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Effectof Science Teachers' Competence and Attitudes Towards ICT integration in Teaching of Science Subjects in Secondary Schools in Anambra State, Nigeria.

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Abstract:*In many countries, integrating information and communication technologies (ICT) into education has been a major concern. Researches have shown that the integration of ICT in teaching and learning have several advantages.The thrust of this paper is to investigate science teachers' perception with regards to the use of computer tools and its software packages in the classroom by looking at the four distinct factors: competence, gender, age, and location that may have effect on teachers' perceptions regarding ICT. The study adopted a multi-stage cluster sampling method for choosing the sample. The research was guided by five research questions.For the investigation, six hypotheses were also proposed.The study's participants were 1638 science teachers from public secondary schools in Anambra State.The study's sample included 322 science teachers from the country's six educational zones of Anambra state.In addition, the researchers created twenty-three (23) questionnaire items for data collection. Internal consistency of the instruments was determined using the Cronbach Alpha analysis, which provided internal consistency coefficients of 0.81 and 0.86, respectively, using the Social Package for Social Sciences (SPSS) version 20.0.. The quantitative data collected were analyzed using descriptive mean; and the decision rule adopted in the analysis was to determine the mean value to be accepted based on the modified four-point Likert-Scale as a criterion mean or cut-off point of 2.5. Similarly, the hypotheses postulated were tested using ANOVAat 0.05 level of significance; and using Chi-square statistical measure to determine the relationship between variables in the study. The result showed that with the availability of computer technology resources in their various schools, science teachers have positive attitude towards computer integration in teaching. Yet, they lack competence in integrating computer technology into the teaching of science subjects. Furthermore, findings revealed that the teacher's competence and attitude towards ICT or computer integration in teaching science subjects in secondary school do not differ regarding gender, age and location. It is hoped or recommended that enlightenment campaign, workshops and seminars be organized and made compulsory for teachers by the Education Authorities: Federal, and State ministries of education, Institutes and Colleges of Education to create the awareness of the efficacy of computer integration in teaching science subjects in secondary school and then sensitize the adoption of the computer integration in their various schools and government should endeavor to include all schools in their on-going school net programme.*

Key Word*:Science teachers; Attitude; Information and Communication Technology; Competencies; Sceondary school.*

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I. Introduction

Computer technology ranks as one of the greatest innovations in human history. Majority of the innovations in the world today were sourced, developed or implemented with computer technology. In this context, computer technology is referred to as Information and Communication Technologies (ICT); it encompasses software applications, mobile devices, and various electronic and mechanical gadgets, as well as communication systems such as computers and others, which are now required pedagogical tools in teaching and learning[1]. Essentially, ICT is a generic term that describes any communication and information device that processes data and facilitates communication. Computer, as a tool for computer technology, is an electronic device which accepts, stores, retrieves and output data in the form of information following a set of instruction called program[2]. The scope of ICT has increased over the years as such gadgets as Smartphones, robots and digital television can reasonably perform computerized functions and could be referenced as computers.

According to recent studies, the implementation and incorporation of computer technology in education have resulted in various improvements in schools[3].For instance, technological advancements have resulted in significant transformations in various aspects of community and personallife.In fact, computer technology has had an impact on how people learn and teach at all levels.In thelight of educational reforms around the world, technology has performed a critical role in making better the teaching and learning process[4].This is because, the world of the twenty-first century is vastly digitalized, and such current realities dictates that teachers and students alike are adept with the use of computer systems.

The role of computer in a modern academic setting cannot be overemphasized. [5] stated that the computer provides interactive hands-on and minds-on activities that stimulates and facilitates critical thinking, creativity and problem-solving skills.In addition to this, Olorukooba[6,8]; adduced the reasons for the poor performance of students in science subjects as the non-use of teacher-centered instructional strategies, abstract nature of teaching science concepts, untrained and unqualified teachers,inadequate infrastructure and laboratory facilities; and the non-availability and utilization of instructional materials.To this end, the Nigerian Federal Government (FGN) set aside funds for laboratory equipment, learning materials, teachers' training and re-training, and research grants.In addition, in recognition of the critical role of computer technology in advancing information and skills required for successful functioning in the real world and nation building, the FGN provided computer systems for both primary and secondary schools through the school net programme[9]. In order to argument the effort of FGN, Anambra state Government also provided computer facilities for both public and private secondary schools [10].

Computer integration is one of the major factors undergirding national growth and development and there is a need for Nigeria and indeed other African nations to step up computer integration in schools.Therefore, [11] describedintegration with regards to teaching and learning as a mixture of information technology knowledge skills and well-established teaching process to produce students with better behaviour, knowledge, expertise and understanding. This integration should begin from the primary schools and continue through secondary and tertiary education levels. Furthermore, several academics expressed their opinion that combining technology and education will foster the growth and development of education in a manner that promote the students' training which is well-focused on students as well as their active participation in the process of acquiring quality education.The integration of computer technology at different educational levels may necessary follow different strategies.[12] proposed using the internet and digital devices such as cameras and video players that can take pictures or record video clips as pedagogical/ educational/instructive tools.

[13] described three (3) types of computer integration.These include learning about computers, integrating implementation to achieve traditional goals, and fully integrating implementation within a constructivist learning environment.Computer learning focuses on implementation rather than incorporation, resulting in computer literacy, which is described as the ability to use computer applications without regard for what is going on in the classroom.The second method of implementation uses a mix of technology and teaching to achieve teaching and learning objectives.It entails learning from a machine, with the computer acting as a teacher and the computer system acting as an information transmitter.The third form is concerned with complete integration within a constructivist learning space, where learning is accomplished by the use of a computer system and its software packages in a generative mode, with computers acting as cognitive, mediational, transformational and evaluative agents.

[14] cites the increasing power of computer integration in education to evaluate students' progress in a less interruptive manner and to record frequent data on their progress, as well as the enhancement of thinking skills and strategies, long-term impact, and preparing students to perform in various functions when they return to real-world application as some of the advantages of computer integration in education. Furthermore, due to the benefits of computer integration, examination bodies such as the Joint Admission Matriculation Board (JAMB) have retained the use of computer-based tests (CBT) in all examinations.In a similar vein, several Nigerian universities, such as Nnamdi Azikiwe University, University of Nigeria Nsukka, and others, have been using CBT in all their general wide course examinations.

Despite the obvious advantages of computer technology incorporation in assisting teachers and learners in the teaching and learning process[15,16], most science teachers are believed not to use computers and software packages in teaching science concepts.The lack of computer facilities in many schools, teachers' lack of necessary requisite skills, and poor knowledge of how to use the computer and software packages have all been cited as reasons for teachers' failure to integrate computers into their teaching.

Nonetheless, studies have revealed that poor academic feat of students in science subjects have been on the increase. In recent times, the achievement ofpost-primaryschool students in science subject examinations could be said to be not encouraging[17].This is worrisome in view of the role played by science in the growth and development of any nation. This evidence of perception is based on reports of the West African Examination Council and Nigerian Examination bodies like WAEC and NECO,which indicated the discouraging or poor performance of students in science subjects between 2004 to 2011as illustrated in the figure [18,19].

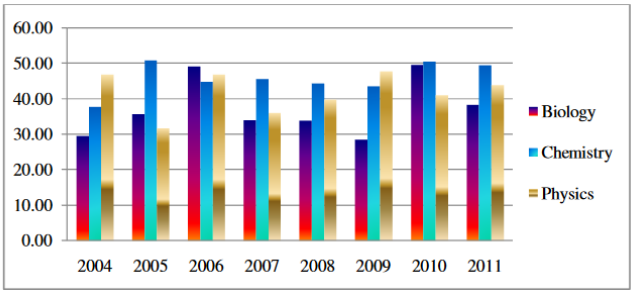

Figure 1. Performance of science students at May/June WASSCE (2004 – 2011)

Consequently, the perception held by some scholars is that certain factors could be responsible for this seemingly persistent phenomenon. Some researchers reported that most teachers do not employ computer system facilities together with educational software in teaching science subjects in secondary schools.Nevertheless,there are cases that the availability of computer facilities in schools does not guarantee an effective use of computer incorporated fully into classroom teaching and learning [20].However, there are barriers to the use of technology as a teaching and learning tool /the challenges with the diffusion of technology as part of educational [21], such as teachers' negative attitudes, inadequate training opportunities, and a lack of competence in using computers to aid teaching and learning is yet to be addressed [22].Science, as the foundation for socioeconomic growth, is intended to perform a key role in accelerating technical knowledge[23]. Therefore, the method for accomplishing success of students in science subjects should be sought.

The aim of this research is to investigate science teachers' perceptionwith regards tothe use of computer tools and its software packages in the classroom by looking at the four distinct factors: competence, gender, age, and location that may have effect on teachers' perceptions regarding ICT.

1.2 Research Questions

In relation to this study's goal,five (5) research questions were addressed. They are:

1. What is the level of computer integration competency among secondary schools science teachers?
2. How do teachers feel about computer integration in the classroom?
3. Do teachers' perceptionwith regard to computer integration in the classroom vary depending on their age?
4. Do teachers' perceptionwith regard to computer integration in the classroom vary depending on their location?
5.Do teachers' perceptionwith regard tocomputer integration in the classroom vary depending on their gender?

1.3 *Significance of the study*

This research is significant because it is relevant to teachers, particularly science teachers, who will be able to determine their level of computer integration competence and attitude.Furthermore, it will allow teachers to determine whether or not they need improvement and, if so, to what degree.The findings of this study will also assist science teachers in **honing** their computer-assisted teaching skills.When teachers have a high level of computer integration competency and a positive attitude toward computer integration, students are the direct beneficiaries.In the same context, it will help the curriculum planners to determine the computer competencies and attitudes of teachers.This, in turn, aids in determining whether the nation's computer integration policies' objectives are being met, as the issue can either help or hinder the achievement of the stated goals.

II. Review Of Related Works

[24] used the UNESCO ICT CFT to assess Economics teachers' perceptions of their ICT competencies, using a descriptive survey and a traditionaldesign.In addition, data wereobtained through the use of an Information and Communication Technology Competency Scale (ICTCS), which is a self-assessment tool.The sample of the study used was 80 Economics teachers sampled from Enugu education zones.Research questions and hypotheses were formulated, analysed and tested using standard mean method and analysis of variance.Theoutcome showed that Economics teachers in Enugu's education zonedo not possess the requisite competencies needed to use ICT facilities to teach Economics. Besides, gender and age are not significant factors considered in the use of ICT to teach Economics in Enugu state. However, the area of study differs from that of the present study and younger teachers have high degree of competencies than the older teachers.

A study carried out by [25] examined the ICT competencies of teachers of English language as second language (ESL) in Lagos state secondary schools. The study sample consisted of 200 schools, with a research questionnaire serving as the data collection instrument. The data and the hypotheses formulated were analyzed using descriptive analysis statistical methods such as the t-test and chi-square. The findings of the study revealed that English teachers have a low level of competency.Also, teacher awareness of policy objectives was limited as well as the facilities and services available to facilitate ICT incorporation into the school curriculum

were severely lacking. However, this study was conducted in Anambra State, and the respondents were science teachers.

[26] conducted research on the use of ICT skills in the implementation of mathematics curriculain Niger State of Nigeria**.** In the research, two research questions directed the review.The data was collected using an observation/interview guide and a questionnaire. Similarly, the data obtained was analyzed using frequency tables, percentages, and the mean.The results revealed that most mathematics teachers are not computer skilled. Again, [27] conducted research on computer Assistant Instruction (CAI) in secondary schools in the teaching and learning of biology and concluded that using ICT techniques has an unquantifiable advantages.It included 120 secondary school students from three private schools in Nigeria's Oyo state.This study found that students who are exposed to CAI on an individual or corporate level perform better than those who are exposed to traditional classroom instruction.This emphasizes the importance of developing ICT strategies for teaching and learning biology (a science subject) in Nigerian secondary schools.The study emphasizes the importance of implementing ICT-based biology teaching and learning methods in Nigerian secondary schools.The study also revealed the easiness with which teachers ordered the knowledge of the subject with ICT assisted methods tostudents after obtaining the trainings reworked for their use.

[28] investigated library staff's perceptions of work motivation in relation to job satisfaction and organizational engagement in academic and research libraries in Oyo state, Nigeria.A total enumeration sampling of 200 library staff (41 percent female, 59 percent male) was taken from five research and four academic libraries.Work Motivation, Job Satisfaction, and Organizational Commitment Scale (WMJSCS) was adapted from Organization Commitment Questionnaire prepared[29], Minnesota Satisfaction Questionnaire[30], and Motivation Behaviour Scale[31], having an overall co-efficient of r = 0.83 cronbach alpha. Moreso, data was gathered and analysedusing the Executive Behaviour Battery and the t-test respectively. Besides, the authors employed multiple classification, Pearson Multiple Correlation,multiple regression, and t-test statistical methods to build and evaluate four research questionsdesigned.The resultindicated that both job satisfaction and commitment correlate are related to library workers' perceptions of work motivation. Hence, no significant difference exists in the perception of work motivation of professional and non-professional library personnel.

[32] reported the finding from a case study on ICT on Teacher Training in Nigeria, using two Nigerian Universities where the students were taking the computer course FSC 103. The study was to determine the attainment of ICT competencies of initial language teacher trainees after completion of the course.The study included 300 participants, including teachers and students.The result revealed that the provisions for teacher trainees in the computer course at the two Nigerian universities are woefully inadequate in terms of ICT training.The findings also revealed that the teacher trainees who completed the computer course have very limited opportunities of developing their IT skills. This is because the institute themselves have insufficient support in terms of resources tutorial supervision accessand use. The study also reported that the teacher trainees were motivated by sheer desire for knowledge and the acquisition of more ICT skills after their exposure to the computer course. [32] therefore asserts: "training teacher to use computers can be very easy once a tension free environment is created where trainees can develop and maintain a pleasurable and interest driven attitude''

[33] examined the status of ICT in secondary schools, including ICT competence, access to computers by teachers and students, and experience teaching and studying Physics.This research was carried out in Kenya, specifically in Bungoma County, using a descriptive survey design.The target demographic was made up of students from 11 of the 23 district's high schools.A mixture of stratified, purposive, and random sampling procedures was used to select 11 schools with computer facilities for at least three years for the analysis. Eleven secondary school principals, 30 physics teachers, and 250 form three students (83 girls and 167 boys) participated in the report.As a research tool, the study used a questionnaire, an interview, and a focus group, lesson observation and document analysis in the collection of data.The data collected was analysed using SPSS version 17.0 using descriptive statistics method. The results revealed that the majority of the physics teachers in the sample schools had a high level of ICT competency.The study also established that most of the teachers used the computer for less than one hour a day.This in turn indicated a favorable inclination for the use of computer technology.

[34]Consequently, the ICT skills of biology teachers' in the Awka-South Education Zone of Anambra State were assessed in this study.The study focused was on biology teachers' pedagogical, subject-matter, and personal competencies in using ICT.Three research questions and two hypotheses led the investigation.The study sample consisted of ninety-nine biology teachers, and it was carried using survey design method. The hypotheses were examined using ANOVA and the T-test, and the research questions were answered using frequency and percentage. The result showed that majority of biology teachers in the Awka South Education Zone are proficient (41.4%) and fairly proficient (53.5%) in the use of ICT.

[35] carried out a study on science teachers' attitude towards computer integration.The study was aimed to disclose the perception of Turkish teachers to the incorporation of computer technology into teaching and learning. The researchers explored the relationship between teachers' attitude and the various factors which are related to teachers' characteristics (age, gender, etc). The study employed descriptive research design and a

sample of study was 1071 science teachers in high schools from seven geographical regions of Turkey. The data used for the study was collected using the instrument of questionnaire.The data was analysedthrough the use of mean and standard deviation to describe and sum up the attributes of the data collected from the respondents. The result showed that Turkish science teachers have favourable attitude towards computer technology. Though the attitude of teachers towards ICT does not change with gender.However, it differs with age and computer experience.The study of [35]shows great relevance to the present work especially for the fact that the study included age, gender and attitude which the work at hand is investigating.

[36] investigated the knowledge and attitude of science teacher towards ICT as an instructional tool in Anambra secondary schools. In the study,130 science teachers were selected at random out of 1618 teachers involved in the study.The researcher employed two instrument such as the Computer aptitude test and computer Attitude scale to collect the data needed and was analysed using SPSS. The result showed that science teacher's knowledge of basic operations is high but their knowledge of classroom application of ICT is low. In the same vein, the teachers' attitude is positive with large gap in ICT awareness between male and female science teachers. The study conducted by [36] shows relevance to the present work in terms of the design study, instrument of data collection and gender as an influencing variable. However, it does not include location and age as variable or factors considered.

[37]conducted research on knowledge and attitude toward the inclusion of computer technology in teaching English language in Osogbo, Nigeria. This is with the view todetermining how the factor of age influence teachers' attitude towardseffective use of computer technologyin teaching English language among others. The methodology adopted was a descriptive survey method,where the sample study was 175 teachers who werearbitrarily selected for the studyfrom 589 participants. The authors employed the instrument of ICT questionnaire to collect data. Research questions and hypotheses were formulated and tested using Chi-Square and correlation. The result indicated that they had favourableattitude towards the introduction of computer technology in the teaching and learning of English language in secondary schools.

[38]examined the elements that influence ICT integration in secondary schools in Isfahan. In order to attain this goal, the authors conducted a survey of 180 secondary school teachers who were chosen at random. A questionnaire was also created to assess teachers' access to ICT resources, as well as their ICT skills and practices. The questionnaire was validated and Cronbach's alpha was calculated. Descriptive and inferential statistical methods were used to analyze the results.Teachers have access to computer hardware resources both at school and at home, according to the findings. Their level of proficiency in ICT, however, is minimal.

[39] investigated the problem of incorporating ICT into science curricula in Saudi Arabian intermediate schools. A survey form was used to collect data and analysed using descriptive survey method. The researcher used 311 schools as a study sample.The data was analyzed using statistical methods such as mean and percentage, as well as standard deviation. According to the findings of the study, gender had an immediate and strong effect on the integration of ICT in the curriculum of science subjects.

[40] examines chemistry teachers' opinions of hurdles to incorporating technology into their classrooms.The study was founded on a conceptual framework that focused on the concept of ICT integration, integration competences, and chemistry curriculum. In the study, 13 voluntered participants were employed for the study.The method for obtaining decontextualized statements about barriers to computer technology integration was semi-structured, open-ended interviews. In addition, phenomenographic analysis was performed on the collected set of statements,where a small number of qualitatively distinct opinions of technology integration hurdles were observed, including:absence of teacher education, a lack of technical support, limited time for teacher planning, computer placement in remote places that makes access difficult, budget limits, and many teachers' aversion to change.The paper's discussion and consequences sections delve deeper into the challenges of ICT integration chemistry instructions, highlighting the varied nature of the problem as well as the complicated relationship among the hurdles, thereby suggesting ways of overcoming the identified barriers.

III. Method

3.1 Research design

The method adopted in this study is the descriptive survey research design to obtain the appropriate information and data, which seeks to describe events, conditions and occurrences as they are without manipulations of what caused the events that is being described. The rationale behind the adoption of descriptive survey research design is to examine a phenomenon in the state of Anambra with respect to science teacher's competence and attitude towards computer integration in teaching science subjects in secondary schools.

3.2 Setting and Sample

Theresearch was carried out amongst post-primary school teachers who are currently serving in the post primary teachers service commission of Anambra state,Nigeria.The state comprises of twenty (21) local government areas and is subdivided into three senatorial districts with Onitsha and Nnewi as the two largest

commercial and industrial towns in the state. The state is mainly known for commercial business in the urban areas with civil and public servants while the rural areas are known for commercial and peasant farming. The choice of the state as the area of study emanates from the fact that many secondary schools in the state have been provided with modern laboratories and equipped with computer and ICT facilities.

3.3 ***Sample size Determination***

The sample consists of 322 science teachers, which was determined using Yamane's (1967) equation for selectingsuitable sample size from a finite population given as;

$$N = \frac{n}{1 + N(e)^2}$$

Where;
N=finite population
n=sample size
e=level of significance
Here in this study, 5% was used as the level of precision. The sample size represents 20% of the population.

In this study, a multi-stage cluster sampling methodwas used in choosing the sample. The multi-stage cluster sampling method was carried out in stages and usually involves only one sampling method, especially in a large and diverse population. The technique is used in this study because Anambra state is large, with twenty-one local government areas. As a result, getting around secondary schools in local government areas would be difficult within stipulated time frame. The first stage involved was to put the educational zones of the study into six strata. In order to select samples from each stratum, the second stage usedproportionate stratified random samplingtechnique.This techniqueindicates that the sample is arepresentative of the population and that minorities are included in the sample while the sample was drawn from the strata in the third stage using simple random sampling.

3.4 Research instruments

Two major instruments were used to gather information in this study namely Computer Integration Competency Scale (CICS) and Computer Integration Attitude Scale (CIAS). A Computer Integration Competency Scale was developed by the research. The instrument is a self-rater instrument which allows the respondents to rate specific computer competencies they possess with which to effectively teach science subjects. CICS is a four-point rating scale with response pattern: High Competencies (HC), Moderate Competencies (MC), Low Competencies (LC) and No Competencies (NC). High Competencies depicts sufficient competency by a respondent in exhibiting the ability required by an item and is weighted 4 points. Moderate Competencies depicts possession of relatively fair competence by a respondent in exhibiting the ability required by an item and is weighted 3 points. Low Competencies depicts possession of relatively little competence by a respondent in exhibiting the ability required by an item and is weighted 2 points while No Competencies depicts the absence of ability in a respondent on the ability required by an item and is weighted 1 point.

The Computer Integration Attitude Scale (CIAS) was adopted from Yara workin 2003. It consists of 23 items about the attitude of science teachers towards computer integration. In the CIAS, teachers are asked to tick in the appropriate column to show their level of agreement or disagreement with the statements.Twelve (12) of the twenty-three were given positive cues, while eleven (11) were given negative cues.This CIAS research instrument is a four-point Likert-Scale modified and adopted from [41] for data collection.

The validity of these instruments was established through face and content validity criteria.For content validity, the researcher prepared a sample questionnare (appendix six, pg.88) in other to make sure that items were taken from the objectives identified using the UNESCO ICT CFT. The face validationwas carried out by three experts: an experienced secondary school computer teacher, a science educator and a specialist in Measurement and Evaluation from the Department of Science Education and Educational foundations respectively in Nnamdi Azikiwe University, Awka. In the same context the reliability of the instruments (CICS and CIAS) were established through a trial testing. The test of validity was done by administering the questionnaire/giving the instruments to 30 science teachers in 12 different government secondary schools drawn from the six education zones of the state.Feedbacks obtained from the trial test was used to compute the reliability of the instruments. The reliability measure of internal consistency of the instruments was established using SPSS version 20.0 to run the Cronbach Alpha analysis which yielded the internal consistency coefficient of 0.81 and 0.86 respectively because of the items were polychotomously scored.

3.5 Data Collection and Analysis

The instruments were administered by the researcher on his own and with the help of the principals.Teachers were given the questionnaires in their respective schools, and feedback was gathered on the spot after they were completed.Furthermore, respondents who required an on-the-spot guide were provided with one in order to reduce the amount of false or fake data provided.

The quantitative data made use of descriptive means to give answer to the research questions using SPSS. Similarly, the decision rule used in the analysis is to determine the mean value to be accepted based on the modified four-point Likert-Scale as a criterion mean or cut-off point of 2.5. The mean responses of the respondent were compared with the criterion mean value of 2.5 to ascertain to which extent the overall response differed from it. The item with a mean value above 2.5 was regarded as having positive effect on the respondent's decision.The hypotheses were tested using Chi-square statistical measure to determine the relationship between variables in the study. The statistics was preferred because all the variables in the study are nominal and ordinal categorical variables. The p-values were also compared with alpha level (0.05) for appropriate decisions on the null hypotheses tested.

IV. Results and Discussion

4.1 Result

Three hundred and twenty-two (322) questionnaires were administered to the selected secondary science school teachers while three hundred and twenty (320) were returned. The quantitative data analysis was based on the 320 (99.37%) correctly filled and returned. The demographic characteristics of the study respondents are shown in Table 1 which is made up of 235 (73.4%) femaleand 85(26.6%) malerespondents respectively.

Table 1: Teachers' socio-demographic characteristics

Characteristics	Frequency	Percentage frequency (%)
Age		
21-30	57	17.81
31-40	105	32.81
41-50	128	40.00
51-60	30	9.40
Total	320	100.00
Gender		
Male	85	26.60
Female	235	73.40
Total	320	100.00

With respect to the first question (What is the level of teachers' competence in using computers to teach science subjects in the classroom?), the researchers ran a mean distribution analysis. The teachers' competence to computer integration survey included a series of items given in which teachers showed their level of knowledge in computer technology by agreeing to the decision whether they are competent or not competent

Table 2: Table showing the mean score of items constructed to answer question one.

S/N	Items	Mean	Response
1	Ability to use windows Operating System	3.1	Competent
2	Ability to adjust windows accessibility options	2.3	Incompetent
3	Capability of handling plug-ins	3.1	Competent
4	Ability to use Projector	2.1	Incompetent
5	Ability to use printer	2.1	Incompetent
6	Ability to use scanner	2.2	Incompetent
7	Ability to use digital camera	1.3	Incompetent
8	Ability to operate word processing program	3.2	competent
9	Ability to use power presentation program	2.0	Incompetent
10	Ability to explore spreadsheet	2.2	Incompetent
11	Ability to use database program	2.4	Incompetent
12	Ability to use graphics program	2.1	Incompetent
13	Ability to use publisher program	1.5	Incompetent

14	Accuracy in installing software	1.8	Incompetent
15	Use of CD-ROM/DVD	2.7	competent
16	Accuracy in Creating and organizing computer files folders	2.4	Incompetent
17	Capability to store and transfer data using CD/USB devices	2.4	Incompetent
18	Ability to use internet to access information	2.3	Incompetent
19	Ability to use internet for communication	2.7	competent
20	Accuracy in using troubleshooting strategies	1.1	Incompetent
21	Ability to use Anti-virus program and update	2.2	Incompetent
22	Ability to use copyright materials on internet	2.4	Incompetent
23	Accuracy in Practice responsible use of software	1.5	Incompetent
24	Ability to choose computer tools and pedagogy to integrate Computer into the curriculum	2.3	Incompetent
25	Choice of computer tools and pedagogy appropriateto individual student's instructional objectives	1.2	Incompetent
26	Choice of computer tools and pedagogy that allows me manage my learning	1.6	Incompetent
27	Ability to choose computer tools and pedagogy that allows student to manage their learning	1.8	Incompetent
28	Accuracy in guiding students to use computer-based instructions to enhance quality of their creative work	1.9	Incompetent
29	Explanation abouthow Ccomputers can be used to increase the performance level of students	3.4	competent
30	Ability to designlearning programme that uses various computer tools and instruction	2.1	Incompetent
31	Ability to balance computer technology with curriculum	2.1	Incompetent
32	Improving knowledge and teaching skills using computers	2.3	Incompetent
33	Ability to use computers to prepare instructional materials	1.3	Incompetent
34	Ability to use computer to support subject learning	2.4	Incompetent
35	Ability to use computers for project-based collaborativelearning activities	1.2	Incompetent
36	Apportion to students that require computer	2.1	Incompetent
37	Help students get access to right kind of computer-based instruction	1.8	Incompetent
38	Use computers to prepare tools and techniques for students' evaluations	1.3	Incompetent
39	Using computer to access students' performance	1.4	Incompetent
40	Ability to use computer for record keeping activities	2.4	Incompetent
41	Using internet to share information with professionals, parents or students	2.7	competent
42	Ability to use computers to design personalized experience	1.6	Incompetent
43	Appraising the effectiveness of software for my lessons	1.5	Incompetent
45	Ability to prepare course work for my own lessons	1.9	Incompetent
	Grand Mean	2.2	Incompetent

From the result presented in Table 2, it is observed that the mean score for items 1,3,8,15,19, 29 and 41 are above the criterion reference point of 2.50 while the mean score for other items fall below the criterion reference point of 2.50. This shows that the science teachers are incompetent in computer technology integration in teaching science subjects in secondary schools.

To address the second research question (How do teachers feel about using computers in the classroom to teach science subjects?)

Table 3: Mean response of science teachers' attitude towards computer integration in teaching science subjects in secondary schools.

S/N	Items	Mean	Response
1	I enjoy doing things on a computer	3.1	Agree
2	I am tired of using a computer	3.4	Agree
3	I will be able to get job satisfaction if I learn it	3.2	Agree
4	I concentrate on a computer when I use one	2.8	Agree
5	I enjoy computer games very much	2.7	Agree
6	I would work harder if I could use computer more often	2.5	Agree
7	I know computer provides opportunities to learn new things	3.3	Agree
8	I can learn many things using computer	2.7	Agree
9	I enjoy lessons on the computer	3.0	Agree
10	I believe that the more often teachers use computer, the more students enjoy school	3.2	Agree
11	I believe that it is very important for me to learn how to use a computer	3.0	Agree
12	I feel comfortable working with a computer	2.8	Agree
13	I get a sinking feeling when I think of trying to use a computer	3.2	Disagree
14	I think that it takes a long time to finish when I use a computer	2.9	Disagree
15	computers do not scare at all	3.3	Agree
16	working with a computer makes me nervous	3.2	Disagree
17	using a computer is very frustrating	2.8	Disagree
18	I will do as little work with computers as possible	3.0	Disagree
19	Difficulty in using computers	2.7	Disagree
20	learn more from books than from a computer	2.6	Disagree
	Grand Mean	3.3	Agree

The results in Table 3 indicates that the positively cued statements had a mean rating that were above the criterion mean while the negatively cued statements had mean ratings above the criterion mean. this was so because of the reversed weight of the scale. Furthermore, the results in table 3 indicates a grand mean of 3.3. this means that the science teachers have positive attitude towards computer integration in teaching science subjects in secondary schools.

To answer the third research question(What is the influence of gender on competence and attitude towards Computer integration in teaching science subjects in school?)

Table 4: Mean response of male and female teachers on the competence and attitude towards Computer integration in teaching science subjects in school

Gender	N	Science Teachers Computer Integration competence Mean	XMean	Science Teachers Computer Integration attitude	X Grand Mean
Male	85	3.0	3.5		3.25
Female	235	3.2	2.99		3.1
Grand Mean		3.1	3.3	3.2	

Result in Table 4 showed that the male science teachers' computer integration competence mean rating was 3.0 while the male science teachers' computer integration attitude mean ratings was 3.5. The table also showed the female science teachers' computer integration competence was 3.2 while the female science teachers' computer

integration attitude mean rating was 2.9. This means that the male and female teachers responded without being influenced by gender

To answer the fourth research question (What is the influence of age on competence and attitude towards Computer integration in teaching science subjects in school?)

Table 5: Mean response of science teachers on the influence of age on competence and attitude towards Computer integration in teaching science subjects in school

Age N	Science Teachers Computer Integration competence	Science Teachers Computer Integration attitude
	Mean X	Mean X
21-30	57 1.9	3.2
31-40	105 1.5	2.9
41-50	128 1.6	3.1
51-60	30 1.2	3.4
Grand Mean	1.5	3.2

Results in Table 5 showed that the science teachers between the ages of 21 to 30 had mean rating of 1.9 on computer integration competence while the science teachers between the ages of 21 to 30 had a mean rating of 3.2 on computer integration attitude. Again, the table showed that the science teachers between the ages of 31 to 40 had mean rating of 1.5 and 2.9 on computer integration competence and on computer integration attitude respectively. Similarly, that the science teachers between the ages of 41 to 50 had mean rating of 1.6 on computer integration competence while the science teachers between the ages of 41 to 50 had a mean rating of 3.1 on computer integration attitude. Finally, table 5 showed that the that the science teachers between the ages of 51 to 60 had mean rating of 1.2 on computer integration competence while the science teachers between the ages of 51to 60 had a mean rating of 3.4 on computer integration attitude. Therefore, there is no significant influence of age on the competence and attitude of science teachers in computer integration in secondary schools.

To answer the fifth research question(What is the influence of location on competence and attitude towards Computer integration in teaching science subjects in school?)

Table 6: Mean response of science teachers on the influence of location on competence and attitudetowards Computer integration in teaching science subjects in school.

Location N	Science Teachers Computer Integration competence	Science Teachers Computer Integration competence
	Mean X	Mean X
Urban	217 2.2	3.5
Rural	103 1.9	3.2
Grand Mean	2.1	3.4

Result in Table 6 showed that the urban science teachers computer integration competence mean rating was 2.2 while the urban science teachers computer integration attitude mean rating was 3.5. Table5 also showed rural science teachers computer integration competence mean rating was 1.9 while the urban science teachers computer integration attitude mean rating was 3.2. this means that both urban and rural science teachers responded without being influenced by their location.

A one-way ANOVA study was used to examine the relationship between gender (independent variable) and teachers' competence toward technology integration in the classroom (dependent variable).It looked at the impact of gender, age, and location on teachers' competence toward technology integration.Table 7 revealed no significant main effect of gender on teachers' competence with mean score, [F(1,311)=0.381, p= 0.537] (see Table 7). in keeping with the decision rule, therefore, the null hypothesis is not rejected. Thus, the influence of gender on competence of science teachers in computer integration in teaching science subjects in secondary school is not significant.

Table 7: ANOVA summary of Analysis of science teachers' response on the influence of gender on in Computer integration.

Sum of Squares	df	mean Square	F	Sig
Corrected Model	562.118[a]	6	70.265	2.938 .004
Intercept	142652.717	1	142652.717	5964.023 .000
Gender	9.116	1	9.116	.381 .537
Sch location	299.276	1	99.759	4.171 .066
Age	261.540	4	65.385	2.734 .079
Error	7438.770	311	23.919	
Total	283304.000	320		
Corrected Total	8000.888	319		

There is no significant influence of gender on attitude of science teachers towards computer integration in teaching science subjects in secondary schools. Table 8 revealed no significant main effect of gender on the science teachers attitude mean score [F(1,307)=2.083, p=0.150](see Table 8). keeping with the decision rule, therefore, the null hypothesis is not rejected. So, the influence of gender on attitude of science teachers in computer integration in teaching science subjects in secondary school is not significant.

Table 8: ANOVA summary of Analysis of science teachers' response on the influence of gender on in Computer integration.

Sum of Squares	df	mean Square	F	Sig
Corrected Model	387.361[a]	732.280	5.402.000	
Intercept	57398.451	1	142652.717	9606.116.000
Gender	12.446	1	9.116	2.083 .150
Sch location	7.062	41.766	.295 .881	
Age	131.391	118.770	3.141 .093	
Error	1834.386	307	5.975	
Total	107383.000	320		
Corrected Total	2221.747	319		

a.R Squared= .174 (Adjusted R Squared=.142)

There is no significant influence of age on competence of science teachers towards computer integration in teaching science subjects in secondary schools. Table 9 revealed no significant main effect of age on the science teachers competence mean score [F(4,311)=2.734, p=0.079].

Table 9: ANOVA summary of Analysis of science teachers' response on the influence of age on competencein Computer integration.

Sum of Squares	df	mean Square	F	Sig
Corrected Model	562.118[a]	6	70.265	2.938 .004
Intercept	142652.717	1	142652.717	5964.023.000
Gender	9.116	1	9.116	.381 .537
Sch location	299.276	1	99.759	4.171 .066
Age	261.540	4	65.385	2.734 .079
Error	7438.770	311	23.919	
Total	83304.000	320		
Corrected Total	8000.888	319		

In the same context, there is no significant influence of age on attitude of science teachers towards computer integration in teaching science subjects in secondary schools. Table 10 revealed no significant main effect of age on the science teachers attitude mean score [F(4,307) =0.295, p=0.881] (see Table 10).

Table 10: ANOVA summary of Analysis of Science teachrs' response on the influence of age on attitude of Science Teachers in Computer integration.

Sum of Squares	df	mean Square	F	Sig
Corrected Model	387.361[a]	732.280	5.402.000	
Intercept	57398.451	1	142652.717	9606.116.000
Gender	12.446	1	9.116	2.083 .150

Sch location	7.06241.766.295		.881	
Age	131.391118.7703.141.093			
Error	1834.386	307	5.975	
Total	107383.000	320		
Corrected Total	2221.747 319			

a.R Squared= .174 (Adjusted R Squared=.142)

Again, there is no evidence that location has a substantial impact on science teachers' ability to integrate computers into the teaching of science subjects in secondary schools.Table 11 revealed no significant main effect of location on the science teachers competence mean score [F(4,311)=2.734, p=0.066].

Table 11: ANOVA summary of Analysis of science teachers' response on the influence of location oncompetencein Computer integration.

Sum of Squares	df	mean Square	F	Sig
Corrected Model	562.118[a]6	70.265	2.938	.004
Intercept	142652.717	1	142652.717	5964.023 .000
Gender	9.116	1	9.116	.381 .537.
Sch location	299.276	1	99.759	4.171 .066
Age	261.540	4	65.385	2.734 .079
Error	7438.770	311	23.919	
Total	283304.000	320		
Corrected Total	8000.888	319		

There is no significant influence of age on attitude of science teachers towards computer integration in teaching science subjects in secondary schools. Table 12 revealed no significant main effect of location on the science teachers attitude mean score [F(1,307)=.295, p=0.093] (see Table 10). keeping with the decision rule, therefore, the null hypothesis is not rejected. Thus, the influence of location on attitude of science teachers towards computer integration in teaching science subjects in secondary school is not significant.

Table 12: ANOVA Summary of Analysis of Science teachers' response on the influence of gender on Computer integration.

Sum of Squares	df	mean Square	F	Sig
Corrected Model	387.361[a]7	32.2805.402.000		
Intercept	57398.451	1	142652.717	9606.116.000
Gender	12.446	1	9.116	2.083.150
Sch location	7.06241.766.295.881			
Age	131.391118.7703.141 .093			
Error	1834.386	307	5.975	
Total	107383.000	320		
Corrected Total	2221.747	319		

a. R Squared= .174 (Adjusted R Squared=.142)

IV. Discussion of the Findings

Findings from the results of the study show that the science teachers are incompetent in computer integration in teaching science subjects in post-primary schools. This indicates that majority of the teachers are incompetent, that is, they are unable to develop lesson notes, lesson plans and deliver lessons on science subjects using ICT. This is in consonance with the findings of [25,24] who in separate studies reported that English and Economics teachers do not possess requisite competencies needed to use ICT facilities to teach English and Economics respectively. Similarly, awareness of policy goals on the part of teachers was also low. Besides, facilities and resources to support ICT -integration into school curriculum were very limited and poor. However, this finding contradicts [33] who reported that ICT competence among physics teachers in the sample school was fairly high, with the majority of them being able to use word processing and the Internet.

The results revealed that the majority of teachers had a very positive outlook about the use of computer technology in secondary school science subjects.The current study corroborates [33] reports that Physics teachers are optimisticaboutthe use of computer and its software packages, as evidenced by the type of response provided on the use of ICT in the classroom.Similarly, [34,36] found that science teachers areoptimistic about the use of computer technology, and that teachers' attitudes toward computer integration are not gender-based. The present

work contradicts the claims of [38] who reported that the findings confirmed that gender influenced the integration of computer technology into the science curriculum.

The outcome obtained from the study show that there is no influence of gender on the competence and attitude of science teachers towards computer integration in teaching science subjects in secondary school. The result indicates that both the male and female teachers possess same level of computer integration competence as well as the attitude in integrating computer to teach science subjects. The findings agree with the findings of [24] that gender does not influence teachers' competencies needed to use ICT facilities to guide, support learners discover information or teach desired contents in Economics. The findings also supports/ corroborates the findings of [34, 36] who found that science teachers' attitude towards ICT do not differ in relation to gender.

The result presented in Table 9 shows there is no influence of age on the competence and attitude of science teachers towards computer integration in teaching science subjects in secondary school. This finding means that all the age categories of the teachers do not possess the requisite skills needed for computer integration in teaching science subjects and all have the age categories have the same positive attitude. The finding corroborates the findings of [36] who reported that there was no significant influence of age on the attitude towards the use of Computer technology.

Findings presented in Table 11 shows that thereis no influence of location on the competence and attitude of science teachers towards computer integration in teaching science subjects in secondary school. The finding is also in tandem with the findings of [35] who reported that there is no meaningful difference in the ICT knowledge and attitude of the urban and rural science teachers. The results are also consistent with [35] findings, which found no significant differences in ICT knowledge and attitudes among urban and rural science teachers.

V. Conclusion

The provision of ttechnology resources do not guarantee effective teaching and learning as well as improving the academic performance of learners. The study revealed that the prevalencelevel of incompetence of science teachersin the use of computer technology in the preparation and delivery of their lessons and instructions.However, the science teachers have positive attitude towards computer integration in teaching science subjects in schools without gender, age and location influencing the teachers' competence and attitude towards computer integration in teaching science subjects in secondary schools.

Therefore, to bring about the much-needed changes in the performance of teachers and learners,especiallyscienceteachers. Teachers should be persuaded of the effectiveness and assistance/help of these resources in improving or refining education. There is the need forteachers to possess the requisite knowledge, skills, behaviour (competence) and positive attitude to guide the preparation of lesson notes which emerges in the context of the current upsurge in the integration of computer technology for science subjects in secondary schools. This study therefore recommends an operational guideline policy, campaigns, workshops seminars, training and re-training of teachers for the integration of computer and its software packages intotheteaching and learning of science subjects if not all subjects through direct practical experience.

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