Acquisition of Information and Communication Technology Skills among Basic Science Teachers in Kogi Central District of Kogi State

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Abstract

The need for acquisition of skills in information and communications technology among science teachers cannot be over-emphasized. Any science teacher who does not have sufficient skills in ICT may therefore not be able to cope with the 21st century demands of the teaching profession as the use of these technologies take central stage in everyday planning and delivery of teaching and learning in science classes. This study assessed the extent of acquisition of ICT skills among Basic science teachers in Kogi Central District of Kogi State, Nigeria. It adopted a descriptive survey research design. Three hundred and fifty teachers drawn through multi-stage sampling technique were used for the study. Information and communication technology skills acquisition questionnaire (ICTSAQ) was used to collect relevant data for this study. Five research questions were posed and four hypotheses were tested in the study. The research questions were answered using mean and standard deviation while the hypotheses were tested using t-test at .05 level of significance. The findings of this study revealed among others that the basic science teachers do not have sufficient skills in applying arithmetic operations in Microsoft excel. They do not also have sufficient skills in creating and editing power point slides as well as inserting pictures or objects in slides. It further revealed that teaching experience has no statistically significant influence on the acquisition of ICT skills among the teachers. The educational implications of the findings were discussed and adequate recommendations were also made.

Key words: Basic Science, Teachers, Skills, Information and Communications Technology

Introduction

One of the greatest demands on the 21st century teachers is the possession of sufficient skills in information and communications technology (ICT) considering the innumerable benefits derivable from its application in teaching and learning. Evidences have shown that ICT allows for new ways of learning for students and teachers; takes care of students with special needs by enabling them to have access to materials and tools for their own educational needs. It also naturally brings children together where they can talk and discuss what they are doing for their work (collaboration) and this in turn opens up avenues for communication and language

development. It also motivates learning as children are usually fascinated with technology. Hence, with the adoption of the universal basic education policy the federal government of Nigeria inculcated ICT in school curriculums across the various tiers of her educational system. Consequently, Integrated Science (now Basic Science) whose sociological foundation formerly hinged on the prevailing socio-economic factors in the country now focuses on globalization, ICT and entrepreneurship.

The success of the UBE policy for basic science depends more on how computer literate and ICT-compliant the curriculum implementers (teachers) are. Hence, both the governments and other critical stakeholders in education are making concerted efforts towards ensuring that teachers are trained and re-trained in the use of information and communication technologies. In Kogi State, for instance, the government has organized several workshops for her teachers in the basic schools. The government also procured computer facilities for the teachers with a view to motivating them to update their pedagogical and technological knowledge and skills for effective service delivery in their classrooms. Experts in ICT have also rolled out simplified textbooks and software applications on ICT to assist beginners to learn the basics of information and communication technology. Unfortunately, these efforts do not seem to have yielded very significant results as many teachers in basic schools rarely applied ICTs in their lesson delivery. This was clearly evidenced during the COVID-19 era when all schools were shut down due to the pandemic and schools were directed to resort to online teaching and learning for nearly one year. Most schools in Kogi Central District of Kogi State and around the country could not key into online teaching for the whole period of COVID-19 thus raising doubts about the ability of the teachers to deliver their lessons using the modern technology. It is on this premise that the researcher intends to assess the extent of acquisition of ICT skills among basic science teachers using Kogi central district of Kogi State as a focus point.

Statement of Problem

Presently, employers of labour emphasize the acquisition of skills in information and communication technology as prerequisite for engagement of job seekers. The education sector is not excluded from this trend thus making ICT an essential component of every school curriculum in Nigeria and globally. In Nigeria, it is required that every teacher at every level of education be computer literate/ICT-compliant to be able to utilize the numerous opportunities provided by ICT in lesson preparation and delivery.

Although many researchers have assessed the utilization of information and communication technologies in the classrooms, few attempts have been made to ascertain the extent of acquisition of ICT skills among teachers of basic science. The influences of such variables as gender, school location, school ownership and experience on the acquisition of ICT skills among teachers at the basic education level in Nigeria have not equally been extensively documented. In the light of the foregoing, this work intends to assess the extent of acquisition of ICT skills among basic science teachers in Nigeria with focus on Kogi central district of Kogi state.

Objectives of the study
The objectives of this study are to:

(i). ascertain the extent of acquisition of ICT skills among basic science teachers in Kogi central

district of Kogi State

(ii). find out the influence of school location on the acquisition of ICT skills among basic science teachers in Kogi central district of Kogi State

(iii). find out the influence of gender on the acquisition of ICT skills among basic science teachers in Kogi central district of Kogi State

(iv). find out the influence of school ownership on the acquisition of ICT skills among basic science teachers in Kogi central district of Kogi State

(v). find out the influence of teaching experience on the basic science teachers' acquisition of ICT skills

(vi). find out the ICT needs of basic science teachers in Kogi central district of Kogi State

Research Questions

To guide this study the following research questions were put forward:

1. What is the extent of acquisition of ICT skills among basic science teachers in Kogi Central District of Kogi State?
2. What is the influence of gender on the acquisition of ICT skills among basic science teachers in Kogi Central District of Kogi State?
3. What is the influence of school ownership on the acquisition of ICT skills among Basic Science teachers in Kogi Central District of Kogi State?
4. What is the influence of teaching experience on the acquisition of ICT Skills among Basic Science teachers in Kogi Central District of Kogi State?
5. What is the influence of school location on the acquisition of ICT skills among Basic Science teachers in Kogi Central District of Kogi State?

Research Hypotheses

To answer the research questions above, the following hypotheses were put forward.

1. There is no statistically significant influence of gender on the acquisition of ICT skills among basic science teachers in Kogi Central District of Kogi State.
2. There is no statistically significant influence of school ownership on the acquisition of ICT skills among basic science teachers in Kogi Central District of Kogi State.
3. There is no statistically significant influence of teaching experience on the acquisition of ICT skills among basic science teachers in Kogi Central District of kogi State.
4. There is no statistically significant influence of school location on the acquisition of ICT skills among basic science teachers in Kogi Central District of Kogi State

Literature Review

The importance of information and communication technology in enhancing teaching and learning in schools cannot be over-emphasized. Gbenga (2006) noted that ICT can be used to train students in skills which they need in further education and as an ongoing process throughout the rest of their lives and for their future jobs, e.g. word processing, e-mail communication, etc.; provision of access to information and communication outside the

classroom via the internet; supporting teacher development via external networks and potentially transform the teaching and learning process.

Ukwungwu and Oyedepo (2012) similarly submitted that students can acquire communication, creative, coordinating, calculating, commercial, concentration and cognitive skills through the use of information and communications technology. They opined that if these skills are developed the nation's economy, self employment and proper utilization of human and material resources would be improved. ICT has become an integral part of every school curriculum at all levels of education globally. In Nigeria, for instance the adoption of universal basic education made the use and teaching of ICT indispensible especially for teachers of basic science and technology as proper understanding of many concepts require the application of these technologies.

The integration of ICT into pedagogical practices will be compromised if the teachers do not possess adequate knowledge and skills needed to inculcate same to the learners. Kadel (2005) remarked that no matter the quantity and quality of technology available in the classroom the key to how they will be used lies with the teacher. Teachers are the major implementers of school curriculums. They plan the lessons, set out the instructional objectives, deliver the lessons and evaluate the achievement of the stated objectives by the learners. They must therefore have the competence and right attitude towards technology to be able to employ ICTs in their classroom lesson delivery.

Various experts have suggested the ICT skills that every teacher needs to master. Fort (2017) suggested eight ICT skills needed by teachers to include: word processing skills, spreadsheet skills, database management skills, electronic presentation, Internet navigation skills, E-mail management skills, networking skills and touch typing skills. Similarly, in the works of Onwumara (2020) the following ICT skills were considered as paramount for teachers of basic science: video recording and production, use of overhead projectors to present lessons, computer multimedia production, audio recording and production, internet browsing, use of e-books, email correspondence, phone-based connectivity, power point slide presentation, use of computer in teaching, social media blogging, as well as typing and printing of documents.

The foregoing works indicate that the ICT skills needed by teachers are numerous. For this work, therefore, the acquisition of the following ICT skills among Basic Science teachers will be assessed.

1. Computer basics
2. Word processing
3. Excel electronic spreadsheet
4. Power point presentation, and
5. Internet

In a study on the ICT skills possessed by technical teachers in Kano State, Mujittapha, Dauda, Nasiru and Rabiu (2021) observed that the teachers were unskillful in such ICT operations as MS-Excel, Photoshop, database, animation and Corel draw, video conferencing, instructional game, interactive white board and online teaching. Oyeronke and Fagbohun (2013) observed that secondary school teachers in Ota, Ogun State were aware that being computer and ICT literate is very important in their profession. Their study further revealed that 82.35% of the teachers had

received computer training and were willing to receive more training in computer and ICT. However, this study did not indicate the extent of acquisition of the ICT skills among those teachers. On the foreign scene Enu, Nkum, Ninsim and Diabor (2018) observed that the basic school teachers in Ghana used ICT for general and personal purposes which include chatting and communicating with friends and family members via whatsApp, facebook and WeChat. It further noted, however that the teachers hardly use ICT in their lessons because of not having ICT integration skills as well as lack of resources in the basic schools.

Mutula and Mutula (2007) observed that there is a digital divide or imbalance of access to ICTs between communities and countries. The imbalance hampers equitable access to quality education in an electronic age. However, these researchers did not indicate the direction of the digital divide or imbalances that that occurred between communities. Hence, this work will try to find out if such existed among basic science teachers in terms of school location, school ownership and gender of teachers. This research will also try to find out if teaching experience has any significant influence on the level of acquisition of ICT skills among the basic science teachers.

Methodology

This research was carried out in Kogi Central District of Kogi State, Nigeria. The district is made up of five Local Government Areas: Adavi, Ajaokuta, Ogori-magongo, Okehi and Okene. It adopted a descriptive survey research design. The population for this study comprised of all upper basic (Junior Secondary School) science teachers in private and public schools in the district. Multi-stage sampling technique was employed to select three hundred and fifty respondents that were used for this study. A researcher- designed structured questionnaire (Information and Communication Technology Skills Acquisition Questionnaire, ICTSAQ) was used to collect relevant data for this research. The ICTSAQ is comprised of two major sections (appendix 1). Section A sought for demographic information of the respondents while section B contains thirty-one items to which the respondents were to indicate their levels of acquisition of the five broad skills covered in this work on a four-point scale (very little extent, little extent, great extent and very great extent). Five research questions were posed and four hypotheses were formulated to guide this work. The research questions were answered using mean and standard deviation while the hypotheses were tested using t-test at .05 level of significance.

Results
Table 1: Distribution of Basic Science and Technology Teachers in terms of gender, teaching experience, school location and school ownership

Number of Respondents N	Gender		Teaching Experience		School Location		School Ownership	
	Male	Female	Experienced	Less Experienced	Rural	Urban	Private	Public
350	170	180	253	97	160	190	108	242

Table 1 above shows the distribution of respondents in terms of gender, teaching experience, school location and school ownership. The total number of respondents is three hundred and fifty. Of this number 170 are male while 180 are females; 253 teachers have taught basic science for at least five years while 97 have taught for less than five years; 190 were selected from the

urban school schools while 160 were selected from the schools in rural areas; 242 teachers were selected from public schools and 108 were selected from private schools.

Research Question 1: What is the extent of acquisition of ICT skills among basic science teachers in Kogi Central District of Kogi State?

To answer this question, each skill will be considered to be sufficiently (accepted) acquired if the mean, $\bar{X} \geq 2.50$ otherwise it will be rejected or considered to be insufficiently acquired.

Table 2: Overall acquisition of ICT skills among basic science teachers in Kogi Central District of Kogi State

S/N	Skills / Activity (N = 350)	VLE 1	LE 2	GE 3	VGE 4	$\bar{X}$	SD	Decision
	A. Computer Basics							
A1	Identify computer components	11	31	122	186	3.38	0.777	*Sufficient*
A2	Booting and shutting down the computer	8	13	131	198	3.48	0.680	*Sufficient*
A3	Mouse Handling (clicking, pointing, etc)	12	17	122	199	3.45	0.743	*Sufficient*
A4	Keyboarding	36	61	199	54	2.77	0.831	*Sufficient*
A5	Use of short cuts	49	67	166	68	2.72	0.933	*Sufficient*
A6	Use of minimize, maximize and exit keys	17	57	111	165	3.21	0.886	*Sufficient*
A7	Computer multimedia connectivity	63	96	111	80	2.59	1.030	*Sufficient*
	B. Word Processing							
B1	Opening the MS- Word Application	11	23	137	179	3.38	0.747	*Sufficient*
B2	Word processing	27	59	157	107	2.99	0.881	*Sufficient*
B3	Copy and Paste documents	13	31	183	123	3.19	0.745	*Sufficient*
B4	Document formatting	63	107	110	70	2.54	1.006	*Sufficient*
B5	Print preview and Printing	23	57	135	135	3.09	0.897	*Sufficient*
	C. Excel Electronic Spreadsheet							
C1	Open Excel Electronic Spreadsheet	61	97	120	72	2.58	1.003	*Sufficient*
C2	Keying in Data	66	107	97	80	2.55	1.044	*Sufficient*
C3	Toggling between worksheets	59	102	121	68	2.57	0.987	*Sufficient*
C4	Application of Arithmetic operations	89	130	81	50	2.26	0.995	*Insufficient*
C5	File Saving and Retrieval	16	70	156	108	3.02	0.833	*Sufficient*
C6	Copy, Cut and Paste	17	74	153	106	2.99	0.843	*Sufficient*
C7	Exiting Excel Application	51	97	144	58	2.59	0.931	*Sufficient*
	D. Power Point							
D1	Opening the Application	65	89	116	80	2.60	1.035	*Sufficient*
D2	Creating Slides	87	132	89	42	2.25	0.962	*Insufficient*
D3	Editing Slides	87	132	89	42	2.25	0.962	*Insufficient*
D4	Inserting Pictures/Objects in Slides	99	147	74	30	2.10	0.911	*Insufficient*
D5	Save and Retrieve Files	63	90	113	84	2.62	1.038	*Sufficient*
	E. Internet							
E1	Log in/on	37	75	148	90	2.83	0.932	*Sufficient*

E2	Opening an e-mail account	63	91	124	72	2.59	1.008	*Sufficient*
E3	Sending and accessing E-mail	56	80	126	88	2.70	1.017	*Sufficient*
E4	Web browsing/surfing	55	88	133	74	2.65	0.984	*Sufficient*
E5	Use of different search engines	53	86	127	84	2.69	0.999	*Sufficient*
E6	Downloading materials/Documents	57	87	121	85	2.67	1.018	*Sufficient*
E7	Save and Retrieve files	17	48	156	129	3.13	0.827	*Sufficient*

Decision rule: Rate each activity as sufficient if the mean $\bar{X} \geq 2.50$, otherwise insufficient

Table 2 above shows that the basic science teachers acquired ICT skills sufficiently in skills other than application of arithmetic operations in excel; creating slides, editing slides and insertion of pictures/objects in power-point applications.

Research Question 2: What is the influence of gender on the acquisition of ICT skills among basic science teachers in Kogi Central District of Kogi State?

Skills/Activity	Male (N= 170)						Female (N=180)					
A.Computer Basics	VLE	LE	GE	VGE	$\bar{X}$	SD	VLE	LE	GE	VGE	$\bar{X}$	SD
A1	3	14	72	98	3.36	0.71	8	17	50	78	3.40	0.69
A2	3	5	62	100	3.52	0.65	5	8	69	98	3.44	0.51
A3	4	10	70	86	3.40	0.71	8	7	52	113	3.50	0.59
A4	14	19	113	24	2.86	0.75	22	42	86	30	2.69	0.79
A5	20	28	90	32	2.79	0.89	29	39	76	36	2.66	0.95
A6	7	21	67	75	3.25	0.82	10	36	44	90	3.19	0.89
A7	23	32	85	30	2.72	0.91	40	64	26	50	2.48	1.26
B. Word Processing												
B1	6	12	60	92	3.40	0.77	5	11	77	87	3.42	0.54
B2	11	25	87	47	3.40	0.83	16	34	70	60	2.97	0.88
B3	5	14	98	53	3.17	0.69	8	17	85	70	3.21	0.62
B4	25	47	60	38	2.65	0.99	38	60	50	32	2.42	1.03
B5	9	24	55	82	3.24	0.89	14	33	80	53	2.96	0.79
C. Excel Electronic Spreadsheet												
C1	29	33	76	32	2.65	0.97	32	64	44	40	2.51	1.06
C2	39	50	41	40	2.48	1.09	27	57	56	40	2.61	0.99
C3	23	47	75	26	2.62	0.89	37	55	46	42	2.52	1.13
C4	33	56	49	32	2.47	1.01	56	74	32	18	2.07	0.89
C5	7	27	76	60	3.11	0.82	9	43	80	48	2.93	0.70
C6	7	28	77	58	3.09	0.82	10	46	76	48	2.90	0.74
C7	23	39	86	22	2.63	0.88	28	58	58	36	2.57	0.96
D. Power Point												
D1	30	39	66	35	2.62	1.00	35	50	50	45	2.58	1.14
D2	36	58	53	23	2.37	0.97	51	74	36	19	2.12	0.89
D3	37	58	53	22	2.35	0.96	50	74	36	20	2.14	0.91
D4	47	59	43	21	2.22	0.99	52	88	31	9	1.98	0.67
D5	31	38	58	43	2.66	1.05	32	52	55	41	2.58	1.06
E. Internet												
E1	10	20	88	52	3.07	0.81	27	55	60	38	2.61	0.97
E2	20	37	78	35	2.75	0.92	43	54	46	37	2.43	1.14
E3	26	36	59	49	2.77	1.03	30	44	67	39	2.64	1.00

E4	26	37	68	39	2.71	0.99	29	51	65	35	2.59	0.96
E5	21	36	66	47	2.82	0.98	36	52	55	37	2.52	1.07
E6	24	35	57	54	2.83	1.03	33	52	64	31	2.52	0.97
E7	7	16	96	51	3.12	0.74	10	32	60	78	3.14	0.82
Overall mean					2.86	0.34	Overall mean				2.72	0.41

Table 2 above shows that the male teachers did not acquire sufficient skills in the use of excel spreadsheets, specifically with regards to keying in data and application of arithmetic operations. They do not also possess sufficient skills in creating slides, editing slides and inserting pictures in power-point slides. The female teachers do not have sufficient skills in computer multimedia connectivity, document formatting, application of arithmetic operations in excel spreadsheet, as well as creating, editing and inserting objects in power point slides. The overall mean responses of the male teachers (N = 170) is 2.86 with a standard deviation of 0.33 while that of the female teachers (N = 180) is 2.72 with standard deviation of 0.17.

HO1: There is no statistically significant influence of gender on the acquisition of ICT skills among basic science teachers in Kogi Central District of Kogi State.

Table 3: t-test of significance of difference between the mean responses of male and female basic science teachers

Variable	Group	Mean, $\bar{X}$	Std.Dev.	N	DF	t-cal	t-crit	Decision
	Male	2.86	0.34	170				
Gender	Female	2.72	0.41	180	348	3.57	1.65	Rejected

Decision Rule: Reject HO1 if t-cal > t-crit, otherwise accept HO1.

Table 3 presents the t-test of significance of difference between the mean responses of male and female basic science teachers in Kogi Central District of Kogi State. From the table, the mean response of male teachers is 2.86 (N = 170, S.D = 0.34 while that of the female teachers is 2.72 (N = 180, S.D = 0.41). The t-calculated is greater than the t-critical. Hence, HO1 is rejected and it is concluded that there is a statistically significant difference in the mean acquisition of ICT skills by male and female basic science teachers in favour of the male teachers.

***Research Question* 3:** What is the influence of school ownership on the acquisition of ICT skills among Basic Science teachers in Kogi Central District of Kogi State?

Table 4: Responses of basic science teachers in public and private schools

Skills/Activity A. Computer Basics	Public (N = 242)						Private (N = 108)					
	VLE	LE	GE	VGE	$\bar{X}$	SD	VLE	LE	GE	VGE	$\bar{X}$	SD
	1	2	3	4			1	2	3	4		
A1	8	21	85	128	3.38	0.78	3	10	37	58	3.39	0.77
A2	6	9	91	136	3.48	0.69	2	4	40	62	3.50	0.66
A3	9	13	92	150	3.40	0.76	3	4	30	49	3.56	0.70
A4	26	45	150	21	2.69	0.78	10	16	49	33	2.97	0.91
A5	38	30	124	50	2.77	0.95	11	37	42	18	2.62	0.88
A6	13	43	83	46	3.14	0.89	4	14	28	62	3.37	0.84
A7	43	74	81	44	2.52	0.99	20	22	30	36	2.76	1.11

B. Word Processing

B1	9	17	83	133	3.41	0.78	2	6	54	46	3.33	0.67
B2	21	45	118	58	2.88	0.87	6	14	39	49	3.21	0.87
B3	9	23	137	73	3.13	0.72	4	8	46	50	3.31	0.77
B4	47	79	80	36	2.43	0.96	16	28	30	34	2.75	1.06
B5	18	43	100	81	3.01	0.90	5	14	35	54	3.28	0.86

C. Excel Electronic Spreadsheet

C1	49	73	79	41	2.46	0.99	12	24	41	31	2.84	0.97
C2	50	77	76	39	2.43	0.99	16	30	21	41	2.81	1.11
C3	43	69	90	40	2.52	0.96	16	33	31	28	2.66	1.02
C4	65	87	61	29	2.20	0.97	24	43	20	21	2.35	1.04
C5	11	53	118	60	2.94	0.80	5	17	38	48	3.19	0.87
C6	14	56	113	61	2.89	0.84	3	18	40	47	3.21	0.82
C7	37	73	106	26	2.50	0.88	14	24	38	32	2.81	1.00

D. Power Point

D1	49	70	76	47	2.50	1.02	16	19	40	33	2.83	1.02
D2	69	97	53	23	2.12	0.93	18	35	36	19	2.51	0.97
D3	69	97	53	23	2.12	0.93	18	35	36	19	2.51	0.97
D4	74	109	46	13	1.99	0.84	25	38	28	17	2.34	1.00
D5	46	68	85	43	2.52	0.99	17	22	28	41	2.86	1.09

E. Internet

E1	26	56	105	55	2.78	0.92	11	19	43	35	2.94	0.95
E2	40	66	85	51	2.61	0.99	23	25	39	21	2.53	1.04
E3	46	58	78	60	2.62	1.06	10	22	48	28	2.87	0.91
E4	45	66	83	48	2.55	1.00	10	22	50	26	2.85	0.89
E5	42	64	91	45	2.57	0.98	11	22	36	39	2.95	0.98
E6	40	58	91	53	2.65	1.00	17	29	30	32	2.71	1.06
E7	13	34	114	81	3.09	0.83	4	14	42	48	3.24	0.82
Overall					2.72	0.39					2.94	0.33

From table it is seen that the teachers in public schools do not have sufficient skills in document formatting ($\bar{X} = 2.43$), opening of excel electronic spreadsheets ($\bar{X} = 2.46$), keying in data in excel spreadsheet ($\bar{X}$ 2.43), application of arithmetic operations in excel electronic spreadsheets ($\bar{X} = 2.20$). In the use of power-point, the same group of teachers has not acquired sufficient skills in creating slides, editing slides and inserting pictures/objects in slides. On the other hand, the teachers in private schools have not acquired sufficient skills in application of arithmetic operations in excel and inserting pictures/objects in slides in power point. The overall mean for the responses of teachers in public and private schools is 2.72 and 2.94 respectively.

HO2: There is no statistically significant influence of school ownership on the acquisition of ICT skills among basic science teachers in Kogi Central District of Kogi State.

Table 5: t-test of significance of difference between the mean responses of male and female basic science teachers

Variable	Group	Mean, $\bar{X}$	Std.Dev.	N	DF	t-cal	t-crit	Decision
School	Public	2.72	0.39	242				
Ownership	Private	2.94	0.34	108	348	5.36	1.65	Rejected

Decision Rule: Reject HO2 if t-cal > t-crit, otherwise accept HO_1.

Table 5 presents a t-test of significance of difference of the mean responses of basic science teachers in public and private schools. From the table the t-calculated (5.36) is greater than the critical value (1.65). Hence, HO_2 is rejected. It is concluded, therefore that there is a significant difference in the mean acquisition of ICT skills between teachers in public schools and their counterparts in private schools in favour of the latter group.

***Research Question* 4:** What is the influence of teaching experience on the acquisition of ICT Skills among Basic Science teachers in Kogi Central District of Kogi State?

Table 6: Responses of Basic science teachers according to Teaching Experiences

Activity	Experienced (N =253)						Less Experienced (N = 97)					
A.Computer Basics	VLE 1	LE 2	GE 3	VGE 4	$\bar{X}$	SD	VLE 1	LE 2	GE 3	VGE 4	$\bar{X}$	SD
A1	8	27	71	147	3.41	0.80	3	4	51	39	3.30	0.69
A2	6	10	101	136	3.45	0.69	2	3	30	62	3.57	0.66
A3	10	13	87	143	3.43	0.77	2	4	35	56	3.50	0.68
A4	31	43	147	32	2.71	0.84	5	18	52	22	2.94	0.79
A5	38	49	138	28	2.62	0.87	11	18	28	40	3.00	1.03
A6	11	39	81	122	3.23	0.87	6	18	30	43	3.13	0.93
A7	50	73	80	50	2.51	1.02	13	23	31	30	2.80	1.03
B. Word Processing												
B1	9	18	115	111	3.29	0.75	2	5	22	68	3.61	0.69
B2	23	48	109	73	2.92	0.91	4	11	48	34	3.15	0.78
B3	9	26	134	84	2.56	0.98	4	5	49	39	3.27	0.74
B4	40	82	80	51	3.15	0.87	23	25	30	19	2.46	1.06
B5	13	40	97	103	2.74	0.98	10	17	38	32	2.95	0.96
C. Excel Electronic Spreadsheet												
C1	35	57	100	61	2.64	1.02	26	40	20	11	2.16	0.95
C2	38	81	69	65	2.59	0.95	28	26	28	15	2.31	1.05
C3	35	81	90	47	2.59	0.94	24	21	31	21	2.51	1.09
C4	62	86	70	35	2.31	0.99	27	44	11	15	2.14	0.99
C5	14	48	120	71	2.98	0.83	2	22	36	37	3.11	0.82
C6	14	48	122	69	2.97	0.82	3	26	31	37	3.05	0.88
C7	27	72	119	35	2.64	0.85	24	25	25	23	2.48	1.11
D. Power Point												
D1	47	49	88	69	2.71	1.06	18	40	28	11	2.33	0.91
D2	52	93	76	32	2.35	0.94	35	39	13	10	1.98	0.95
D3	52	93	76	32	2.35	0.94	35	39	13	10	1.98	0.95
D4	77	105	50	21	2.06	0.91	22	42	24	9	2.21	0.90
D5	39	52	87	75	2.78	1.04	24	38	26	9	2.21	0.92
E. Internet												
E1	27	56	99	71	2.84	0.95	10	19	49	19	2.79	0.87
E2	47	62	89	55	2.60	1.02	16	29	35	17	2.55	0.97
E3	47	61	81	64	2.64	1.05	9	19	45	24	2.87	0.89
E4	43	62	94	54	2.62	1.00	12	26	39	20	2.69	0.94

E5	40	64	98	51	2.63	0.98	13	22	29	33	2.85	1.04
E6	39	63	86	65	2.69	1.02	18	24	35	20	2.59	1.02
E7	11	36	106	100	3.17	0.83	6	12	50	29	3.05	0.82
Overall					2.78	0.35	Overall				2.76	0.46

Table 6 above shows the responses of Basic Science teachers with respect to their teaching experiences. The experienced teachers have acquired sufficient skills in all other activities except application of arithmetic operations in excel, creating slides, editing slides and inserting pictures or objects in power point. The less experienced teachers, on the other hand have insufficient skills in opening excel electronic spreadsheets, keying in data, application of arithmetic operations in excel as well as exiting the excel application. They also have insufficient skills in all activities relating to the power point application. However, the overall mean for the experienced teachers is 2.78 while that of the less experienced teachers is 2.76.

HO3: There is no statistically significant influence of teaching experience on the acquisition of ICT skills among basic science teachers in Kogi Central District of Kogi State.

Table 7: t-test of significance of difference between the mean responses of experienced and less experienced basic science teachers

Variable	Groups	Mean, $\bar{X}$	Std.Dev.	N	DF	t-cal	t-crit	Decision
Teaching Experience	Experienced	2.78	0.35	253				
	Less experienced	2.76	0.46	97	348	0.41	1.650	Accepted

Decision Rule: Reject HO3 if t-cal > t-crit, otherwise accept HO_3.

Table 7 shows a comparison of the means of the ICT skills acquisition among experienced and less experienced Basic Science teachers. From the table the experienced teachers have higher mean ($\bar{X}$ = 2.78, SD = 0.35) while the less experienced teachers have mean ($\bar{X}$ = 2.76, SD = 0.46). The table further shows that the t-calculated is less than the t-critical. Hence, there is no reason to reject HO3. It is therefore concluded that although the experienced teachers have a higher mean (2.78) than the less experienced teachers (2.76), the difference is not significant.

***Research Question* 5:** What is the influence of school location on the acquisition of ICT skills among Basic Science teachers in Kogi Central District of Kogi State?

Table 8: Responses of Basic science teachers according to school location

Skills/Activity	Rural (N = 160)						Urban (N= 190)					
	VLE	LE	GE	VGE	$\bar{X}$	SD	VLE	LE	GE	VGE	$\bar{X}$	SD
A.Computer Basics	1	2	3	4			1	2	3	4		
A1	8	23	53	76	3.23	0.88	3	8	69	110	3.51	0.66
A2	6	9	66	79	3.36	0.76	2	4	65	119	3.58	0.59
A3	8	10	56	86	3.38	0.81	4	7	66	113	3.52	0.67
A4	20	36	89	15	2.62	0.82	16	25	110	39	2.91	0.82

A5	27	39	76	18	2.53	0.90	22	28	90	50	2.88	0.93
A6	9	26	54	71	3.17	0.89	8	31	57	94	3.25	0.88
A7	38	38	52	32	2.48	1.06	25	58	59	48	2.68	0.99
B. Word Processing												
B1	7	13	57	83	3.35	0.81	4	10	80	96	3.41	0.69
B2	15	23	63	59	3.04	0.94	12	36	94	48	2.94	0.83
B3	7	18	87	48	3.10	0.76	6	13	96	75	3.26	0.72
B4	34	59	49	18	2.32	0.93	29	48	61	52	2.72	1.03
B5	13	23	60	64	3.09	0.93	10	34	75	71	3.09	0.87
C. Excel Electronic Spreadsheet												
C1	33	57	58	12	2.31	0.88	28	40	62	60	2.81	1.04
C2	38	57	50	15	2.26	0.92	28	50	47	65	2.78	1.07
C3	31	49	59	21	2.44	0.95	28	53	62	47	2.67	1.01
C4	39	73	31	17	2.16	0.92	50	57	50	33	2.35	1.05
C5	14	42	77	27	2.73	0.84	2	28	79	81	3.26	0.74
C6	14	42	66	38	2.80	0.90	3	32	87	68	3.16	0.75
C7	27	46	66	21	2.51	0.92	24	51	78	37	2.67	0.93
D. Power Point												
D1	31	29	57	43	2.70	1.07	34	60	59	37	2.52	1.00
D2	45	68	44	3	2.03	0.79	42	64	45	39	2.43	1.05
D3	45	68	44	3	2.03	0.79	42	64	45	39	2.43	1.05
D4	49	68	41	2	1.98	0.78	50	79	33	28	2.21	0.99
D5	31	29	58	42	2.69	1.06	32	61	55	42	2.56	1.02
E. Internet												
E1	27	48	60	25	2.52	0.95	10	27	88	65	3.09	0.83
E2	29	39	56	36	2.62	1.03	34	52	68	36	2.56	0.99
E3	28	42	59	31	2.58	0.99	28	38	67	57	2.90	1.04
E4	30	57	40	33	2.48	1.02	25	31	93	41	2.79	0.93
E5	28	48	57	27	2.52	0.97	25	38	70	57	2.84	1.00
E6	30	48	55	27	2.49	0.98	27	39	66	58	2.82	1.02
E7	11	27	80	42	2.96	0.84	6	21	76	87	3.28	0.79
Overall					2.66	0.40	Overall				2.89	0.36

Table 8 shows the responses of Basic Science teachers based on school location. From the table, the teachers in the rural areas have insufficient skills in many activities such as computer multimedia connectivity and document formatting. They do not also have sufficient skills in the use of excel electronic spreadsheets, utilization of power point. On the other hand, the teachers in the urban areas do not possess sufficient skills in the application of arithmetic operations in excel electronic spreadsheets, creating slides, editing slides, and inserting pictures/objects in slides. The overall mean for the teachers in rural schools is 2.66 (SD = 0.40) while that of the teachers in urban schools is 2.89 (SD = 0.36).

HO4: There is no statistically significant influence of school location on the acquisition of ICT skills among basic science teachers in Kogi Central District of Kogi State

Table 9: t-test of significance of difference between the mean responses of basic science teachers in rural and urban schools

Variable	Groups	Mean, $\bar{X}$	Std.Dev.	N	DF	t-cal	t-crit	Decision
School	Rural	2.66	0.40	160				
Location	Urban	2.89	0.36	190	348	3.567	1.650	Rejected

Decision Rule: Reject HO4 if t-cal > t-crit, otherwise accept HO4.

Table 9 shows that the mean response of the two groups of Basic science teachers. The teachers in rural schools has a lower overall mean, $\bar{X}$ = 2.66 (N = 160, SD = 0.40) while the teachers in the urban schools have mean, $\bar{X}$ = 2.89 (N = 190, SD = 0.36). The t-calculated (3.567) is greater than the critical/table value (1.650). Hence, HO4 is rejected. It is therefore concluded that school location has a statistically significant influence on the acquisition of ICT skills among Basic Science teachers in Kogi Central District of Kogi State in favour of urban schools.

Summary of findings
The results of this study revealed the following:

1. The Basic Science teachers in secondary schools in Kogi Central District of Kogi State possessed insufficient ICT skills with regards to the following areas: application of arithmetic operations in Microsoft Excel electronic spreadsheet, creating slides, editing slides and inserting pictures in slides in power point presentations.
2. Gender has a statistically significant influence (in favor of male teachers) on the acquisition of ICT skills among Basic Science teachers in Kogi Central District of Kogi State.
3. School ownership has a statistically significant influence on the acquisition of ICT skills (in favour of Private Schools) among Basic Science teachers in Kogi Central District of Kogi State.
4. Teaching experience has no statistically significant influence on the acquisition of ICT skills among Basic Science teachers in Kogi Central District of Kogi State.
5. School location significantly influenced the acquisition of ICT skills among Basic science teachers (in favour of urban schools) in Kogi Central District of Kogi State.

Educational Implications of the findings
The findings of this work have several implications for teaching and learning. First, the possession of insufficient skills in application of arithmetic operations by the basic science teachers tends to suggest that many of them still rely on manual computation of their students' academic records and the school heads may not have a good database for their schools.

Secondly, since many science concepts are abstract and require demonstration using animations and simulations to drive home the understanding, the teachers would not be able to use these in their classrooms for lack of sufficient knowledge of how to create, edit and insert pictures in power point presentations.

Thirdly, although there appears to be more women in our basic schools than men the disparity in acquisition of ICT skills in favour of male basic science teachers implies that there is need to give increased attention to the women with regards to acquisition of the skills.

Fourthly, since the basic teachers in private schools possessed more ICT skills than their counterparts in public schools, it tends to suggest that the proprietors of private schools pay more attention to the acquisition of ICT skills than the managers of public schools. Children in public schools may be left at a disadvantaged position if their teachers cannot sufficiently make use of modern technologies in their classrooms.

Finally, the difference in acquisition of ICT skills between the teachers in urban and rural schools (in favour of urban schools) tends to suggest that sufficient attention is not paid to rural schools. This will naturally continue to sustain the existing rural-urban divide that has been reported in many instances.

Recommendations and Conclusion

Consequent upon the findings of this study and its implications for science teaching and learning in our basic schools, the following recommendations are made:

1. The government should collaborate with proprietors of private schools, individuals and corporate organizations to organize periodical in-service training on ICT for all teachers in the basic schools especially on the skills that are predominantly deficient in the teachers.
2. The female basic science teachers should be encouraged to update their ICT knowledge and skills through conferences, seminars, symposia and workshops bearing in mind their increasing participation in science and technology education.
3. Where lacking or insufficient, the government, individuals and corporate organizations should assist in procuring ICT equipment and facilities for schools. This will encourage the teachers to continue to update their knowledge and be able to deliver their lessons more effectively in the classrooms.
4. Basic science teachers in rural areas should be encouraged to update their ICT knowledge and skills to enable them measure up with their counterparts in urban areas. The parent-teachers' associations should assist in procuring the needed ICT equipments in the rural schools as a way to encourage the teachers and students to key into the modern world of information and communications technology.

Conclusively, it is hoped that the implementation of the foregoing recommendations would place the teachers on the right tracks in terms of the acquisition of information and communication technology skills.

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Appendix 1: Information and Communication Technology Skills Acquisition Questionnaire, *ICTSAQ*

Name of School:……………………….…....…… **LGA:** ………………………….

School Location:　　Rural ☐　　　　Urban ☐

School Type:　　　　Private ☐　　　Public ☐

Sex:　　　　　　　　Male ☐　　　　Female ☐

Teaching Experience: 1 – 5years ☐　　Above 5 years ☐

Please indicate the extent to which you can perform the following tasks using a computer

S/N	ACTIVITY	Very Little Extent	Little Extent	Great Extent	Very Great Extent
	A. Computer Basics				
1	Identification of computer components				
2	Booting and shutting down the computer				
3	Mouse Handling (clicking, pointing, dragging, etc)				
4	Keyboarding				
5	Use of short cuts				
6	Use of minimize, maximize and exit keys				
7	Computer multimedia connectivity				
	B. MS-Word				
1	Opening the MS- Word programme				
2	Word processing				
3	Copy and Paste documents				
4	Document formatting				
5	Print preview and Printing				
	C. Excel Electronic Spreadsheet				
1	Opening the Excel Electronic spreadsheet				
2	Keying in Data				
3	Toggling between worksheets				
4	Application of Arithmetic operations				
5	File Saving and Retrieval				
6	Copy, Cut and Paste				
7	Exiting Excel Program				
	D. Power Point				
1	Opening the Programme				
2	Creating Slides				
3	Editing Slides				
4	Inserting Pictures/Objects in Slides				
5	Save and Retrieve Files on Powerpoint				
	E. Internet				
1	Log in/on				
2	Open an e-mail				
3	Sending and accessing E-mail				

4	Web browsing/surfing				
5	Use of search engines				
6	Downloading materials/Documents				
7	Save and Retrieve files				