2035.285	1046.130	.000	S
Pre_SCLS	17478.745	1	17478.745	8984.019	.000	
Error	453.310	233	1.946			
Total	127619.000	236				
Corrected Total	20369.165	235				

WHERE S = Significant at P < .05; a. R Squared = .978 (Adjusted R Squared = .978)
According to the ANCOVA results in Table 4, GROUP had a significant F-value of 0.000 and an F-value of 1046.130. The null hypothesis 2 was rejected as indicated because the value of 0.000 was less than 0.05. The study came to the conclusion that there was a substantial difference between the means of the computer literacy levels of senior secondary school students who were taught Computer Studies using the Programmed Learning Strategy and those who were taught using the traditional technique.

Question 3: What is relationship between the students' Computer Literacy and senior computer science performance of secondary school students?

Table 5

Pearson Correlation Coefficient of Students' Computer Literacy and performance of senior secondary school students in computer studies

Predictor	Criterion	N	Correlation Coefficient 'r'	Interpretation
Computer Literacy	Achievement	236	.471[a]	Moderate positive Relationship

a. Predictors: (Constant), Pre_SCLS, Post_SCLS

b. Dependent Variable: Post_CAT

Table 5 above showed that the correlation coefficient of the Students' Computer Literacy and their achievement scores in Computer Studies was .471. The result showed that there was a moderate/average/normal positive relationship between Students' Computer literacy level and their achievement in Computer Studies.

$H0_3$: There is no significant relationship between the students' Computer literacy level and senior secondary school students' achievement in Computer Studies.

Table 6

Regression Analysis ANOVA of the Students' Predictive Variable (Students' Computer Literacy) on Student' achievement in Computer Studies

Model		Sum of Squares	Df	Mean Square	F	Sig.	Dec.
1	Regression	10415.307	2	5207.653	33.185	.000[b]	S
	Residual	36564.354	233	156.929			
	Total	46979.661	235				

a. Dependent Variable: Post_CAT

b. Predictors: (Constant), Pre_SCLS, Post_SCLS

The Analysis of Variance (ANOVA) for the regression (prediction) showed that the F-ratio was 33.185 and was significant at 0.000, according to the Regression ANOVA results in Table 6. As indicated, the null hypothesis 3 was rejected because 0.000 was less than 0.05. As a result, the study came to the conclusion that there was a substantial correlation between students' computer literacy and their ability in computer studies in senior secondary school.

Question 4: What is the relative effect of Computer literacy level on senior secondary school students' achievement in Computer Studies?

Table 7

Regression Model Summary of Students' Computer literacy level of performance of senior secondary school students in computer studies

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change
1	.471[a]	.222	.215	12.52711	.222

a. Predictors: (Constant), Pre_SCLS, Post_SCLS

b. Dependent Variable: Post_CAT

c. Weighted Least Squares Regression - Weighted by SCLS

In Table 7, the outcome, it was revealed that the multiple correlation coefficients R were 0.471. This suggested that the predictor variable and the criteria variable had a moderately positive connection. The chart also showed that R2 produced a value of.222, or 22.2% of the variation the effectiveness of students' computer studies, was due to the combined influence of their level of computer literacy and the standard error of 12.53. The table also demonstrated that, with an adjusted R2 of.215, the students' achievement in computer studies increased by 21.5% for every modification made to their degree of computer literacy. H0 4:Computer literacy level has no appreciable relative impact on senior students in secondary schools in computer studies.

Table 8

Standardized and Unstandardized Regression Coefficients of Students' Computer literacy level and SSS Students' achievement in Computer Studies

Model		Unstandardized Coefficients		Standardized Coefficients			
		B	Std. Error	Beta	T	Sig.	Decision
1	(Constant)	23.729	2.285		10.384	.000	
	Post_SCLS	2.038	.251	1.342	8.116	.000	S
	Pre_SCLS	-2.114	.269	-1.298	-7.852	.000	S

a. Dependent Variable: Post_CAT

The result in Table 8 showed the Standardized and Unstandardized Regression Coefficient and the corresponding T-values for each of the independent variables Students' Computer Literacy Level. The beta weight gives an indication of the relative contribution of the variable to the prediction of students' achievement in Computer Studies when all other variables are controlled. From the result in Table 8, it was revealed that the unstandardized coefficient measured the extent to which the independent variable can predict the dependent variable. Table 8 showed that the rates at which Students' Computer literacy level (Post_SCLS) can predict the students' achievements in Computer Studies is 1.342% (Beta=1.342) and the rate at which the Computer Studies teachers allow their students to use their students' prior Computer literacy level (Pre_SCLS) is predicted to decrease the students' achievement by 1.298% (Beta=-1.298). From the table 8, it was also discovered that for any increase of additional unit of 2.038% (Beta = 2.038) on Students' Computer literacy level (Post_SCLS), the students' prior Computer literacy level (Pre_SCLS) will decrease by 2.114% (Beta=-2.114), the students' achievement is predicted to increase by 23.729 (Beta=23.729), which are significant with the respective t=statistic values of 8.116, -7.852 and 10.384 at a significant values of .000. Since .000 is less than .05 levels of significance, the null hypothesis was rejected. As a result, computer literacy had a large relative impact on senior secondary school pupils' ability in computer studies.

Discussion

According to the study, pupils who were taught computer science utilizing a programmed learning strategy greatly superior to their competition in terms of academic performance and literacy levels. This result is consistent with those of Onuchie (2019), Kurima (2014), and Chaudhary (2015) who discovered that the use of programmed learning materials (PLM) was a more effective teaching strategy than the conventional method. According to Pigcon (2014), programmed learning strategy is a student-centered learning strategy in which students are exposed to numerous of small learning frames or pieces of information in a logical sequence that provides immediate knowledge and feedback following a comprehension test. Since programmed learning strategies help students learn computer science at a rate of 42.69% faster, computer science professors must make sure they use them when teaching their pupils the subject.

The study also showed that, in comparison to students taught using the conventional way, those using the Programmed Learning Strategy are substantially more likely to start computer training, increasing their Computer Literacy skill level to 62.47%. The result of tables 3 and 4 showed that the mean scores of the students' Computer literacy levels for both groups were very poor at pretest and posttest because both groups were not able to get an average mean scores of the students' Computer literacy levels of 45, which indicated that the students were not exposed to any form of Computer training programme at home. However, the result further showed that it was as a result of Programmed Learning Strategy that prompted the students in the Experimental group to embark on Computer Literacy programme which boosted their Computer literacy level to 62.47%. Hence, parents must ensure that they send their ward on Computer Literacy training in order to aid their ward acquire Computer Literacy without shifting the entire boarding to the Computer Studies teacher. This is due to the fact that, according to Ausbel, Novak, and Henesiana in Nneji (2012), programmed learning is used as a self-instructional mechanism and for maintaining the availability of a copy of newly acquired methods or repeat performances by learners using newly acquired knowledge. Additionally, it regulates the variances among each student and gives the learning environment, appropriate behavior, and topic comprehension equal weight.

This result corroborated the findings of Oyelabi (2017) and Bellman, Esogbue, and Ichiro (2014), who in separate research found a connection between students' knowledge of computer technology and their academic success in computer science education, and suggested a connection between the students' proficiency with computers and their ability in computer studies, and in secondary school.This implies that both have an impact. The study also showed that the students' low levels of computer literacy were a significant factor in their poor ability in computer studies. This is consistent with Oyelabi's (2017) findings, which showed that students' poor ability in computer studies was caused by their low computer literacy level. This implied that students' poor ability in computer studies was due to their lack of computer literacy. As a result, the Enugu State government must see to it that students in senior secondary schools that provide computer studies receive instruction in computer literacy.

Conclusion and Recommendations

This study highlighted the significant findings that offered additional insight into the association between students' computer literacy and their success in computer studies. However, student achievement in computer studies is strongly predicted by their level of computer literacy. Additionally, the students' efficiency in computer studies and their computer literacy were both improved by the programmed learning strategy.

Based on the findings of the study, the researchers therefore, recommends the following:

1. The Federal/State Ministries of Education, Nigerian Educational Research and Developmental Council (NERDC) should develop Computer Studies curriculum that is inclusive of Programmed Learning Strategy and that will prompt the students to be Computer literate.
2. Enugu State Government through the Post Primary School Management Board should pay Computer Studies teacher some incentives that they Computer Studies teachers can use to power the Computer Lab which they will use in teaching the students Computer Studies.
3. Federal/State Ministries of Education, Nigerian Educational Research and Developmental Council (NERDC), Post-Primary School Management Board (PPSMB), Nigerian Society

of Computer Educators and other non-governmental agencies should organize conferences, seminars and/or workshops for Computer Studies teachers on the use of Programmed Learning Strategy and the need to motivate their students embark on Computer Literacy training.

4. Computer Studies teachers should use Programmed Learning Strategy in teaching their students Computer Studies.
5. Students' confidence in their Computer insights and literacy should be developed and maintained using the Programmed Learning Strategy.
6. Enugu State government must ensure that the seniors studying computer science receive instruction in computer literacy. Students from senior secondary schools participating in computer studies embark on Computer literacy training.

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