8-19-2019

Utilization of ICT Facilities for Enhancing Instructional Delivery of Agricultural Science in Nigerian Secondary Schools

Francis Madueke ONU (Ph.D)
Faculty of Vocational and Technical Education, University of Nigeria, Nsukka, Department of Agricultural Education,
maduekefrancis@gmail.com

Irimiah Abeya EZHIM
Faculty of Vocational and Technical Education, University of Nigeria - Nsukka, Department of Agricultural Education,
abeya.ezhim.pg80189@unn.edu.ng

UTILIZATION OF ICT FACILITIES FOR ENHANCING INSTRUCTIONAL DELIVERY OF AGRICULTURAL SCIENCE IN NIGERIAN SECONDARY SCHOOLS

Onu, Francis Madueke (Ph.D) and *Ezhim, Irimiah Abeya

Faculty of Vocational and Technical Education, Department of Agricultural Education, University of Nigeria, Nsukka, Nigeria
Corresponding author: abeya.ezhim.pg80189@unn.edu.ng; +2347030843351

Abstract

This study examined the availability, functionality and utilization of ICT facilities for effective instructional delivery of agricultural science in Nigeria Secondary Schools. Descriptive survey research design was adopted for the study. Three research questions guided the study. The study area was North-central States of Nigeria and the population was 1706 teachers of agricultural science in secondary schools. Purposive Sampling Technique was adopted to select 853 Heads of Departments of Agriculture from the secondary schools. The researchers developed a 60-item questionnaire titled utilization of ICT facilities for instructional delivery of agricultural science (UICTFIDAS) for data collection. Three experts validated the instrument. Cronbach Alpha method was used to test the reliability and a coefficient value of 0.82 was obtained. Research question one was answered using frequencies and percentages, while mean and standard deviation were used to answer research questions 2 and 3. Findings of the study revealed that most ICT facilities were not available, and the few available were not utilized because of non-functionality in most secondary schools in the study area. The study concluded that there was need for a refocus on ICT integration in the education system, which is a common trend in the millennium. Recommendations were made among which, was that government should collaborate with stakeholders in providing adequate ICT facilities, organize seminars and workshops to empower teachers with ICT knowledge and skills. In addition, school administrators should ensure utilization and maintenance of ICT facilities available in their schools.

Key words: *availability, functionality, agricultural science, ICTs, instructional delivery, Secondary schools, utilization*

Introduction

The transfer of knowledge and skills to the growing generation is an endeavour that requires adoption of modern innovations to keep pace with the emerging trends in the 21st century education system. One of the innovations that could influence and is still capable of enhancing knowledge delivery is the integration of Information and Communication Technology (ICT) at all levels of the education system (Ziden, Ismail, Spain, & Kumutha, 2011) especially in developing nations like Nigeria. Agbulu and Ademu (2010) submitted that the use of information

and communication technology by teachers could provide significant benefits in terms of cost reduction, productivity improvement and better services. Agbulu and Ademu further state that if properly adopted, ICT could create a better learning environment that is student-centred, promote active and cooperative learning; and stimulate increased teacher-student interaction.

Integrating ICTs in the school system is apt as researchers (Ukpe, 2013; Miima, Ondigi, & Mavisi, 2018) recommended its adoption in classroom instructional delivery. Despite the widespread emphasis, direct sponsorship by the government to incorporate ICTs in school pedagogy in Nigeria has been discouraging and thus, the phenomenon was yet to receive the desired attention. However, the Federal Government of Nigeria (FGN, 2014) in her National Policy on Education has directed Schools and Colleges to embrace and integrate ICT in instructional delivery with the inclusion of Secondary Schools. ICTs comprise a combination of hardware, software and accompanying multimedia tools for information transmission (Tezci, 2010; Kubiatko, 2010). Kubiatko further notes that, ICTs if used appropriately could support students' collaboration stimulate higher cognitive skills and deepen students' comprehension. Integration of ICT in teaching and learning in secondary school is therefore necessary to improve the quality of instruction at that level of education. More so, that ICT has become a regular part of the classroom experience. If it used appropriately, evidence abounds on the positive impact ICT has on performance of the students (Ziden et al., 2011); and this extends to the wider economy.

More recently, in Nigeria, the emphasis of the government has been how to diversify her economy using agriculture. This is because the nation's over reliance on oil-centred economy has continued to dwindle and is evidenced by the sharp fall in global price of the oil from its peak of S 145.31/barrel in July 2008 to 54.20/barrel in July 2018 (Central Bank of Nigeria [CBN], 2018). Miima et al. (2018) reported that in response to the dwindling oil sector, the government placed top priority on how to diversify the economy with agriculture in central focus. The sector according to Miima et al. seems to be receiving much attention, with the aim of pulling the nation out of recession. Consequently, the future farmers who are still at the secondary school level requires encouragement to become more innovative and arguably be exposed to innovative ways of improved agriculture practices through ICT interventions. Information on how the teaching and learning of agriculture at the secondary school level could be made more interactive using ICT and which could serve as sources of information for engaging on improved agriculture

could provide a premise for encouraging and motivating the teachers of agriculture to deliver learning contents using the ICTs.

The necessity for using ICT facilities in the instructional delivery process of agricultural science in the secondary schools cannot be overemphasized. Instructional delivery refers to the act of sending information and procedures to comprehend and adhere by the receiver (Merriam, 2019). It means that instructional delivery is the process whereby the teacher (instructor) carefully selects the method and technique for handing down learning experiences to learners through appropriate mediums of communication. In the context of this study, instructional delivery entails preparing and sending learning experiences in agricultural science to learners in the secondary schools. A few years ago, precisely late 20th century and early 21st century, technological advancements changed the face of instructional delivery. ICT has come in vogue in the instructional delivery (teaching and learning) process in learning institutions including in secondary schools (United Nations Education Scientific and Cultural Organization [UNESCO], 2008).

Secondary school education according to the Federal Republic of Nigeria (FGN) in her National Policy on Education is a form of education provided for learners after primary education and which, prepares them for tertiary education (FGN, 2014). According to FGN (2014), the broad goals of secondary education are to prepare the individuals for useful living within the society. One of the ways of preparing students for useful living in Nigeria is through the study of agricultural science in the secondary schools. Agricultural science is among the vocational subjects offered in the secondary schools. The subject is however, taught both at basic levels and in senior secondary schools and encompasses teaching of principles, abilities, attitude and skills for production agriculture (FGN, 2014). The aim is to equip the learners with skills in agriculture-related occupations or trades. Since agricultural science teaches the tenets of agricultural practices and production, incorporation of ICT in its curriculum implementation process remains sacrosanct.

Agriculture is a major sector of Nigerian economy which engages over 70% of the labour force and contributes about 40 % of the gross domestic product (GDP) (Adegoke, Ibe, & Araba, 2015). It therefore remains fundamental to economic growth and in poverty reduction among the populace especially in the developing countries of the world in the 21st century (World Bank, 2008). In order that agriculture should play the expected roles in Nigeria, the subject should be

taught well especially, in the secondary schools. This is because the secondary school is the level where the future farmers are largely prepared. Because of its enormous benefits, using ICTs in the delivery of knowledge and skills in agriculture may produce better results on the learners. Thus, in order to ensure an effective delivery process of agricultural science in our globalized society, the utilization of ICT is inevitable. The reason is that globalization has evolved many changes and innovations in virtually all facets of people's life.

ICT is an innovation of the 21st century that has gained relevance and has become indispensable in both in education and the world of work. UNESCO (2008) identified ICT as including the radio, televisions and wired telephone, and the 'new' ICTs such as computers, wireless technology, satellite and the internet. ICT thus, comprise information handling tools that are used to process and store, then distribute and exchange (disseminate) information (Adedeji, 2011). Adedeji further states that ICT is a generic term that refers to technologies used for collecting, storing, editing and passing on information in various forms to various destinations. Recently too, the facilitation of communication and broadening of learners knowledge has been achieved through the development of micro computers, optimal disc, the establishment of telecommunication network, television, internet, among others (Ziden et al., 2011).

It has been noted in literature that the use of new technological devices which includes the computer, internet, CD Rom, interactive videodisc instruction, Computer Assisted Instruction, Computer Based Instruction, Computer Based Learning, e-learning, and others have been very effective in classroom interactions especially in agricultural instructional delivery (Felder & Brent, 2004). The authors added that it is useful to learners in finding solution to learning tasks in agriculture related education. It therefore means that ICTs in education may encompass utilization of rapidly evolving technologies such desktops, CD-ROM, DVDs, notebooks, digital camera and the internet among others. It also includes applications such as spreadsheets, electronic mails, digital libraries and video conferencing among others. Evidence from research abounds on the positive impact of ICTs on students' learning outcomes (Ziden et al., 2011; Onwuagboke & Singh, 2016).

In effect, ICTs has greater prospects in enhancing interrelationships in terms of space, time and cost-effectiveness in learning activities (Ugwu & Oboegbulem, 2011). According to Ugwu and Oboegbulem, the sole dependence on printed books and other material on agricultural science in libraries by teachers and learners for use are no longer much in vogue because ICTs

have evolved to facilitate the process of instructional delivery. ICTs have the potential to motivate and actively engage students; and facilitate acquisition of in-depth knowledge and work-based competencies in the learning environment. Moreover, ICTs could contribute to radical changes in school management and administration and provide opportunities for networking between the school and the wider society. Over and above all, it is capable of promoting and enhancing learners' achievements and later performances (Dambo & Umah, 2018).

Existing literatures have further established that introduction of ICTs into school setting has influenced greatly on attainment of educational goals by improving teaching and learning (Onodugo, 2016, Uzoka & Ugboaja, 2013). The importance ICT has in classroom instruction is no longer in doubt but one disagreement is, whether the facilities are available and utilized as it is still being explored in literature. In the view of Asogwa, Onu, and Egbo (2013), availability refers to a situation where it is easy to find and use a resource for a particular purpose and at a particular time; and how usable such resources are based on its designated functions. Availability of ICT facilities refers to its existence as provided by and/or to the secondary schools for use in teaching and learning (Dambo & Umah, 2018). Similarly, Ibrahim (2016) regarded availability as describing the ease of accessing and utilizing a resource to achieve a particular purpose. Therefore, availability means a condition whereby an individual have access to any valuable resource for use at a particular point when it is needed. The valuable resource in this study is the ICT facilities that teachers of agricultural science could be availed of its use to facilitate instructional delivery. ICT utilization in instructional delivery remains a function of its availability and functionality. This is because one cannot utilize what is not available.

Utilization, according to Raghu (as cited in Asogwa et al. 2013) is the primary method by which asset performance is measured and business determined. It is the transformation of a set of input into goods or services thereby creating value for the available items as needed by an individual. Accordingly, utilization of ICT connotes the presentation and distribution of instructional content via the electronic devices (e teaching) to support learning and communication (Yusuf, 2011). Utilization of ICT is the adoption of communication technologies for the purpose of achieving content delivery and for retrieving feedback from learners to attain the core objective of the content (Egomo, Enyi, & Tah, 2012; Yusuf, 2011).

In the context of this study, utilization explains how often or regularly the teachers of agricultural science use available ICT facilities to facilitate instructional delivery of the subject content to the students. One thing is for the ICT facilities to be available; another thing is its functionality, and then the teachers' efficiency in using it to enhance the teaching and learning of agricultural science subject matter. To enhance means to improve in value, quality and desirability (Merriam, 2019). An enhanced instructional delivery therefore, refers improved techniques of preparing and presenting learning experiences by the teachers and utilizing resources that are in tune with global best practices.

The evolution of computers and other information and communication resources could facilitate delivery of instructions in agricultural science (Agbulu & Ademu, 2010; Uzoka & Ugboaja, 2013). Essentiality, literature (Yusuf, 2011) stipulates that the evolution of ICTs has helped in enhancing teachers' abilities in the management of learning resources, experiences and information through several ICT media. Thus, teachers could prepare and upload lecture notes into the internet or into storage devices as CDs, flash discs, memory cards and students could access either as individuals, or as groups. According to Yusuf, the use of above ICT facilities minimizes space, time and other structural requirements such as large classroom. It has been contended that using innovative devices such as computers, internet, CD-Rom, interactive video instructions, computer assisted instruction, computer based instruction has been very helpful effective delivery of instructions in agricultural science (Felder & Brent, 2004; Samuel & Bakar, 2006). The authors believed that ICTs are also useful to learners in finding solutions to learning tasks in the educational process especially, in this era of 21st century globalization. Teachers of the 21st century globalized world thus, need to be well informed and motivated to take advantage of the inherent opportunities in the use of ICT in classroom instruction especially as it concerns agricultural science teaching and learning. Unfortunately, some authors (Agbulu & Ademu, 2010; Egomo et al., 2012) have expressed worry over low availability (inadequacy) of ICT tools for effective instructional delivery is relatively low in most educational institutions.

A focused group discussion with some teachers of agricultural science by the researchers during the study revealed that they hardly made use of computer sets and other ICT facilities in delivery of instruction due to either non-availability or non-functionality of the available ICT facilities and poor knowledge on the use of such ICT tools. The tendency is that the number provided, compared to the population of teachers and learners seems very inadequate. It is

possible to believe that the teachers may not be adequately empowered with the skills for using the ICTs in instructional delivery process. Adedeji (2011) reported that most schools would rather utilize available ICTs for administrative purposes as against the primary objective of facilitating teaching and learning. Many factors could challenge the utilization of ICT in the learning environment. For instance, Samuel and Bakar (2006) decried insufficient computer laboratories in schools, erratic power supply, and absence of internet, limited computer facilities for teachers, no central databases and no learning management systems available for the purposes of electronic learning. The authors further pointed out insufficient capacity building and training for the teachers who ought to have been provided with sufficient training on how to use such facilities when provided. In like manner, it was documented poor ICT infrastructure is eminent in that many developing and that the same (ICT) was yet to be accorded the desired importance (Harle as cited in Petronilla, David & Lyn, 2016). This may not be exceptional in educational institutions and especially in secondary school level.

Conversely, Kiptalam and Rodrigues (2011) pointed out that the use of ICT and related technologies is still at an early stage of development and implementation. It is still inconclusive and an unending task for researchers on the issue of ICT integration in instructional delivery most especially in the secondary schools system. Meanwhile, since no adequate facts exist from research to resolve the issue of availability and utilization of ICT in classroom instructional delivery of agricultural science, this study contributes to the existing literature through its findings. The main purpose of the study therefore, was to find out extent of utilization of ICT facilities for effective instructional delivery of agricultural science in Secondary Schools. Specifically the study sought and determined the;

1. availability of ICT facilities for instructional delivery of agricultural science in secondary schools.
2. extent of utilization of available ICTs in instructional delivery of agriculture science secondary school in Secondary schools.
3. challenges encountered on the utilization of ICTs in the instructional delivery of agricultural science content in Secondary schools.

Research Questions
1. What are the ICTs facilities are available for instructional delivery of agricultural science in Nigeria secondary schools?

2. What is the extent of utilization of the available ICT facilities for instructional delivery agricultural science content in Nigerian secondary schools?

3. What are the challenges faced in the utilization of ICTs for instructional delivery of agricultural science content in Nigerian secondary schools?

Research Methods

The study adopted descriptive survey research design. Descriptive survey design is one in which a group of people or item are studied by collecting and analyzing data from only a few representative members of the group under study (Nworgu, 2006). The design was appropriate because information/opinions were gathered from agricultural science teachers in senior secondary schools. The study was carried out covering secondary schools in North-central states of Nigeria. There are 853 Secondary Schools in the six states of the North-central zone of Nigeria. The governments at these states have been pioneering the use of ICT in secondary school level where millions of naira is claimed to have been spent in procuring ICT facilities for use in the teaching and learning in the schools. The population of the study was 1706 agricultural science teachers from the 853 Government Secondary Schools in the North-Central states of Nigeria (Federal Ministry of Education, 2017). Purposive sampling technique was used to sample 853 Heads of Departments of Agriculture in the Senior Secondary Schools in the study area. A 60-items questionnaire titled "Utilization of ICT for Instructional Delivery of Agricultural Science Questionnaire (UICTIDAS) was developed by the researchers and used for data collection. The questionnaire was divided into three sections-A, B & C. While section A elicited responses on the availability of ICT facilities, section B elicited responses on utilization of those facilities for instructional delivery of agricultural science in the secondary schools in the study area. Then Section C elicited responses on the challenges to the availability and utilization of ICTs facilities for effective instructional delivery of Agricultural science in the study area.

Items on availability-Section (A), was structured based on two-point scale of available (A) and Not available (NA). Sections B was structured on a 4 points rating scale of Highly Utilized=4, Moderately Utilized=3, Slightly Utilized=2; and Not Utilized=1 for assessing extent of utilization; and Strongly Agree (SD), Agree (A), Disagree (DA) Strongly Disagree (SD) for assessing challenges in the availability and utilization of the ICT facilities in the schools respectively. Three experts validated the research instrument. Two of them were from Faculty of vocational and technical education, University of Nigeria, Nsukka, and One (1) from Department

of Science and Environmental Education, University of Abuja, Nigeria. The observations made by the experts were effected and clean copies were produced and distributed for respondents to supply data.

The instrument was trial tested on 20 teachers in Government Secondary Schools in Port-Harcot, Rivers State, South-South, Nigeria. Cronbach Alpha reliability method was used to determine the internal consistency of the items of the instrument and a reliability coefficient of 0.82 was obtained. This shows that the instrument was reliable. The researchers recruited and trained twelve research assistants two per a state, on how to administer and retrieve the questionnaire. The questionnaire was administered on the agricultural science head teachers through personal contact and distribution.

Eight hundred and fifty three (853) copies of the questionnaire were distributed to the respondents. All the copies of the questionnaire were returned indicating 100% return. Hence, data analysis was based on 853 copies of the questionnaire. Data was analyzed using descriptive statistical tools including frequency tables, percentages, means and standard deviation. In order to establish the degree of agreement or disagreement in each of the item statements, values were used to establish cut off points, which were used as basis for judgment (decision). For Section A, 50% benchmark was used to judge availability or non-availability of the items. Any item with response of 50% and above was regarded as available (Av), while any item which response figure is less or below 50% was regarded as not available (N/Av).

In the case of sections B, real limit of numbers was used to determine the extent of utilization of ICT facilities. Thus, when the mean falls between 4.00 and 3.50, it is described as Highly utilized; when the mean falls between 3.49 and 2.50, it is described as moderately utilized; and when the mean falls between 2.49 and 1.50, it is described as slightly utilized. Nevertheless, when the mean falls between 1.49 and 1.00, it is described as Not utilized. Similarly, for Section C, any item with mean score of 2.50 and above was considered agreed (i.e. there is challenge) while an item below 2.50 was regarded as disagreed (i.e. no challenge). In addition, a checklist was developed to find out which of the ICT facilities were available or not. Physical checking of the facilities was done to check (tick) if the facilities were available or not and whether the available ones were functional.

Another instrument called Focus Group Discussion (FGD) guide was developed by the researchers to guide the study the researchers in taking decision on the availability, utilization

and functionality of the available ICT facilities in the secondary schools. The FGD was developed to find out from the group of ten (10) students in the 12 schools; two schools from each state were used for the exercise. The aim was to find out how the ICT facilities are available in their schools for instructional delivery in agricultural science; how often the teachers utilized the ICT in delivering their instructions in agricultural science and the challenges that might be responsible for the non-availability of the ICT facilities in the schools. The findings of the FGD were to corroborate with the information from the questionnaire and the checklist.

Results

The results of the study were obtained from the data analyzed and shown in tables 1-3

Research Question 1: What are the available ICT facilities for instructional delivery of agricultural science in secondary schools?

Table 1a: Check list of the availability of ICT facilities for instructional delivery of agricultural science (No of schools=853).

S/N	ICT facility	Recommended/ required facility in schools	Av	% age	N/Av	% age	Remark
1	Computer laboratories	853	105	12.31	748	87.69	N/Av
2	Television set	853	85	9.96	768	90.04	N/Av
3	Internet services	853	2	0.23	851	99.77	N/Av
4	Emailing platform	853	2	0.23	851	99.77	N/Av
5	Overhead projector	2559 (3 per sch)	215	8.40	2344	91.60	N/Av
6	Laptops	2559	3150	12.31	22440	87.69	N/Av
7	Desktop	25590 (30 per sch)	150	0.59	25440	99.41	N/Av
8	Webcam	853	101	11.84	752	88.16	N/Av
9	ipads	25590 (30 per sch)	3150	12.31	22440	87.69	N/Av
10	Camera	8530 (10 per sch)	11	0.13	8519	99.87	N/Av
11	Wireless technology	853	2	0.23	851	99.77	N/Av
12	Interactive board	8530 (10 per sch)	3	0.04	8527	99.99	N/Av
13	Printer	853	2	0.23	851	99.77	N/Av
14	Scanner	853	2	0.23	851	99.77	N/Av
15	Video conferencing media	4265 (5 per sch)	2	0.05	4263	99.95	N/Av
16	Public address system	24	80	9.38	773	90.62	N/Av

Av=available; %age=percentage; N/A=Not available

Table 1b: Frequency and percentage ratings of teachers on the availability of ICT facilities for instructional delivery of agricultural science   N=853

S/N	ICT facility	Av	% age	N/Av	% age	Remark
1	Computer laboratories	193	22.63	660	77.37	N/Av
2	Television set	139	16.32	714	83.68	N/Av
3	Internet services	49	5.79	804	94.21	N/Av
4	Emailing platform	63	7.37	790	92.63	N/Av
5	Overhead projector	81	9.47	772	90.53	N/Av
6	Laptops	90	10.53	763	89.47	N/Av

7	Desktop	404	47.37	440	52.63	N/Av
8	Webcam	137	15.79	718	84.21	N/Av
9	ipads	76	8.95	777	91.05	N/Av
10	Camera	40	4.74	813	95.26	N/Av
11	Wireless technology	45	5.27	808	94.73	N/Av
12	Interactive board	22	2.63	831	97.37	N/Av
13	Printer	281	33.16	570	66.84	N/Av
14	Scanner	54	6.32	799	93.68	N/Av
15	Video conferencing media	45	5.27	808	94.73	N/Av
16	Public address system	108	12.63	745	87.37	N/Av

Av=available; %age=percentage; N/Av=Not available

The responses above showed that the ICT facilities were not available for use in teaching agricultural science in secondary schools in the study area.

Table 1a and 1b above showed that the ICT facilities were grossly inadequate for the teaching and learning of agricultural science in secondary schools. The findings from the FGD supported the findings that the do schools do not have ICT facilities for the teaching and learning of agricultural science in the schools. Money spent in procuring the purported facilities by the government was not accounted for as most of the schools decry lack of such facilities in the schools for instructional delivery.

Research question 2: What is the extent of utilization of ICT facilities by teachers in instructional delivery of agricultural science in Secondary Schools?

Table 2: **Mean ratings and SD of responses of teachers on the extent of utilization of ICT facilities in instructional delivery of agricultural science**   **N=853**

S/N	ICT Facility	X	SD	Remark
1	Computer (laboratories)	2.47	0.37	SU
2	Television set	1.68	0.87	NU
3	Internet services	1.46	0.74	NU
4	Emailing platform	1.96	0.40	SU
5	Overhead projector	1.46	0.62	NU
6	Laptops	2.05	0.58	SU
7	Desktop	2.02	0.48	SU
8	Web cam	1.88	0.51	SU
9	Ipads	1.71	0.48	SU
10	Camera	1.79	0.85	SU
11	Wireless technology	2.08	0.94	SU
12	Interactive board	1.51	0.78	SU
13	Printer	2.36.	0.95	SU
14	Scanner	2.42	0.92	SU
15	Video conferencing media	1.34	0.73	NU
16	Public address system	2.06	0.87	SU

X=Mean of Responses; SD=Standard Deviation; SU=Slightly Utilized; NU=Not Utilized,

Table 2 revealed mean scores of between lowest 1.34 and 2.47. The mean for the items showed that the utilization of the ICT facilities in the schools were either slightly utilized or not utilized at all in the schools. The SD also ranged between the lowest 0.37 and highest 0.95. That goes to show that the responses of the respondents were close to each other and that the heads of department were also closer to one another in their opinions. The means as presented in the table indicates that the level of utilization of ICT in their instructional delivery was very low where the facilities were available.

Research Question 3: What are the challenges of utilization of ICT facilities in instructional delivery of agricultural science?

Table 3: Mean ratings and SD of the responses of the teachers on the challenges of effective utilization of ICT facilities in instructional delivery of agricultural science N=853

S/N	Item statement	X	SD	Remark
1	There is insufficient ICT facilities	4.00	0.31	Agree
2	Most of the available ICT facilities are nonfunctional	2.79	0.90	Agree
3	Computers are insufficient for use	2.90	0.45	Agree
4	Poor supervision by the teachers and HODs	3.61	1.02	Agree
5	There is no steady power supply to operate	3.11	0.67	Agree
6	Low proficiency and competency by the agriculture teacher	3.02	0.87	Agree
7	Students' population is large/over population of students to use available facilities	3.00	1.00	Agree
8	No adequate provision in time table for practical use of ICT facilities	3.77	0.88	Agree
9	Resistance to change by teachers	3.68	0.72	Agree
10	Poor policy on implementation of ICT utilization	2.55	0.41	Agree
11	Inadequate e-learning facilities	3.21	1.07	Agree
12	Poor internet connectivity	3.01	0.92	Agree

X=mean; SD=standard deviation

Table 3 revealed mean scores of between 2.55 and 4.00. The SD also ranged between the lowest figure of 0.31 and highest figure of 1.07. That goes to show that the responses of the respondents were close to each other and the Head teachers were also closer to one another in their opinions. The Means as presented in the table were all above the benchmark of 2.50 which indicates that the respondents totally agreed that the there are great challenges which hinders their effective utilization of ICT.

Discussion

In view of the research question one, the responses showed that agricultural science teachers' responses indicated that ICT facilities were not available in the secondary schools in the study area. In variably, it implies that there were no available ICT facilities in the various secondary schools. This finding agrees with Eriba and Adejoh (2004) who reported that

unavailability of computers has been one of the most important obstacles to technology adoption and integration in Nigeria. In addition, the findings concurred with those of Samuel and Bakar (2006) and a more recent finding by Dambo and Umah (2018) who revealed that there were insufficient ICT facilities in secondary schools for teaching and learning. The FGD also supports the findings that the facilities were not utilized and those available were not functional. Therefore, utilization was not encouraging. To this end, it was concluded that the laudable benefits of ICT facilities would not be realized in our Secondary Schools if they are not available and effectively utilized in teaching and learning.

The analysis in Table 2 showed that ICT facilities were less utilized in the instructional delivery of agricultural science in the secondary schools in the study area. The finding is in tandem with that of Mangal (2010) who reported that apart from the non-availability of ICT facilities in secondary schools, inadequate computers, breakdown and non-functionality; and higher cost of procurement, phobia towards use of the facilities by both teachers and administrators of schools were prevalent. Others prevailing factors were obsolesce of the few existing computers hinders the utilization of the ICT facilities during classroom instruction.. This is in line with Ngwu (2014) who reported that most ICT facilities are not adequately available in schools. The finding is also in line with that of Egomo et al. (2016); and Sibanda & Ramrathan (2017) that availability of ICT in many organizations is relatively low. A study by Miima et al. (2013) in Kakamega County found out that Kiswahili language teachers (99%) do not use ICTs in teaching and learning process. In another study, Tasir, Abour, Halim, & Harun (2012) revealed that Malaysian teachers are able to use most ICT tools for classroom instruction, which also has direct relationship with their competency level. Although the present study did not carter for the skill-competency of the agriculture teacher in the study area, the low level of utilization of ICT in the study area could be explained by the low level of availability as revealed by the first objective of the study.

Findings in Table 3 showed that teachers of Agricultural Science in North Central States of Nigeria are faced with many challenges in utilizing Information and communication technology. This finding does not deviate from earlier researches. For instance, Onodugo (2016) identified several challenges of integrating ICT in learning environment to include inadequate or near absence of information and communication infrastructure, poor telecommunication facilities, lack of coherent plan for adopting ICTs, problems of connectivity, erratic electricity

supply, thus necessitating extra cost for standby generators among others. The finding form the FGD showed that challenge of appropriate pedagogy by the teacher, challenge of evaluation of learning outcomes through information technology and the phobia on the part of the teachers prevent the use of ICTs by the teachers. The study found that the cost of acquisition and maintenance of ICT equipment and accessories posed serious challenges both to the school management and to Agricultural Science Teachers. This is in accordance with earlier findings of a study by Andural and Ikyumen (2006) and Tezci (2010). Andural and Ikyumen concluded that the situation in Nigeria could be explained by the traditionally resource poor status of the schools considering the current low levels of funding for education. This condition poses set back in the effort to integrate ICT in the Nigerian education system especially at the secondary school level.

Conclusion

From the findings of the study, it was concluded that ICT facilities such as computer laboratories, internet services, e-mail facilities, overhead projectors, laptop/desktop computers, wireless technologies, interactive boards and public address systems among others were not adequately available for use by teachers including teachers of agricultural science. The facilities were therefore, not readily utilized by the teachers of agricultural science to aid the teachers in the delivery of instructions in the study area. However, this was not exclusively due to total absence of those facilities. The teacher factors also had influence on the phenomenon. This ranged from teachers' phobia for use of the facilities and low technical expertise and skills for manipulating the few available facilities. Thus, it could be summarized that ICT facilities, are both generally inadequate and not adequately utilized for instructional delivery of agricultural science in Nigerian Secondary Schools.

Recommendations

Based on findings of the study, the following recommendations were made:

1. Government should purchase and supply adequate ICT facilities to aid effective instructional delivery and tools to cover subjects like agricultural science in the secondary schools.
2. School administrators should liaise with philanthropic individuals and non-governmental organizations for the procurement and maintenance of ICT facilities.

3. Seminars and training workshops to empower the teachers with skills needed for using the ICT facilities for instructional delivery in the learning process by the school management and relevant government authorities.

4. Individual students should be encouraged to purchase some ICT facilities that are within their reach like Laptops for use during classroom instructions and at home.

References

Adedeji, T. (2011). Availability and use of ICT in South-Western Nigerian Colleges of Education. *International Multidisciplinary Journal, 5*(5), 315-331

Adegoke, J., Ibe, C., & Araba, A. (2015 Eds.). A report by the advisory committee on agriculture resilience in Nigeria. Federal Ministry of Agriculture and Rural Development. https://fmard.gov.ng/wp-content/uploads/2018/04/NARF-Main-document.pdf

Agbulu, O. N. & Ademu, A. (2010). Assessment of agricultural science teachers' knowledge and utilization of information and communication technology in Nigerian secondary schools. *Journal of Emerging Trends in Educational Research and Policy Studies, 1*(1), 1-9

Andural, S. I, & Ikyumen, M. I. (2006). The use of information technology in the teaching/ learning of vocational technical education in Nigeria. *Benue State University Journal of Education, 7*(1), *53-59*

Central Bank of Nigeria. (2018). Statistical bulletin. Abuja, Nigeria: Federal Government Press.

Dambo, B. I. & Umah, M. H. (2018). Accessibility and utilization of information and communication technology facilities for learning business studies in public junior secondary schools Port Harcourt metropolis. *International Journal of Innovative Social & Science Education Research, 6*(4), 83-90

Egomo, J. E., Enyi, B. I. & Tah, M. M. (2012). Availability and Utilization of ICT Tools for effective instructional delivery in tertiary institutions in cross Rivers State, Nigeria. *Global Journal of Educational Research and Review,* 1(8), 190-195

Eriba, J. O. & Adejoh, M. T. (2004). Information and Communication Technology in Science Education Programme in the Universities in Benue State. *Benue State University Journal of Education, 5*, 58-64

Federal Ministry of Education (2017). Record of Secondary Schools Student Enrolment. Abuja. FME. http://education.gov.ng/basic-secondary-education/

Federal Republic of Nigeria (2014). *National policy on education: Major reforms & innovations recently introduced into the Nigerian education system.* Nigeria. Federal Ministry of Education Printing press

Felder, R. & Bent, R. (2004). Navigating the bumpy road to student-centered instruction. *Communication Technology.* Ibadan: Heinemann Educational Books

Ibrahim, A. (2016). *School factors influencing adoption of information communication technology in teaching and learning in secondary schools in Westlands, Kenya.* (Master's thesis). University of Nairobi, Kenya

Kiptalam, G. K. & Rodrigues,A. J. (2011). Accessibility and utilization of ICTs among secondary school teachers in Kenya. *Computers and Education,* 246-263

Kubiatko, M. (2010). Czech university students' attitudes towards ICT used in science education. *Journal of Technology & Information Education, 2*(3), 20-25

Mangal, S.K. (2010). *Information and Communication and Educational Technology*. Ludhiana. Tandon Publications.

Merriam, W. (2019). Definition of instructional delivery. Accessed on 27 April 2019 from http://www.merriam-webster.com/dictionary/ instructional delivery

Miima, F., Ondigi, S. & Mavisi, R. (2013). Teachers' perception about integration of ict in teaching and learning of Kiswahili language in secondary schools in Kenya. *International Journal of Arts & Commerce, 2* (3), 27-32

Ngwu, O. G. (2014). *Assessment of availability and utilization of ICT resources in teaching in F.C.E Eha-Amufu, Enugu.* Nigeria. *ICELW*

Nworgu, B. G. (2006). *Educational research basic issues and methodology*. Nsukka: University trust publishers

Onodugo, I. C. (2016). Impact of information and communication technology (ICT) on teaching and learning in Nigerian tertiary institutions. *International Journal of Multidisciplinary Education and Research, 1*(1), 1-6

Onwuagboke, B. B. C. & Singh, T. K. R. (2016). Faculty attitude and use of ICT in instructional delivery in tertiary institutions in a developing nation. *International Journal of Research studies in Educational Technology, 5*(1), 282-288

Petronilla, M., David, H., & Lyn, P. (2016). Factors contributing to adoption and use of information and communication technologies within research collaborations in Kenya, Information Technology for Development, 22:sup1, 84-100,DOI: 10.1080/02681102.2015.1121856

Samuel, R., S. & Bakar, Z., A. (2006). The utilization and integration of ICT trends in promoting English language teaching and learning: Reflections from English option teachers in Kuala Langat District, Malaysia. *International Journal of Education and Development Using Information and Communication Technology, 2* (2), 4-14.

Sibanda, M., & Ramrathan, D. (2017). Influence of information technology on organization strategy. *Foundations of Management, 9,* 181-202. DOI: 10.1515/fman-2017-0015191 Statistics Unit, Canada.

Tasir, Z., Abour, K. M. E. A., Halim, N. D. A., & Harun, J. (2012). Relationship between teachers' ICT competency, confidence level, and satisfaction toward ICT training programmes: A case study among postgraduate students. *The Turkish Online Journal of Educational Technology, 11*(1), 138 – 144

Tezci, E. (2010). Attitudes and knowledge level of teachers in ICT use: The case of Turkish teachers. *International Journal of Human Sciences* [Online], *7*, 2. Available: http://www.insanbilimleri.com/en

Ugwu, R. N. & Oboegbulem, A. I. (2011). Information and communication technology (ICT) capacity building for staff personnel in post primary schools for effective school administration. *International Journal for Educational Research, 11*(1), *190-201*

Ukpe, E. (2013). ICT in education: Catalyst for economic growth in Nigeria. *International Journal of Education & Research, 1*(10), 1-8

UNESCO (2008). ICT competency standards for teachers: Implementation guidelines version 1.0: United Kingdom. UNESCO publication.

Uzoka, R. N. & Ugboaja, C. I. (2013). Perceptions of agricultural science teachers on the use of information and communication technology (ict) in teaching and learning. *Journal of Qualitative Education, 9*(3), 1-9

World Bank (2008). Environmental assessment source book. Environment Department, Washington, D. C.: The World Bank.

Yusuf, M. O. 2011). Student teachers' competence and attitudes towards Information and Communication Technology: a case study in a Nigerian university. Contemporary Educational Technology, 2 (1), 18-36.

Ziden, A. A., Ismail, I., Spain, R. & Kumutha, K. (2011). The effect of ICT use in teaching and learning on students' achievement in science subjects in a primary school in Malaysia. *Malaysian Journal of Distance Education, 13*(2), 19-32