

**COMPARING THE AVAILABILITY AND USE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN TEACHING STEM SUBJECTS IN PUBLIC AND PRIVATE SECONDARY SCHOOLS IN OGUN STATE**

**<sup>1</sup>Dr. Adebusuyi Olubusayo Foluso**

<sup>1</sup> Department of science and Technology Education  
Faculty of Education  
Olabisi Onabanjo University, Ago - Iwoye

**<sup>2</sup>Dr. Bimbola Dupe OLUDIPE**

<sup>2</sup> Department of science and Technology Education  
Faculty of Education  
Olabisi Onabanjo University, Ago - Iwoye

**<sup>3</sup>Dr. Ademola Kehinde BADRU**

<sup>3</sup> Science and Technology Education Department  
Faculty of Education,  
Olabisi Onabanjo University, Ago- Iwoye, Ogun state, Nigeria

**<sup>4</sup>Dr. Olajumoke, Toyé OMINOWA**

<sup>4</sup>Department of Science Education,  
Adekunle Ajasin University Akungba Akoko, Ondo State

\*Corresponding author's Email: \*adebusuyi.olubusayo@oouagoiwoye.edu.ng

### Abstract

The study's goals were to: (1) highlight the current state of information communication technology (ICT) in public and private secondary schools in Ogun State; (2) compare the availability and use of information technology resources in public and private secondary schools; (3) identify problems with the use of information technology in public and private secondary schools; and (4) compare the participation in professional development programs in science, technology, and mathematics (STM). The design of the study was descriptive, and two questionnaires were used for data collection: one for teachers and one for students. The sample were thirty (30) teachers selected from public and private schools, and seventy-two (72) students were randomly selected. The data were analysed using percentage, t-test, and ANOVA. there was no significant difference between the extent of usage of ICT tools and resources of STEM teachers in private schools ( $M = 19.30$ ,  $SD = 1.77$ ) and public ( $M = 19.33$ ,  $SD = 1.21$ ) in the study area;  $t(29) = 1.56$ ,  $P > 0.05$ . but a significant difference was observed in STM teachers' attendance in professional development programmes and ICT skills acquired by STM teachers in private schools ( $M = 15.52$ ,  $SD = 1.12$ ) and public schools ( $M = 19.20$ ,  $SD = 2.10$ );  $t(29) = 3.06$ ,  $P < 0.05$ . The study recommended that all school owners should be enlightened to allow STM teachers attend workshops and seminars to develop technological skills on how to use the functional ICT facilities strategies/techniques in the schools.

**Keywords:** Availability and Utilization of Information Communication and Technology; ICT tools; Science, private and public schools.

### 1.0 Introduction

The term "information and communication technology" (ICT) refers to a broad range of electronic and technical tools and resources that are used to manage, generate, and share information. Especially in today's information age, information, and communication technology (ICT) offers effective teaching and learning to boost learners' creative and intellectual resources. According to Jones (2010), technology goes wherever humans do. Utilizing speech, images, and video as a means of information delivery, support infrastructure must be managed. ICT tools like videos, televisions, multimedia, and hypermedia software that combine text, sound, and vibrant moving images can now be integrated into the teaching and learning process because of the widespread use of technology (Akude & Ajuzie, 2011; Adamu 2007, Ibrahim, 2009, Ikwuka, 2013; Ubaru, 2005). This is changing how education is delivered and how socioeconomic development occurs.

This new paradigm in education opens the door to a wider range of ICT technological instruments that enhance the educational experience, offering the possibility of variety, diversity, and better organization. Science, Technology, and Mathematics (STM) education provides a fertile ground for exploring the possibilities presented by ICT (Adebusuyi, Bamidele, & Adebusuyi, 2020). It goes without saying that STM topics lack the informational and communicative edge necessary to succeed in the twenty-first century, and graduates of STM programs lack the ICT competencies necessary to compete worldwide. The study of living beings, their surroundings, and diverse interactions between living things and the environment are the focus of the dynamic, inventive, and collaborative discipline of science (Adebusuyi, Bamidele, & Adebusuyi, 2022; Avwiri & Phimiah, 2020). During instructional practices, science educators frequently have to display diagrammatically on a writing board true concepts that ask for pragmatic presentation with the use of ICT facilities. Therefore, effective ICT integration consistency on the part of the teachers is required for measuring learning in science, technology, and mathematics. The government has not provided STM teachers with the training they require to deal with the continuously changing trends in ICT, while STM teachers at some private secondary schools have not been able to participate owing to the workload they must handle. Most times, it has been emphasized that teachers need to be able to appropriately incorporate ICT into the classroom, yet there are several complex issues that have never been addressed. The lack of electrical power grids throughout most of the nation, insufficient telecommunication coverage, the issue of inadequate funding of ICT facilities by the school administration and government, inadequate infrastructural facilities, and a lack of ICT device maintenance are a few of these. Additionally, Nigeria's capacity to

effectively implement its ICT plan may have been limited by insufficient funding from budgetary allocations, which influences secondary school students' academic achievements. Researchers have stressed that in order for teachers to effectively use the ICT tools and resources indicated above (Avwiri & Phimiah, 2020; Ibrahim, 2009; Ikwuka, 2013; Ubaru, 2005), they must have access to them.

For instance, Mandefro (2013) discovered that secondary schools in the Islamabad zone have very limited access to and use of various ICT facilities for instruction. Regarding the use of ICT facilities for teaching, instructors from all backgrounds, disciplines, and grade levels had similar perspectives.

According to Yasmeen (2015), there is no discernible difference in how information technology is used at public and private colleges. The usage of information technology by students at public and private institutions is obvious. The study also demonstrated that there were no appreciable differences between public and private colleges in terms of teacher preparation and expertise. Ajeigbe (2015) also conducted research to evaluate the accessibility and use of ICT resources for efficient computer science instruction in secondary schools. The outcome showed that the availability of ICT resources for computer science instruction in schools was above average, and utilization was determined to be high. The authors also demonstrated a considerable difference between public and private secondary schools in terms of how much ICT is used by instructors to teach computer science. According to recent research, lecturers' age and years of teaching experience are also important variables that affect how much ICT is used in the classroom (Yushau & Nannim, 2020).

Teachers must be proficient with a variety of ICT tools and possess a variety of technological abilities in order to support the current ICT initiatives for secondary education, which will result in quality improvement initiatives through digital school materials (MoE, 2005). The disparity between Nigeria's private and public secondary schools, those who have access to and manage technology, and those who do not, creates a big difference in the use of ICTs, even if the aims of integrating technology in education will not be achieved by the substantial role instructors play. According to studies (Adebusuyi, Bamidele, and Adebusuyi, 2020; Akturk & Ozturk, 2019; Arslan, 2015), instructors lack the technological skills necessary to incorporate technology into scientific instruction. This is because having subject understanding does not automatically convert to technological expertise.

According to research, teachers' instructional practices may be enhanced if they possess sufficient material knowledge through efficient PD (Al Salami et al. 2017). For instance, Barlow et al. (2014) discovered through observations and interviews that participants' teaching methods were influenced by PD to varying degrees (low, medium, and high). According to Gardner et al. (2019), instructors who participated in professional development had an impact on how they taught. Many times, whether STM teachers can attend conferences, seminars, and workshops to further their technology abilities depends on the type of school they work at, whether it be a private (individually owned) or public (owned by the government) school. The use of ICT tools depends on the teacher's technological knowledge, but there isn't enough support in the literature to show that this is the case. The availability, use, and disparities in STM teachers' participation in professional development programs in private and public schools in Ogun State's Ijebu North Local Government Area were therefore the focus of the study.

## **1.2 Statement of the Problem**

Technology is now a crucial instrument that must be integrated into the teaching and learning of science, technology, and mathematics (STM) in secondary schools. Nevertheless, even though ICT tools are crucial for enhancing students' learning outcomes, they are not readily available; students lack access to instructional software and struggle to use ICT tools for learning.

However, it has been observed that the availability of ICT tools in private and public schools differs, and in schools where ICT tools and resources are available, teachers lack enough technological knowledge. Teachers may lack technological skills if they do not engage in frequent professional development programs. It is crucial that teachers and students rise to the current educational technology challenges if they are to succeed in the new era of technology integration. Therefore, the study assessed the availability and utilization of teachers in private and public secondary schools and their influence on students' performance in STM subjects.

### **1.3 Purpose of the Study**

The main aims and objectives of this study is to examine the availability and utilization of ICT facilities and adequacy of use in the teaching and learning of Biology studies in Ijebu North Local Government Area of Ogun State. Specifically, the purpose of this study is to;

- i. Examine the availability and utilization of ICT facilities and adequacy of use in the teaching and learning of Biology.
- ii. To compare the availability & utilization of ICT resources in public and private senior secondary schools in Ijebu-North Local Government Area of Ogun State.
- iii. Investigate the influence of ICT usage on students' performance in scope Studies.
- iv. To find the problems in the use of ICT in the teaching of biology in the selected secondary schools.

### **1.4 Research Questions**

The study specifically sought answers to the following questions:

- a. What are the functional ICT facilities available for teaching science subjects in public & private senior secondary schools in Ijebu-North Local government area of Ogun State?
- b. What is the utilization level of ICT facilities used by students in the learning of Biology in senior secondary schools?
- c. What are the identified problems in the use of ICT tools and resources in the secondary schools?

### **1.5 Research Hypotheses (If any)**

The following hypotheses were formulated and tested at 0.05 level of significance.

HO1: There is no significant influence of utilization and on secondary school biology students' performance in Ijebu-North Local Government Area of Ogun State.

HO2: There is no significant difference between the professional development programme attended by STM teachers in public and private schools.

HO3: There is no significant influence of utilization and on secondary school biology students' performance in Ijebu-North Local Government Area of Ogun State.

### **1.6 Significance of the Study**

Secondary school administrators may use this information as a starting point to evaluate their institutions' strengths and shortcomings to offer the ICT resources required to enhance teaching and learning in their institutions.

Teachers, school administrators, supervisors, the government, and other stakeholders may also get knowledge on the issues that prevent the supply and use of ICT facilities as well as solutions to these problems.

The finding will raise awareness to support school administration's decision-making process on use of ICT in teaching and learning and provide a justification for the need for allowing STM teachers to attend professional development workshops and seminars. It will provide valuable information for those engaged in education sector development programs, especially to improve the quality of education.

### **1.7 Scope of the Study**

The scope of this study is covered four senior secondary schools, in Ijebu North Local Government Areas of Ogun state where both private and public schools were sampled.

### 3.0 Methodology

#### A. Research Design

This research work made use of descriptive survey research design. The descriptive survey approach was considered okay because it contributes to the insight of a phenomenon as a means of providing basic information on the focus of the study. Besides, survey aids in collecting primary data from a large population as those intended for this research.

#### B. Sample and Sampling Technique

The population of the study comprised all senior secondary school teachers and students in the public and private secondary schools in Ijebu North Local Government Area of Ogun State. The sample consisted of 31 in-service science, technology, and mathematics teachers (of whom 45.2% were female and 54.8% male) and students that were randomly selected. A multistage sampling technique was employed in selecting the sample. In Ogun State, one local government area (Ijebu North Local Government Area) was purposefully selected to be able to understudy the area. From the towns in this area, two were randomly selected. To this end, from the 24 government secondary schools in this town, four secondary schools (two private and two public) were selected randomly. One public and one private school from Ago-iwoye and two (2) public and private schools from Ijebu Igbo because of the large populations and because of the case study. The study comprises seventy-two (72) students and twenty-four (24) teachers from Ago iwoye (Abobi comprehensive high school), thirty-four (34) from Molusi College Ijebu Igbo, and seventeen (17) from Corner's Stone Ijebu Igbo. Thus, from five secondary schools, a total of 31 teachers and 72 students were taken as a sample population, which represented the total number of teachers who serve in the four randomly selected government secondary schools of the Ijebu North local government area. A detailed description of the sample used in the study can be found in Tables 1 and 2.

#### C. Instrumentation

The researcher made use of three instruments, which are a self-developed checklist, a questionnaire, and students achievement tests in five subjects (physics, chemistry, biology, computer science, and mathematics). The self-developed checklist contained important ICT tools and resources that should be present in schools to aid teaching and learning in STM subjects. The checklist was used to ascertain the functional ICT facilities available in the senior secondary schools of Ijebu North Local Government Area. Three categories of ICT resources were itemized on the checklist, which are:

- (1). Computer hardware components
- (2). Computer software components
- (3). Internet facilities

The questionnaire used, tagged Questionnaire on Utilization of ICT Facilities (QUIF), coined by Mandefro (2013), was used to determine the level of utilization and major problems inhibiting the use of ICT in public and private secondary schools, broken into two sections. Section A consisted of questions that were related to general information about the teacher and in-service training received, while Section B was further divided into two parts. Part A consists of 13 item questions on how frequently teachers use the ICT tools, to which they responded on a modified 5-likert type scale of: never, rarely, certainly, many times, and regularly. Part B is a 10-item scale that inquires about the problems associated with ICTS use in the teaching and learning of science problems in secondary schools. Participants responded according to: HIGHLY SERIOUS PROBLEM=HSP; SERIOUS PROBLEM = SP; SOME WHAT SERIOUS PROBLEM=SWP; OBSERVED BUT NOT SERIOUS PROBLEM=OBSP; NOT A PROBLEM AT ALL = NAP.

The third instrument was the Student Performance Test in Science, Technology, and Mathematics. This was a 20-item multiple-choice quiz to test student performance in physics, chemistry, biology, mathematics, and computer subjects. Students were examined with four (4) questions each from the subjects, and each question was scored as 1.

The reliability of the QUIF instrument was determined, and a reliability coefficient of 0.82 was obtained using the Pearson Product Moment Reliability Coefficient formula. The procedure for the distribution of the questionnaire was hand delivery. The questionnaire was given to the respondents through personal contact and collected by the same procedure. This was done to yield a high rate of return.

Table 1: Sample for the Study

Public Secondary Schools	No of teachers (%)	No of students (%)	Private secondary schools	No of teachers (%)	No of students (%)
Abobi High School	10	32 (45)	Corner Stone Comprehensive School	8	15 (21)
Molusi College	10	19 (27)	Happy Home Model School	3	13 (7)
Total	20	51 (72)		11	28 (28)

Table 1 shows that a total of thirty-one teachers (31) participated in the study with twenty teachers (20) from public schools while eleven (11) of the participating teachers were from private schools. The 31 teachers from the public and private schools' demographic data are in Table 2.

Table 2: Demographic characteristics of the teachers that participated in the Study

Category	Groups	No of participants	Percentage (%)
Gender	Male	17	54.8
	Female	14	45.2
	Total	31	100
Age	Below 20	5	16.1
	20-33	21	67.7
	34 – 43	2	6.5
	Above 43	3	9.7
	Total	31	100
Subject	Physics	3	9.7
	Chemistry	9	29.0
	Biology	9	29.0
	Mathematics	3	9.7
	Computer	7	22.6
	Total	31	100
Qualification	PhD	1	3.2
	Master's Degree	3	9.7
	Bachelor's Degree	27	87.1
		31	100
Years of Teaching Experience	1-10years	1	3.2
	10-25 years	8	25.8
	25 - 35 years	22	71.0

Table 2 shows that most of the participants were male 17 (54.8%) while 14 (45.2%) were female. Most of the respondents age were between 20-33 years 21 (67.7%). Majority of the respondents holds bachelors' degree 27 (87.1%). Also, most of the respondents have their years of teaching experience between 25-35 (71%) years.

#### 4.0 Results/Findings

- a. **Research Question 1:** What are the functional ICT facilities available for teaching science subjects in public & private senior secondary schools in Ijebu-North Local government area of Ogun State?

Table 3: Availability of functional ICT facilities in secondary schools in Ogun State

		Corner Stone Comprehensive School (private)			Molusi College (public)			Abobi High School (public)			Happy home international school (private)		
A	Hardware Component	Available	Functional	Non-Functional	Available	Functional	Non-Functional	Available	Functional	Non-Functional	Available	Functional	Non functional
1	Computer	5	4	1	20	20	20	5	3	2	7	4	3
2	Scanner	-	-	-	-	-	-	-	-	-	1	1	0
3	CD ROMS	8	5	3	15	12	3	2	2	-	3	2	1
4	Printer/Photocopier	5	2	3	13	2	11	6	2	4	3	1	2
5	CPU	6	4	2	20	20	20	5	3	2	8	4	4
6	Monitor	6	4	2	30	12	18	3	3	-	7	4	3
7	Keyboard	7	5	2	40	15	25	8	5	3	7	5	2
8	Mouse	6	5	1	41	25	16	5	5	-	7	6	1
	Total	43	32	106	-	113	113	34	23	11	43	27	16
B	Software component												
9	Educational Programme	-	-	-	-	-	-	-	-	-	-	-	-
10	Microsoft word App	5	4	1	15	10	5	5	3	2	4	4	0
11	Excel App	3	3	0	5	5	0	3	3	0	4	4	0
12	Powerpoint App	2	2	0	-	-	-	-	-	-	-	-	-
13	Educational games	-	-	-	-	-	-	-	-	-	-	-	-
14	Encyclopedia	-	1	-	-	-	-	-	-	-	-	-	--
C	Internet	-			-			-			-		
13	E-mail	-	1	-	-	-	-	-	-	-	-	-	-
14	Modems	-	-	-	-	-	-	-	-	-	-	-	-
15	Wi-fi	-	1	-	-	-	-	-	-	-	-	-	-
	Total												

Table 3 shows that out of the three categories of ICT facilities, all the schools examined had all the hardware components except for scanner which was only available in one of the private schools and were functional such as computer, keyboard, CD ROM, photocopying machine, and mouse. However, the result revealed that the software component, such as Educational Program, excel app, PowerPoint, educational documentation, educational games and encyclopaedia were scarce in the schools. Internet facilities were completely not available. This implies that the few computers facilities present might mainly for office use while the major computer programs required for teaching and learning are either absent or non-functional.

**b. Research Question 2:** What is the utilization level of ICT facilities used by STM teachers in teaching in senior secondary schools?

Table 4: Utilization level of ICT used by STM teachers in senior secondary schools in Ogun state

S/N	Items for utilization	Never No (%)	Rarely No (%)	Certainly No (%)	Many times No (%)	Regularly No (%)	Remark
1	I am using computer to facilitate all my work	9(29)	14 (45)	8 (26)	-	-	Very Low usage
2	I am using laptop to present the lesson in the classroom	16(52)	12(39)	3(10)			No usage
3	I develop my lesson note through the use of internet resources on my laptop through Microsoft word use	19(61)	72(23)	4(13)			No usage
4	I develop and make use of powerpoint to present my lesson to the students in the class	20(65)	7(22)	4(13)			No usage
5	I develop notes with word App and convert it to PDF files	27(87)	2(7)	1(3)	1(3)		No usage
6	I use television to teach students in the classroom	28(90)	3(10)				No usage



7	I use printer to print different teaching materials	7(23)	12(39)	10(32)	2(7)		Very low usage
8	I make use of photocopy machine to copy teaching materials	8(26)	11(36)	10(32)	2(7)		Very low usage
9	I use tape recorder to teach audio lessons recorded by radio cassettes or CD	27(87)	2(7)	1(3)	1(3)		No usage
10	I send materials through PDF to students	28(90)	1(3)	2(7)			No usage
11	I make use of different educational software to teach my subject	23(74)	4(13)	4(13)			No usage
12	I make use of zoom, teams, google meet to teach my students	30(97)		1(3)			No usage
13	I make use of projectors to teach students in the classroom	31(100)					No usage

Table 4 shows the percentage of the extent of usage of ICT tools and resources science, technology and mathematics teachers used in the classroom. Table 4 shows that the highest percentage (45%) of them indicated that they rarely used computers to facilitate their work, 65% of them indicated that they never make use of power point presentation, and 61% never used internet resources to get materials to develop lesson notes. A general observation to the results showed that the ICT hardware's available in the school were either never used or very low usage while software's and internet resources that are not available were completely never used by majority of the participating STEM teachers.

- c. **Research Question 3:** What are the identified problems in the use of ICT tools and resources in the secondary schools?

Table 5: Problems in Use of ICT Facilities to teach STM subjects

S/N	ITEMS	HSP&SP (%)	SWP &OBSP (%)	NAP (%)
1	Shortage of computers in schools	93	3	3
2	Lack of finance to purchase different ICT facilities in the school	96	4	0
3	Absence of support from ministry of education	68	29	3
4	Absence of support from NGOS to purchase ICT tools	74	20	6
5	Absence of ICT training to teachers	78	13	9
6	Intermittent disruption of electricity	93	3	4
7	Absence of internet connections the school	65	32	3
8	Absence of computer accessories for maintenance	65	32	3
9	Absence of ICT staffs and technicians	71	26	3
10	Absence of instructional software in different subject areas	77	19	4

Table 5 shows the percentage of frequencies of the problems mentioned in the questionnaire by teachers. Ninety-three percent of respondents stated that the shortage of computers in their schools is a highly serious problem. The absence of support from the ministry of education, NGOs constitute another serious problem as 65% marked they don't have internet connection, not have high speed Internet connection. The next was absence of computer accessories and maintenance: Majority of them said there is no maintenance culture in the schools. There is no instructional and educational software for specific subject areas therefore couldn't engage in video conferencing and attend virtual meetings.

HO<sub>1</sub>: There is no significant difference between the utilization level of ICT tools & resources in public and private senior secondary schools in Ijebu-North Local Government Area of Ogun State.

Table 6: t-test Analysis of the utilization of ICT tools and resources by STM teachers based on school type.

School Type	N	$\bar{x}$	SD	Df	T	Sig
Private	10	19.30	1.77	29	1.56	0.98
Public	21	19.33	1.21			

Table 6 shows that, there was no significant difference between the extent of usage of ICT tools and resources of STEM teachers in private ( $\bar{x} = 19.30$ ,  $SD = 1.77$ ) and public ( $\bar{x} = 19.33$ ,  $SD = 1.21$ ) schools in the study area ;  $t_{(29)} = 1.56$ ,  $P > 0.05$ . Hence, 't' was not significant at 0.05 level. The null hypothesis is hereby not rejected. This shows that the extent of usage of ICT tools and resources by STEM teachers do not depend on whether they are in public or private secondary schools.

HO<sub>2</sub>: There is no significant difference between the professional development programme attended by STM teachers in public and private schools.

Table 7: t-test Analysis of STM teachers professional development and skills based in private and public schools

School Location	N	$\bar{x}$	SD	Df	T	Sig
Private	10	15.52	1.12	29	3.06	.005
Public	21	19.20	2.10			

Table 7 shows that, there was a significant difference between the professional development and ICT skills acquired by STEM teachers in private schools ( $\bar{x} = 15.52$ ,  $SD = 1.12$ ) and public schools ( $\bar{x} = 19.20$ ,  $SD = 2.10$ );  $t_{(29)} = 3.06$ ,  $P < 0.05$ . Hence, 't' was significant at 0.05 level. The null hypothesis is hereby rejected. This shows that opportunity to attend workshops, seminars, conferences depend on the type of school the STEM teacher is teaching.

HO3: There is no significant influence of utilization and on secondary school biology students' performance in Ijebu-North Local Government Area of Ogun State.

Table 8: ANOVA analysis of the influence of ICT utilization on students' performance Score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	91.750	14	6.554	.672	.768
Within Groups	146.250	15	9.750		
Total	238.000	29			

The STEM teachers' students were also examined to find out if the extent of ICT tools usage will have an influence on their student's performance. Table 8 shows that, there was no significant influence of STEM teachers' use of ICT tools on their students' performance  $P > 0.05$ . Hence, 't' was not significant at 0.05 level. The null hypothesis is hereby not rejected. This shows that the extent of ICT tools and resources usage do not influence the students' performance in the study area.

## 5.0 Discussion of Results

The finding from the results shows that while only a few ICT hardware components were functional, such as a computer, keyboard, CD ROM, photocopying machine, and mouse, software components such as Microsoft Word, Excel, PowerPoint, educational programs, educational documentation, and educational games were not available or non-functional, and internet facilities were completely unavailable. This implies that there are not enough ICT tools and resources that STEM teachers can use to integrate technology into their daily teaching in the classroom.

This above result is in agreement with the work of Avwiri and Phimiah (2020), who found that ICT tools are not sufficiently available and that most available ICT tools are not in good working condition; hence, they are not sufficiently used for teaching but mainly for office use. Other researchers [Apagu and Bala (2015); Mandefro (2013); Ofondu & Oso (2015); Yushau & Nanim (2020)] have also found that ICT facilities such as PCs and TV sets were not sufficiently available or accessible in secondary schools, technical colleges, and universities.

The results further revealed that the ICT hardware available in the school was either never used or had very low usage, while software and internet resources that were not available were completely never used by the majority of the participating STEM teachers. The finding is in line with Avwiri and Phimiah (2020), who reported that teachers level of awareness of information and communication technology resources was high while the level of utilization was low. However, the result is in contrast with Ajeigbe, Ogunsakin, and Shogbesan (2015), who found that

the usage of ICT facilities in the teaching of computer studies in secondary schools in Ife Central LGA is "high," and computer studies teachers have "high" and "very high" extents of usage, respectively. The present study further showed there was no significant difference in the extent of usage of ICT tools and resources by STEM teachers in public or private secondary schools. The finding agreed with that of Yushau & Nannim (2020), who found a significant difference between the availability and usage of equipment in education departments of public and private universities in Islamabad and Rawalpindi.

Moreover, the present study found that a shortage of computers in their schools, an absence of support from the ministry of education and NGOs, and a lack of high-speed internet connections all constitute highly serious problems for the usage of ICT tools in teaching science subjects. Therefore, if these teachers don't have access, there is no way they can fully integrate technology into their teaching or engage in video conferencing or attend virtual meetings. This will not allow for the new shift educators are clamouring for in the integration of technology into teaching.

In addition, there was a significant difference between the professional development and ICT skills acquired by STEM teachers in private schools and public schools, which implied that teachers in public schools had more access to workshops, seminars, and conferences. Yushau & Nannim (2020) concluded that the difference between students learning and teachers training skills was not significant.

Also, there was no significant influence of STEM teachers' use of ICT tools on their students' performance.

## **6.0 Recommendations**

Based on the research findings, the following recommendations were made:

1. Non-Governmental Organization, ministry of education, Cooperative bodies, multinational cooperation, and individual should be dedicated to the provision of functional ICT facilities in both private and public schools; this will improve quality teaching and learning. ICT facilities ought to all the time be upgraded and well maintained. The Ministry of Education ought to appoint a quality assurance committee that will monitor to guarantee the functional ICT facilities available are in good working condition.
2. Enlightenment campaign, workshops and seminars ought to be organized for teachers and students by Education Authorities – Federal and State Ministries of Education to develop technological skills on how to use the functional ICT facilities strategies/techniques. This will advance increase motivation of both students and teachers in teaching and learning.

## **7.0 Conclusion**

The study concluded that few hardware of ICT facilities available in teaching. and learning of STEM subjects were non-functional while the software components were few and internet resources were completely nonavailable. STEM teachers rarely use ICT facilities, and there was a significant difference in the professional development programmes the STEM teachers in private and public schools attended.

## **8.0 Acknowledgement: Nil**

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