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Effect of Information and Communication Technology on the Interest and Achievement of Secondary School Students in Chemistry in Aguata Education Zone

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Abstract

This research work investigates the impact of Information and Communications Technology instructional methods on the interest and performance in Chemistry by Senior Secondary School Students within Aguata Education Zone of Anambra State. The research design that was used in the study is a quasi-experimental pre-test, post-test and control group design from an intact class. Four research questions were raised and three hypotheses were tested at 0. 05 level of significance. The population of the study therefore included 2,644 Senior Secondary School Students Class Two from nine out of the 52 public schools in Aguata Education Zone. Chemistry Interest Inventory (CII) was the instrument used for data collection while Chemistry Achievement Test (CAT) was also used and these two were analyzed using Cronbach Alpha and Kuder- Richardson (K-20) respectively revealed a reliability coefficient of CII is 0.64) and the reliability coefficient of CAT is 0.73. For the research questions, mean and standard deviation were used to analyze the collected data. The hypotheses were tested at 0. 05 level of significance using analysis of covariance. The findings revealed that there was a significant improvement in students' cognitive achievement and interest in chemistry due to ICT instructional packages. And, that gender does not affect the performance of students that were taught Chemistry with ICT instructional package. In light of this, it was recommended that Chemistry teachers should adopt ICT constructional methods in the teaching of Chemistry in Senior Secondary Schools.

Keywords : Achievement, interest, information and communication technology.

1. Introduction

Science is the foundation on which today technological advancement is built upon. It is a lively human process that aims at comprehending the functioning of our world. According to Fape (2010), science is a rationally structured knowledge about nature that is characterized by systematic methods of attitudes for it acquiring, teaching, learning and practicing. It consists of fundamental subjects which include Chemistry, Physics, Biology and Mathematics. Chemistry stands in a special place among various science subjects taught at the secondary school level. Chemistry is the Oracle of the contemporary science. Most of the core science-based courses have it as a fundamental requirement.

Chemistry is defined as the science that seeks to understand the composition of matter, examining its properties and the reactions it undergoes. It explores how substances interact, combine, or transform, and applies this knowledge to produce new materials (Ani, Ani, & Chukwuneke, 2015; Maier, 2023). Chemistry education has to catch up with the growing need for science and technology by both private and government entities. If Chemistry education is not well imparted to the students then the future of our nation seems bleak. This is because the natural resources, which are in abundance in Nigeria, requires to be exploited, refined, and transformed into useful products for maximum utilization. Some of them include coal, columbite, tin, iron ore, kaolin, lime stone, gold, uranium etc in the category of solid minerals and animal hides and skins, rubber, palm produce, groundnuts, cassava etc in the category of agricultural products which remain underutilized (Adikwu, 2010).

Chemistry Education is facing such challenges as poor performance and lack of interest among students, which have resulted in low performance and enrolment scores (Akinsola & Igwe, 2009). Education, at the Senior School Certificate Examination (SSCE) conducted by the West African Examination Council (WAEC) and the National Examination Council (NECO) has remained poor especially in Chemistry that has one of the worst and poorest result over the years (Ibe & Madusnum, 2001). From the report of the Chief Examiner for the West African Senior School Certificate Examination up to the current year, he outlined the causes of the poor performance of candidates in Chemistry. Some of the reasons are: Numeracy and literacy of the students: Majority of the students could not solve most of the numerical questions; Poor written expressions and the use of wrong terms, worst performance on IUPAC nomenclature especially organic compounds, writings of formulae, and balancing of chemical equations. The causes of poor performance of students in Chemistry have been identified to comprise; poor instructional approach used by most Chemistry teachers (Igboanugo & Njoku, 2015; Igboanugo 2013; Njoku & Ezinwa, 2014); inability of teachers to allow students to apply theoretical content of science knowledge in practical problems (Onyegegbu, 2001); and use of ineffective strategies.

This means that the conventional method is centered on the instructor rather than the student. This could also make students lose concentration during a long lecture hence having a hard time in retaining what was taught thus, making students be more of listeners rather than active learners. Some scholars including Aniodoh & Egbo (2013); Akpoghol, Ezeudu, Adzape & Otor (2016) opined that, educational objectives in Chemistry are hard to achieve in Nigeria due to the fact that the conventional method of instruction is been employed in teaching Chemistry. This leads to low academic performance in Chemistry. All the above suggest that Chemistry teaching has to be done in a way that will help the relevance and transferability of Chemistry

concepts and science process skill, the prominence they require. According to Njoku (2003) students' interest is in direct proportion to their performance in school subjects such that where students' interest in Chemistry is poor, then poor academic achievement in Chemistry will be observed. It is necessary therefore, to focus chemistry education research from the conventional method towards adopting new teaching methods. According to Ali (1998), it is interesting instructional approach that makes a lot of difference in favor of learning in sciences.

From literature, researchers noted that applying ICT has the potential of building and maintaining students' interest and curiosity towards learning. In support of this, Soylu & Ibis (2008) on the use of Computer Assisted Instruction stated that; most of the knowledge which is related to natural phenomena is now available in the computer environment. Applying computer in teaching and learning may enhance academic achievement; this result may improve students' achievements and also encourage them. Furthermore, there has been an exceptional support towards using ICT in the instructional and learning processes across the country and even globally (Okoro & Ekpo, 2016).

Khan, Bhatti & Khan (2011) has described ICT as a combination of tools and tools that are applied to transfer, store and process information; The use of ICT in teaching is relevant and implemental approach in offering education to the learners that would equip them adequately with the necessary skills as per world of work. Employment of different multimedia tools including TV, recorded programs, videos and computer based applications makes the learning environment more stimulating and interesting for any learner at any age they may be. The use of ICT may introduce various skills related to the students' needs in the future such as the use of the computer for purpose of writing with Microsoft Word, for Emails and use of Internet for lifelong learning processes (Gabare, Gabarre, Din, Shah & Karim, 2014; Khalid, 2014). Looking at generalized assertions made by scholars like Reynolds, Treharne, & Tripp (2003) , "ICT enhances the performance in examination or statutory test scores, emergence of other styles of social, cultural and intellectual capacity". In implementing ICT-integrated lessons, learner learner-centered lessons are achieved where students learn from their experiences or from their hand-on initiatives. This is in sharp comparison with other conventional learning contexts where the teacher is the knowledge reservoir, the possessor of knowledge, while the learners are the reciprocals of the existing knowledge in a linear way. That is the reason such materials are commonly referred to as Computer Aided Instructions (CAI) packages, as they use the combination of text, auditory signals, and video clips, as a rule. Computer Aided Instructional packages consist of tutorials, drill and practice, simulation and games and application modes.

The tutorial method is a type of programmed learning that uses Stimulus-Response theory of learning as pointed out by Ozofor (2015). According to Shamsideen (2015), computer tutorial instructional method is an interactive, self-schedulable, and self-contained sequential content teaching-learning tool in which students are able to learn contents with the aid of a computer and no other teaching material is required. This type of instruction informs the students, in most cases it provides new information like a human teacher or tutor would, it commonly employs text and graphics to portray content (Osuafor & Onoh, 2022). Some of the benefits of using this type of instruction include the ability to present content based on learner response to the questions, dynamism in content delivery and record keeping (Eze, Onwusa & Nwaosa, 2020).

Another factor that may affect Interest and Achievement in Chemistry could also be gender. Gender is defined as the biological sex of an individual that plays a significant determinant factor in science and technology education. Umameike & Osunde (2005) define gender as all the attributes of male and female behaviour that determines what one is expected to do or be as a male or female in a society. The study has revealed gender as one of the determinants of students' performance (Anagbogu & Ezeliora 2007). Gender-related studies with regard to students' achievement in chemistry is frequently used in literature. According to the study conducted by Eze (2008), gender played a crucial role in determining students' performance in chemistry and it established that male students out-performed their female counterparts. Jahun & Mmoh (2011), and Mari (2019), opined that male students have better performance in Chemistry than female students. These contradictory findings on the effects of gender on academic performance has created the need to validate gender effects on instructional practices especially in relation to achievement and interest in chemistry. Based on the afore said, the researcher proceeded to establish the impact of information and communication technology (ICT) on senior secondary school students' interest and achievement in chemistry in Aguata Education Zone, Anambra State.

The level of achievement and interest demonstrated by poor students in Chemistry is worrisome. From the analysis of the results obtained from the question papers of WAEC (2012), those candidates who had chemistry as one of their chosen subjects performed poorly in the areas such as concept of equilibrium of reversible reaction, writing of the formulae and correct balanced chemical equations and explanation of basic chemical principles, concepts and their applications. Njoku and Nzewi (2010) affirmed that the implementation strategy used by the Chemistry teacher is to a great extent accountable for the consistent poor performance and interest in Chemistry. Chemistry being an activity oriented should mostly be taught by using teaching methods that motivates the students. They should be used in the contemporary

teaching methods to help teachers to address issues of learners' poor attentiveness and performance in chemistry. Besides, students of the 21st century consider technology tools as appealing hence the tools are viewed as motivators that can capture and sustain student interest. Computer-aided learning means that learners can engage with the computer to learn in a way that enables them to gain mastery over a topic compared to the traditional method (Etiubon & Etiubon, 2021).

The study focuses specifically on the impact of Information and Communication Technology on students' performance and interest in Chemistry in senior secondary schools in Aguata Education Zone of Anambra State. It has topics such as Rates of Reaction, Reaction Equilibrium, Writing and balancing of Chemical Equations, IUPAC nomenclature of Organic compounds. The choice of the topics was made from some of the topics chemistry educators stated to be some of the challenging topics in chemistry for students. This was done because one of the variables in the study is gender and for this reason co-educational schools were used. SS2 were also used because the topics for the study were from Senior Secondary Two syllabuses; Senior Secondary Two is not an external examination class to avoid putting much pressure on the students. The researcher presumed that if the concepts are taught with Information and Communication Technological package, they would grasp these subjects.

The research hypotheses for this study are as follows: There is no significant difference in the mean achievement scores between students taught chemistry using Information and Communication Technology and those taught using the Conventional Method. Additionally, there is no significant difference between the mean achievement scores of male and female students taught chemistry using Information and Communication Technology. Furthermore, there is no significant difference in the mean interest scores between students taught chemistry using Information and Communication Technology and those taught using the Conventional Method. Lastly, there is no significant difference between the mean interest scores of male and female students taught chemistry using Information and Communication Technology.

2. Research Method

In this study, the researchers used quasi-experimental research design. Quasi experimental design is therefore a type of design where the researcher has no control over how the participants are grouped. It was deemed economical to use quasi experimental design in the study because intact classes were used in the study. The study involved the experimental group and the control group. The population of the study includes 2642 Senior Secondary School Class (SS2) Chemistry students from the 52 public secondary schools in Aguata Education Zone of Anambra State. Two of the

schools were from Orumba South LGA, two public schools from Orumba North LGA and two public schools from Aguata LGA. Out of the six schools, three schools were placed in the experimental condition while the other three schools were placed in the control group through simple random methods. The population was made up of all SS2 students in the sample schools. 135 male students, 102 female students meaning a sample size of 237 participants for the study. The instruments for collection of data adopted in the study were Chemistry Achievement Test (CAT) and Chemistry Interest Inventory (CII). Section A and B were included in the Chemistry Achievement Test (CAT). Section A looked for gender and the name of the school the students belong to.

Section B was comprised of achievement test items that were developed by the researcher from W. A. S. S. C. E and N. E. C. O past question papers that corresponded to the topics being taught for the study. The CAT comprised forty (40) items with multiple choices of four options for each item, namely options A, B, C and D. Each test item had only one correct option available. Each correct response was worth 2 ½ points and the exam score totaled to one hundred points. The Chemistry Interest Inventory (CII) comprised two parts, and they were known as Section A and Section B. As for Section A, it asked for the personal details of the students regarding their gender and the name of their school. Section B of the instrument was developed by the researcher and was made up of twenty-nine (29) items to measure the students' interest in Chemistry. The CII was completed on a 4-point modified Likert type rating scale of Strongly Agree =4, Agree =3, Disagree=2 and Strongly Disagree =1. The participants in the study provided the ratings as to how much they agreed with each of the items. The above instrument was validated by two experts in Nwafor Orizu College of Education, Nsugbe. Cronbach Alpha was used in the analysis of the test results from CII while Kuder- Richardson (K-20) was used in the analysis of results from CAT. Since the items were non-dichotomously scored, Cronbach alpha method was used in analyzing CII scores. Kuder-Richardson (K-20) method was used for CAT because it assumed all items to be equal in difficulty levels and it is easy to operate.

The reliability coefficient of CII and the reliability coefficient of CAT would be calculated. These show high correlation coefficient thereby substantiating the notion that the instruments were reliable. There were two instructional strategies employed for the study. In more detail, the experimental group received teaching through information and communication technology while the control group received teaching through conventional method. The researcher recruited and trained the research assistants, who are the Chemistry teachers of the schools that were used for the study. The teachers of the experimental group were trained to use a lesson plan that was developed by the researcher and the information and communication technology of tutorial mode of instruction was employed.

The experimental group involved students who were required to be proactive in the lesson through the use of a computer system. It is a form of discovery learning where the students pursued different activities in the computer packages as guided by their teacher. To implement the method for the control group, teachers were instructed to follow the traditional approach using the lesson plans developed by the researcher. In both lesson plans, the topics to be covered, instructional objectives, and method of evaluation were the same. Both the sections got taught with the same amount of time (period) of double periods each week for two months. Before the beginning of the experiment on the sample students, they were given a Pre-Test. After completing the study each teacher gave the Post-Test to the students. Both the pre-test and the post test were administered and corrected by the teachers and scores recorded. These data were provided to the researcher for analysis. Thus, the quantitative data was analyzed using mean and standard deviation to answer the research questions while using the Analysis of Covariance (ANCOVA) statistics to test the hypotheses at $p < 0.05$ level of significance.

3. Results and Discussion

3.1 The Achievement Scores for Students Taught Chemistry Using Information and communication technology and Those Taught Using Conventional Method.

Table 1. Mean and Standard Deviation of the Achievement Scores for Students Taught Chemistry Using Information and communication technology and Those Taught Using Conventional Method

		PRE TEST		POST TEST		GAIN	
Method	**N**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
ICT	112	15.13	9.44	72.56	16.52	57.43	17.12
CM	125	15.07	8.63	46.96	14.85	31.89	12.98

The achievement scores from the experimental and control groups were summarized by mean and standard deviation in table 1. Therefore, the mean achievement score and the standard deviation of students taught Chemistry with information and communication technology were 72. 56 and 16. 52 respectively. These gave a mean gain score of 57. 43. In the same way, the mean achievement score and the standard deviation of Chemistry students who were taught by Conventional Method were 46. 96 and 14. 85 respectively. These provided a mean gain of 31. 89. Therefore, the study concludes that students taught Chemistry with ICT had higher scores than students taught via Conventional Method. This was demonstrated below with the help of bar graph to show the difference in the mean scores of students taught Chemistry using ICT and conventional method.

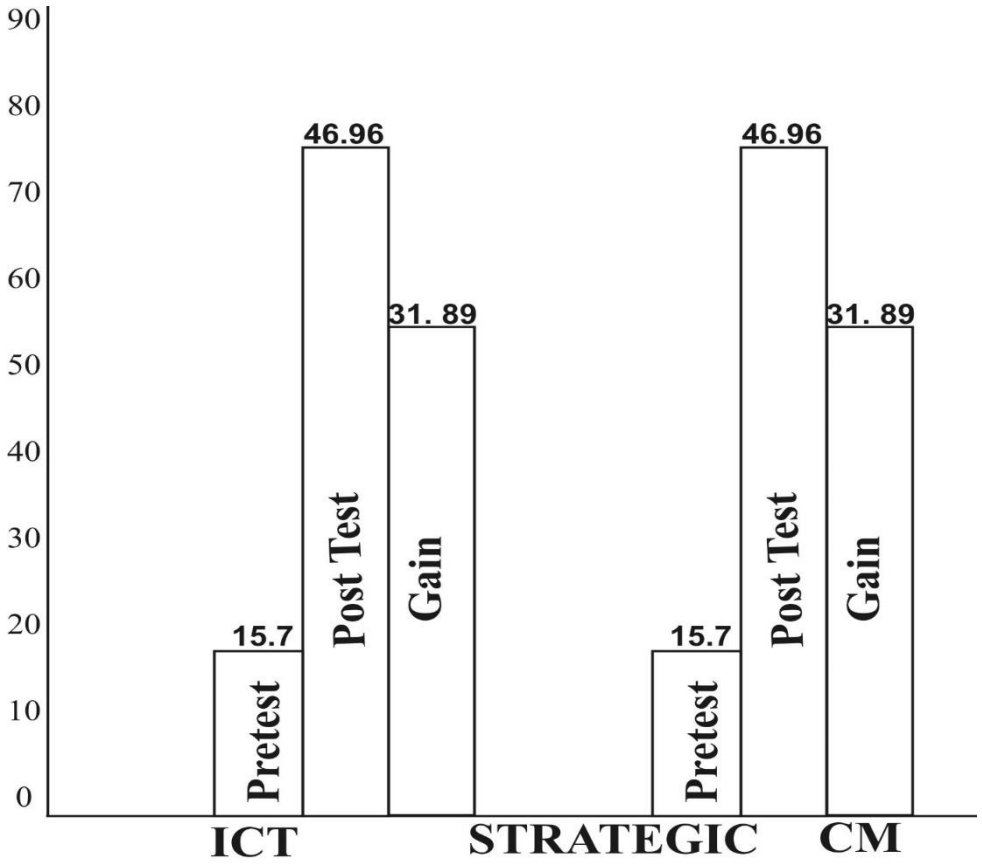

Fig 1: Graphic illustration of students mean achievement using information and communization technology conventional method.

3.2 The Achievement Score for Male and Female Students Taught Chemistry Using Information and Communication Technology

Table 2. Mean and Standard Deviation Scores of the Achievement Score for Male and Female Students Taught Chemistry Using Information and Communication Technology

		PRETEST		POST TEST		GAIN	
Gender	**N**	**Mean**	**SD**	Mean	**SD**	**Mean**	**SD**
Male	63	15.13	8.97	75.63	14.75	60.50	15.76
Female	49	15.14	10.05	69.26	17.86	54.12	18.12

The mean and standard deviation of achievement scores of the male and female participants taught Chemistry using information and communication technology is provided in Table 2. From the result, the mean achievement score and standard deviation of male students taught Chemistry with information and communication technology were 75. 63 and 14. 75 respectively. This provided a mean gain scores of 60. 50. Also, the overall achievement score and the standard error of the mean of the female students who were taught Chemistry with information and communication technology were 69. 26 and 17. 86. This gave a mean gain scores of 54. 12. However, the mean gain difference between the male and female students was computed to be 6. 38 in support of the male students. This meant that male students scored higher than their female counterparts in Chemistry when taught with Information and Communication Technology. This is highlighted below using graphic illustration to show the differences in the mean scores of the male and female participants taught Chemistry using information and communication technology.

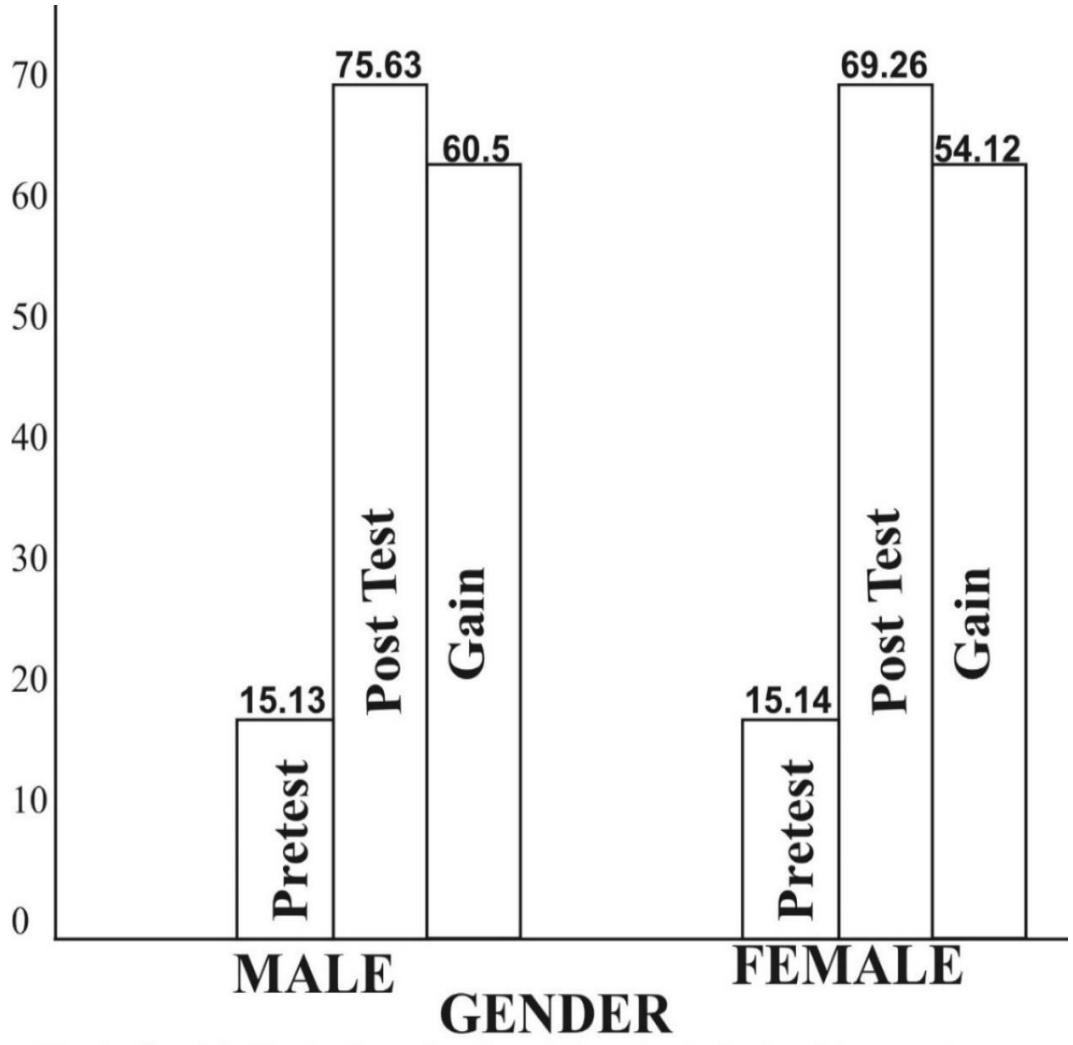

Fig 2: Graphic illustration of male and female student achievement using information and communization technology.

3.3 The mean interest scores of students taught Chemistry using Information and Communication Technology and those taught with Conventional Method

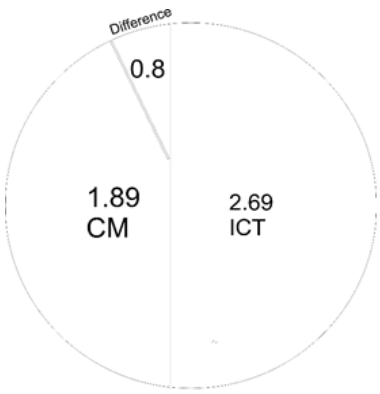

Fig 3: Graphic illustration of grand mean scores of student interest taught chemistry using information and communication technology and those taught with conventional method.

The result shown in the Fig 3 depicts the grand mean of the interest score of students taught chemistry using information and communication technology and that of students taught using conventional method. From the result, the grand mean interest score of those taught using information and communication technology was 2. 69 while the grand mean score of those taught using Conventional Method was 1.89. The grand mean interest of the subjects that were taught with Information and Communication Technology was . 80. This is an indication that ICT could improve students' interest more than the Conventional Method. From Fig. 3, graphic illustration showed the difference in the interest scores of students taught chemistry using Information and Communication Technology and those taught using the Conventional Method. From the result the grand mean interest score of those taught using information and communication technology was 2. 69 while the grand mean score of the students taught using Conventional Method was 1. 89. The grand mean difference of those taught with Information and communication technology and those taught with Conventional Method was .80. This is an indication that information and communication technology can enhance students' interest more than the Conventional Method.

3.4 The influence of gender on students' mean interest score in Chemistry when taught with Information and communication technology

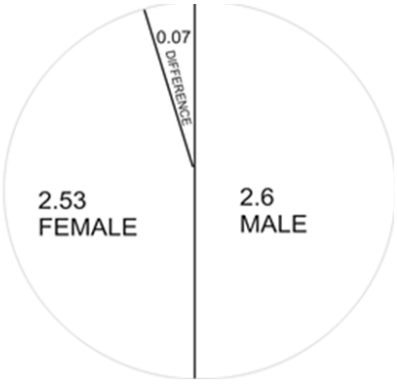

Fig 4: Graphic illustration of grand mean of male and female students' interest taught chemistry using information and communication technology.

Figure 4: demonstrated the grand mean interest score of male and female students taught Chemistry using Information and communication technology as 2. 53, whereas that of the male counterparts was 2. 60. Thus the mean difference is . 07 it was observed that the male students were favoured. This result implies that male students who went through Information and communication technology have better interest gains than female students.

3.5 Hypothesis Results

3.5.1 Analysis Of Covariance Result of the Mean Achievement Scores of Students Taught Chemistry Using information and communication technology and Those Taught With Conventional Method

Table 3. Analysis Of Covariance Result of the Mean Achievement Scores of Students Taught Chemistry Using information and communication technology and Those Taught With Conventional Method

Source	Sum of square	Df	Mean square	*F*	Sig	Partial Eta squared
Corrected						
Model	40654.244	2	20327.100	*92.431*	*0.000*	0.441
Intercept	173938.900	1	173939.000	*790.931*	0.000	0.772
Pretest	3597.154	1	3597.150	*16.357*	0.000	0.065

Groups	37805.549	1	37805.500	*171.908*	0.000	0.424
Error	51460.524	234	219.917			
Total	937831.250	237				
Corrected Total	92114.250	236				

A.R-square =.441 (Adjusted R square = .437)

The data analyzed in the Table 3 revealed the F-calculated values for test of significance between the mean achievement scores of students taught Chemistry using Information and Communication Technology (experimental) and the students taught Chemistry with conventional method (control) as F (1,234) = 171. 91, p= . 0005. η2= . 42. As the probability value of . 000 is less than the . At 5% level of significance, the null hypothesis was rejected. This means that there is an F-test value that supports the hypothesis that there is a difference between the experimental group and the control group in favor of the experimental group which was taught Chemistry using information and communication technology.

3.5.2 The Difference Between the Mean Achievement Scores of Male And Female Student Taught Chemistry Using the Information and Communication Technology

Table 4. Analysis of Covariance Result of the Mean Achievement Score of Male and Female Student Taught Chemistry Using the Information and Communication Technology

Source	Sum of square	Df	Mean square	F	sig	Partial Eta Square
Corrected Model	2927.876[a]	2	1463.938	3.841	.023	0.032
Intercept	171982	1	1719.82	451.23	.000	0.659
Pretest	2880.517	1	2880.517	7.558	.006	0.031
Gender	79.182	1	79.182	0.208	.649	0.001
Error	89186.89	234	381.141			
Total	937 831.3	237				
Corrected Total	92114.77	236				

A.R –square =0.32 (Adjusted R squared = 0.24)

Table 4 indicated the F-calculated value for test of significance between the mean achievement scores of male and female students taught Chemistry using information and communication technology as F (1,234) = 0. 208, p = . 65, η2= . 001. The value of F is not significant at . 05 which tells us that there is no significant difference between the two groups. 05 level of significance. Hence, the hypothesis that sought to find out

if there was any significant difference in the mean achievements score between male and female students taught Chemistry using information and communication technology is rejected. Therefore it is safe to conclude that the use of information and communication technology does not have a statistical significant effect on the mean achievement score of male and female Chemistry students.

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3.5.4 The Difference Between the Mean Interest Scores of Male and Female Students Taught Chemistry Using Information and Communication Technology

Table 6. Analysis of covariance Result of the mean interest Scores of Male and Female Students Taught Physics Using The Computer Assisted Instructional Package

Source	Sum of Squares	DF	Mean Square	F	Sig	Partial Eta Squared
Corrected	11251.437	2	5625.719	56.467	0.000	
Model				0.326		
Intercept	16907.27	1	16907.27	169.702	0.000	0.42
Pre Interest	2100.089	1	2100.089	21.079	0.000	0.083
Gender	1220.0	1	1220.064	12.246	0.401	0.05
Error	23313.18	234	99.629			
Total	935430.8	237				
Corrected Total	34564.62	236				

R Squared = 0.326 (Adjusted R Squared = 0.320)

The analysis of covariance in table 8 reveals significant differences in mean interest scores between male and female students taught physics using computer-assisted instruction. The model, including pre-interest and gender, is significant ($F = 0.326$, $p < 0.05$). The intercept and pre-interest have substantial effects ($p < 0.001$) on interest scores, with the intercept showing the highest impact (Partial Eta Squared = 0.42). Gender also has a significant effect ($p = 0.401$), although relatively smaller (Partial Eta Squared = 0.05). Overall, the model explains 32.6% of the variance in interest scores, suggesting a moderate predictive capability. Adjusted R Squared indicates a good fit (Adjusted R Squared = 0.320).

According to the findings of this study, it can be concluded that ICT has a positive impact on student's achievement and interest in chemistry more than conventional teaching method. This study showed that students who were taught chemistry with Information and Communication Technology packages has higher achievement than students who were taught chemistry with Conventional Method. Also, the treatment using Information and Communication Technology package yielded a significant difference in students' achievement in chemistry compared to those taught using Conventional Method. This result supported Avinash and Shailja (2013) who indicated that the ICT package is more conducive than the conventional teaching technique in the sense that it produced better achievement scores in chemistry among students. This is also in line with Agrahari and Singh (2013) who revealed that ICT enhances the achievement scores in chemistry at secondary level. This smiled to higher achievement in the treatment group, fear of the students on the use of the computer for instruction and also individualization, which comes with new innovation such as the use of computer by the students. Through the use of the new innovation the students interest and attention were positively directed towards the lesson hence the high achievement. In addition the compelling pictorial representation offered by the computer that was lacking in the conventional method

could also have been a factor that led to high achievement by the treatment group. In this respect, it can be seen that Information and Communication Technological package allowed for students' increased engagement in the learning process.

This study also revealed that male students were able to perform slightly better than the female students in chemistry using Information and Communication Technology package and therefore concludes that there was no significant difference in achievement between Male and Female chemistry students. This implies that, the male and female Chemistry students were in the same proportion affected by using Information and Communication Technology package. That is, there were no significant differences in the performance of the female students and the male students given equal opportunities; which means there is no favourability of either gender. This finding is in contrast to the opinion by Igori, Eru & Inalegwu (2019) which observed that gender contributes to the performance of students in Chemistry when they are taught with ICT instructional package.

Interest is an intent state that affects the academic performance of a given student. In this study, students who were taught using Information and Communication Package in teaching Chemistry had higher level of interest compared to students who were taught using the Conventional Method. The analysis of interest on the subject matter revealed a statistically significant difference between the two groups at $p<0.05$ in favour of the experimental group. This result does support the finding of Tamunosisi (2015) whose result revealed that there was a significant interaction effect of treatment on the interest of students in science. This result pointed out that Information and Communication Technological Package has highly stimulating impact in making what is hard and uninteresting to be easier and enjoyable for the students hence improving students' interest in chemistry. This may have explained the increase in students' interest in chemistry which may have resulted from motivated behavior that grows and evolves each time the participants re-enroll in chemistry learning using ICT. These findings are in line with those of Agrahari and Singh (2013) who concluded that ICT had a positive impact on achievement scores of students in chemistry at the secondary level. This study supports Okorie (2014) who argued that incorporating computers in teaching helps address the issue of poor method of teaching and poor textbooks in use by teachers. This view goes contrary to the opinions of Mbaeze, Ukwandu & Anudu (2010) who observed that there was no correlation between the use of ICT and students' performance. In conclusion the Outcome of the finding is very informative to both teachers and administration. This then leads to the notion that more effort must be made and more exploitation of the ICT facilities especially the computer in facilitating effective teaching and learning.

4. Conclusion

Based on the findings, the teaching methodology significantly influences students' chemistry learning. The study showed that ICT (Information and Communication Technology) was more effective than traditional methods in increasing students' interest and performance in Chemistry. Students taught with ICT performed better in both interest and achievement than those taught using conventional methods. It also revealed no gender difference in performance and highlighted the importance of training ICT personnel. Limitations included power supply issues and limited computer lab resources, which affected the experimental group. Despite these challenges, the study has implications for using ICT in teaching Chemistry, suggesting its broader application in other subjects and educational levels. Future research should consider primary, junior secondary, and tertiary students, expand to other regions, and include rural areas to ensure comprehensive integration of ICT.

Recommendations include integrating ICT as a teaching strategy in Chemistry, ensuring teachers are computer literate, and encouraging students to develop computer skills. Parents should provide home computers with internet access to support students' practice and learning. Additionally, the government should ensure the supply of computers, internet facilities, and power to secondary schools to facilitate ICT-based education.

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